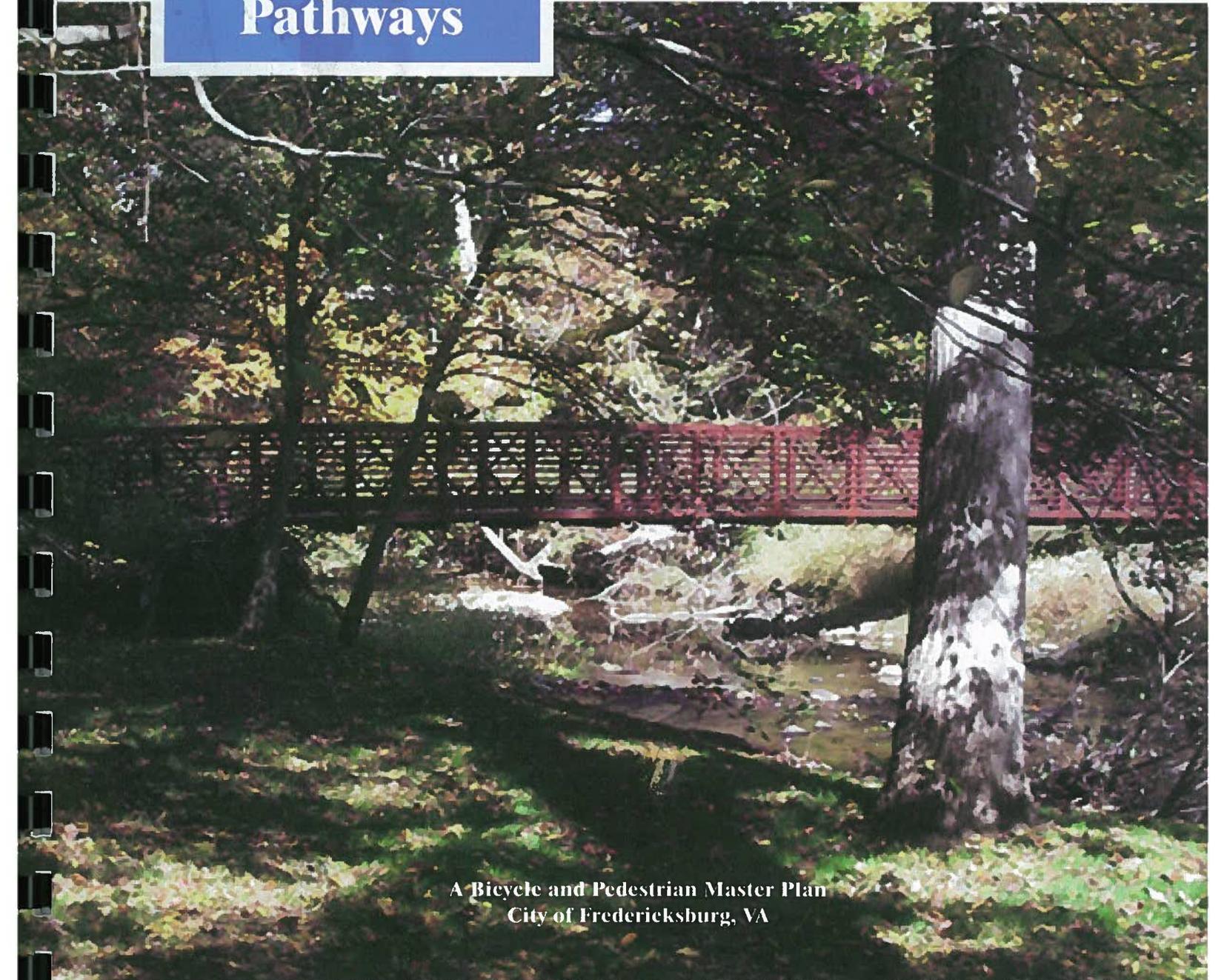




**Fredericksburg
Pathways**

January 2006



**A Bicycle and Pedestrian Master Plan
City of Fredericksburg, VA**



**Prepared By:
The Fredericksburg Pathways Committee
and Fredericksburg Office of Planning & Community Development**

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I. INTRODUCTION

Bicycling and walking are fundamental means of travel and an efficient transportation network will provide for them. Integrated bicycle and pedestrian accommodations ensure safe and convenient access to the community, connectivity with the overall transportation network, and independent mobility regardless of age, physical constraints, or income.

When people define the qualities that make Fredericksburg an attractive place to live and do business, they often resort to phrases like quality of life, small town atmosphere, and sense of place. These concepts are pleasant, but how are they really achieved? Part of the answer is found in a community's physical attributes. The historic sections of Fredericksburg include an interconnected street grid, sidewalks, mixed land uses, and safe street crossings. All of these factors provide enormous opportunities for social encounter and exchange in public places, as citizens attend to their daily activities.

Opportunities for unplanned social interaction became diminished, however, when public spaces are given over entirely to automobiles. The full impact of this trend is evident where roads have been built exclusively for vehicles. The Jefferson Davis Highway, the Blue and Gray Parkway, and State Route 3 were designed to move vehicles only. No provision was made for foot traffic even when these corridors subsequently experienced both commercial and residential development. Rather than providing pedestrian connections, road engineers want people on foot removed from their systems. Their Highway Capacity Manual even describes pedestrians as "flow interruptions." Traffic engineers, after all, use speed as a factor to show congestion relief on their computer models.

The deliberate design for speed reaches beyond primary travel corridors into once quiet neighborhoods. Roads that connect major arterials can become heavily used throughways in their own right. Twin Lakes Drive, Stafford Avenue, and Prince Edward Street are examples of neighborhood streets that now serve as preferred automobile routes. There are numerous others.

Streets overwhelmed by vehicles become dangerous to everything else. In the United States, pedestrians account for 14 percent of all motor vehicle related deaths (approximately 6,000 per year between 1986 and 1995). For every pedestrian killed, 20 others are injured. Senior citizens comprise 13 percent of the population, but account for 23 percent of pedestrian fatalities. An astonishing 55 percent of pedestrian deaths take place on neighborhood streets. If Fredericksburg is going to regain, or recapture, its quality of life, its small town atmosphere, and its sense of place, it needs to reconnect to itself with safe routes for walking and bicycling.

PURPOSE AND SCOPE

This plan provides the policy frame work through which the City of Fredericksburg will accommodate bicyclists and pedestrians in an integrated transportation system. The intent is to improve the environment in which bicyclists and pedestrians travel, to achieve a safe, effective, and balanced multimodal transportation system. Examples of accommodations include the provision of sidewalks, bicycle lanes and signs, as well as the installation of traffic calming devices that enhance neighborhood safety.

BACKGROUND

The City of Fredericksburg has formally supported trails development since adopting its 1981 Comprehensive Plan. This step came after years of work and advocacy by a group of citizens dedicated to establishing a wide-ranging trails network. The Canal Park Trail was subsequently established in 1983, but further efforts languished as available staff time was directed to working out an annexation agreement with Spotsylvania County.

In 1989, with annexation completed and a revised Comprehensive Plan in place, the Fredericksburg City Council again endorsed the concept of a city-wide pathway system. The Department of Parks and Recreation was authorized to expand upon the Canal Park Trail and begin researching, planning, designing and developing a multi-purpose trail network. The Civil War Sites Trail Plan (1991) gave further impetus to this effort, by highlighting some of Fredericksburg's historic resources that could be protected and included as cultural attractions within a larger trail system.

Trails planning also moved beyond a recreational focus, because a trail system can also facilitate safe non-motorized travel within the community. Research shows that automobile travel typically excludes fully 25 percent of the population, which is the percentage that is either too young or too old to drive or who do not own a vehicle. Buses and railways are necessary components of a transportation system, but clearly so are trails and sidewalks.

To address this need (and to assist in obtaining funding) the City Council adopted a comprehensive trails plan, called Fredericksburg Pathways, in 1996. This document conformed to Virginia Department of Transportation guidelines (A Virginia Guide for Bicycle Facility Planning – 1994).

Since 1993, the Fredericksburg City Council has also incorporated its trails plans into relevant Comprehensive Plans. In this manner, the community's vision for a trails network has been included in all of the City's long-range planning documents and additional trails have subsequently been constructed in conjunction with new road development. Cowan Boulevard and Mary Washington and Sam Perry Boulevards, for example, have sidewalks or bicycle trails within their respective rights-of-way.

In January 2005, the Fredericksburg City Council authorized the Recreation Commission's Pathways Committee to review the 1996 plan and recommend revisions.

The City Council and the Pathways Committee both agreed that a comprehensive review was in order. To formalize its vision, City Council highlighted the concept of connectivity in its adopted goals and initiatives (8 February 2005). This specific goal is to ensure that residents and visitors can readily travel between different sections of the City on streets, pathways and sidewalks.

This revised 2006 trails plan ensures that proposed trail development addresses changing physical conditions yet continues to reflect the overall vision of a cohesive trails system throughout Fredericksburg.

BENEFITS OF PEDESTRIAN AND BICYCLE FACILITIES

A variety of benefits accrue from pedestrian and bicycle facilities – some of them quite apparent, but others more difficult to quantify. Available facilities and the number of people who use them, for instance, can be measured or estimated with reasonable accuracy. The corresponding positive impact on traffic congestion and parking demand can be assumed, but may not be readily determined within the context of a computerized regional traffic model. Computerized traffic modeling aside, pedestrian/bicycle facilities are good for the overall health and fitness of the users, are good for the environment, and will enhance the overall transportation network, especially for persons who do not, or cannot, drive a motor vehicle.

Health and Physical Fitness Benefits

Contemporary lifestyles are not as physically active as they have been in the past and the Center for Disease Control and Prevention emphasizes the connection between health problems and physical activity. As a consequence, many individuals seek to deliberately overcome this deficiency through recreational activity. Walking or cycling are very individualized activities and a person may pursue them as vigorously as he or she desires. Even moderate levels of walking or cycling provide excellent health benefits. As noted before, the number of users can be measured, but the overall improved health of the community, which can be assumed to translate into reduced health care costs, is not so readily shown.

A related aspect of any health benefit is an assumption of user safety. Pedestrian and bicycle facilities need to be designed to minimize conflicts and reduce potential hazards. In addition to addressing safety through facility design, though, research shows that more users will improve overall safety. As bicycle trail use increases, the incidence of accidents actually decreases, as motorists and cyclists learn to accommodate one another. More users reinforce safety as they become more fully accepted as a component of the overall transportation system.

Environmental Benefits

The Fredericksburg region must conform to air quality standards specified in the Clean Air Act when it plans its regional transportation network. In January 2006, the

Environmental Protection Agency (EPA) redesignated the Fredericksburg area as meeting attainment requirements for the 8-hour ozone national ambient air quality standard (it had been designated as non-attainment since June 2004). This redesignation, however, stipulates that regional transportation include a maintenance plan for the continued improvement of air quality over the next decade. In this context, modes of travel that do not result in any vehicle emissions are a welcome development.

While urban dwellers continue to walk extensively, suburban dwellers lack similar opportunities and routinely drive to their various destinations. Newer developments in Fredericksburg are distinctly suburban in nature, requiring an automobile for even brief errands. A well-planned pedestrian/bicycle network has the potential to replace some of the short local trips that must currently be made in an automobile. Short trips are the least fuel efficient, so a non-polluting travel option should be very welcome in a region that must strive to meet EPA air quality standards.

Transportation Benefits

Lewis Mumford, the great urban philosopher, wrote: “A good transportation system minimizes unnecessary transportation; and in any event, it offers change of speed and mode to fit a diversity of human purposes.” Pedestrian and bicycle facilities can reduce automobile trips (thus minimizing unnecessary transportation), provide links to other modes (such as mass transit), and make the overall community more accessible to its citizens (many of whom do not drive automobiles). A trails network can also reduce congestion, as long as modal conflicts are minimized and applicable connections are made. Improvements to accommodate bicycles can also benefit motorists. Wider shoulders to provide bicycle lanes, for instance, have been shown to reduce sideswipes, head on collisions, and road run-offs.

Adapting a transportation network to include pedestrian and bicycle facilities enhances overall safety. A useable network, however, requires that all applicable connections be made as safe as possible. Motorized vehicle speeds, for instance, will need to be reduced on certain roads to encourage non-motorized travel. A series of traffic calming options can provide the necessary means to reduce vehicle speeds on specific routes, in order to reclaim neighborhoods for their residents.

Pedestrian and bicycle facilities need not be limited to the road network. Off road trails can provide numerous benefits. Separation from motor vehicle traffic, for instance, enhances user safety. Well laid out trails also expand travel options. In the right location, off road trails can provide a recreational amenity for both residents and visitors. Such facilities can also function as linear parks with both natural areas as well as historic sites.

Quality of Life/Economic Benefits

A locality’s quality of life is defined by such things as sidewalks that connect other parts of the community, safe street crossings, as well as places like coffee shops and

restaurants near residential neighborhoods. If points of interest are added – such as historic sites, a vibrant downtown with multiple activities, and the Rappahannock River – then the local quality of life becomes attractive to visitors as well.

Bicycle and trail facilities have proven to be a wise investment for communities that have created them. These facilities have been demonstrated to have a direct impact on a community's ability to attract jobs and promote tourism, on real estate values, and on the success of nearby small businesses. A recent US Government study of the economic impact of the Washington and Old Dominion Trail found that the trail generated a direct annual benefit of \$7 million into the local economy and resulted in a net total economic benefit of between \$14.1 and 21.6 million.

As an urban area, Fredericksburg is already a relatively compact community. Many destinations are within walking or biking distance and the City's most expensive homes are within the urban core, reflecting an attractive and vibrant center. Some of the outlying areas, however, are isolated, cut off from the community by busy roads as well as distance. In addition, neighborhoods that are not considered part of the visitor circuit have not had their street tree canopy maintained or their streets and sidewalks kept in good repair.

A comprehensive trails network will provide connections to all neighborhoods, even the ones that are currently somewhat neglected. In addition, trails will provide links to historic attractions and sites, which will make them attractive to visitors. A sustained attention to planting trees along trails and streets will also enhance the local quality of life while encouraging visitation.

PLANNING PROCESS OVERVIEW

In January 2005, the Fredericksburg City Council authorized the Recreation Commission's Pathways Committee to review the 1996 Fredericksburg Pathways Plan.

This committee had already begun to meet in October 2004, to examine existing plans from several other localities and to develop materials for public presentations. From January through April, the group briefed many local organizations. During that period, the committee also worked with the City Manager and City Council, to ensure trails funding would be included in the City's Capital Improvement Program.

In May 2005, several committee members traveled to Richmond for the Governor's Conference on Greenways, Blueways, and Trails. In addition, staff met with David Brickley to discuss the City's ongoing trails planning and to coordinate local efforts with the East Coast Greenway, an urban version of the Appalachian Trail that will extend from Maine to Florida and is planned to be routed through Fredericksburg.

Plan development continued through the summer months and a draft Pathways Plan was presented to the public on October 10, 2005. The Recreation Commission received the completed Plan on October 20, and subsequently directed the Pathways Committee to

submit the draft plan to the Planning Commission. The Planning Commission recommended approval of the submitted plan on November 30, 2005. City Council adopted the final draft on January 24, 2006, and directed staff to incorporate the completed plan into the City's 2006 Comprehensive Plan, its Transportation Plan, and the Fredericksburg Area Metropolitan Planning Organization's Constrained Long Range Plan.

CITIZEN PARTICIPATION

In January 2005, the Fredericksburg Pathways Committee initiated a concerted public participation process. Members of the Committee provided a series of presentations to the City's elected officials, the Recreation Commission, various user groups such as cyclist and hiking clubs, resource advocacy groups such as the Friends of the Rappahannock, health organizations such as the Health Care Assembly, the AARP, and every neighborhood group that meets on a regular basis.

In addition, the Committee held a public forum at the Central Rappahannock Regional Library on May 31, 2005. Approximately 70 citizens attended this well advertised event. Participants provided ideas about potential trail routes as well as expressed their thoughts on overall trails policies. The Committee compiled the received comments and began to evaluate each idea and suggestion, to determine what could be incorporated into a revised trails plan.

The Committee developed a draft plan, which was then presented at another public forum on October 10, 2005. Approximately 37 citizens attended this meeting and provided comments and suggestions, which the Committee incorporated into the plan before submitting the next draft to Recreation Commission, on October 20, for further submittal to the Planning Commission. The Committee also conducted tours of selected routes on the 15th, 16th, and 22nd of October.

There were two public hearings associated with the proposed trails plan. The Planning Commission held its public hearing on November 9, 2005, which also opened a 15-day public comment period. This comment period closed on November 23, 2005 and the Committee incorporated all received comments before submitting the final draft to City Council. The City Council held its public hearing on December 13, 2005. The Committee finalized the draft document and the City Council adopted the revised trails plan (Fredericksburg Pathways), by Resolution 06__.

II. COMPREHENSIVE PEDESTRIAN/BICYCLE PLANNING

Cities do not function well with only one mode of transportation. Vibrant urban communities invariably have transportation systems that accommodate a diversity of human purposes. To achieve this end, planning must include a variety of modes, to ensure a community becomes functional to all of its citizens. Due emphasis must be placed on the entire population, not just those persons who drive automobiles. There is no single step, however, that will provide an attractive, well-functioning community. Instead, a variety of individual steps must be taken during the ongoing and overall development/redevelopment process, to achieve a result that meets basic community needs. An emphasis must be placed on addressing pedestrian and cyclist needs on a daily basis, in order to achieve an accessible community within a reasonable number of years.

PRINCIPLES OF PEDESTRIAN/BICYCLE PLANNING

There are several factors that make a community accessible to pedestrians and cyclists. They are a combination of urban design considerations, transportation planning elements, as well as land use provisions. No single accomplishment ensures success, but the following principles of pedestrian/bicycle planning provide a comprehensive approach that acknowledges travel of all kinds.

Design a Pedestrian-Friendly Environment

A pedestrian-friendly environment includes continuous sidewalks and safe, multi-modal connections to local destinations. These facilities should also be comfortable to use. Pedestrians should be protected from moving traffic by on-street parking as well as a barrier of street trees. A tree canopy will also provide welcome shade. Transit stops should also be safe and readily accessible. The degree to which the following features can be incorporated will determine how pedestrian-friendly Fredericksburg will become.

- Locate bus stops adjacent to commercial areas rather than at the far edge of parking lots.
- Ensure streets have pedestrian crossings at bus stops.
- Provide crosswalks at all signalized arterial intersections. Construct overpasses only as needed.
- Provide sidewalks that are appropriately sized to allow an adequate utility strip for tree planting.
- Ensure sidewalks remain unobstructed.
- Provide shade trees on all streets with sidewalks
- Ensure all applicable provisions are made for persons with disabilities.

Ensure Pedestrian/Bicycle Connections

Commuting to work represents approximately 20 percent of all household trips. The other 80 percent of trips include travel to daycare, school, shopping, errands, and

recreation. Where local destinations can be reached by walking or cycling, residents have a choice as to whether they will drive or not. The following steps can increase the available transportation choices for residents.

- Provide a coordinated system of bicycle/foot trails throughout the community.
- Locate pedestrian routes and bicycle trails along streets, as much as possible, rather than through parking lots or in the rear of residential areas.
- Link pedestrian routes and bicycle trails to local destinations and building entrances. Where street connections are not feasible, provide connections, as necessary, between residential and commercial areas.
- Connect pedestrian routes and bicycle trails to bus stops.
- Provide bicycle racks at attractions and destinations.
- Ensure bicycle/foot trails are easily followed, through unified pavement textures, street trees, and street furniture.

Provide Interconnected and Safe Streets

Interconnected streets are inherently well-suited for walking and cycling. They provide convenient and direct routes in marked contrast to the circuitous road networks found in contemporary residential subdivisions. Interconnected streets also provide multiple routes to local destinations. Consequently, no single street gets overloaded with traffic and vehicles move at slower speeds through intersections, which is more conducive to pedestrian safety. A cohesive street grid provides an interconnected community, while individual street design impacts driver as well as pedestrian safety.

- Ensure a hierarchy of streets that provide connections to local destinations while protecting neighborhoods from excessive congestion.
- Avoid developing dead end streets that curtail pedestrian circulation and preclude bus service in a neighborhood.
- Design neighborhood streets that discourage excessive automobile speeds that threaten pedestrian safety.
- Implement traffic calming improvements where connector streets pass through neighborhoods.
- Encourage on-street parking to buffer pedestrians/cyclists from moving traffic.
- Design intersections with minimum widths, to slow traffic as well as reduce pedestrian crossing distances.
- Design local streets to enhance pedestrian safety, through minimum widths, turning radii, and design speeds.

Develop/Redevelop with Appropriate Densities and Mixed Uses

Concentrated activities within a well planned street pattern provide a pedestrian-oriented place with strong economic potential. Such development should not displace vehicular traffic, but simply integrate it into the built environment. The defining element of any built environment is its infrastructure. The following planning concepts relate to

accommodations for automobiles, but will affect the feasibility of walking and cycling in Fredericksburg.

- Implement reduced parking standards, where warranted by walkable environments and mixed uses.
- Design parking lots so they do not dominate street frontages, interrupt pedestrian routes, or negatively impact surrounding neighborhoods.
- Break extensive surface parking into smaller lots by placing a street through two parking areas or locating a building between parking areas.
- Minimize building setbacks.
- Integrate parking structures into existing streetscapes.
- Provide for increased densities during redevelopment of existing commercial areas by reducing areas of surface parking with structured parking facilities.
- Integrate existing uses into comprehensive pedestrian-oriented plans that are developed during redevelopment efforts.

Ensuring that Fredericksburg remains a walkable community will entail two approaches. First, pedestrian infrastructure needs to be considered and accommodated during any capital project, such as new roadways or existing roadway improvements. Second, existing places that have been allowed to become overwhelmed by motorized transportation need to be retrofitted, as feasible, to improve the pedestrian environment. This latter task will appear overwhelming, but can be successfully accomplished street by street, and neighborhood by neighborhood.

IDENTIFICATION OF USERS

There are a great many categories of pedestrians. There are hikers and power walkers, children with or without their parents, and a growing elderly population. There are cyclists of varying levels of ability. Further, there are persons with impaired vision and/or hearing as well as those with physical or mental disabilities. All of these users need to be considered when designing pedestrian facilities.

Pedestrians

Pedestrians will generally be the largest group of trail users. They often walk or jog in pairs, so multi-use paths should allow for two pairs of people to pass one another. Hikers are capable of more challenging terrain and prefer trail locations that are more isolated. In terms of age, children generally require supervision and have not yet developed adequate perceptions of speed and distance; teenagers exhibit poor judgment and a sense of invulnerability; adults are generally fully aware, but with a diminishing of reflexes as they grow older; and older people may suffer from a loss of sight or hearing, move slowly, and not react quickly.

The Americans with Disabilities Act (ADA) requires that all new design, construction and renovation projects will be readily accessible to users with disabilities, except where an entity can demonstrate that it is structurally impractical, excessively difficult or

expensive to meet the requirements of design. Not all trails (particularly hiking trails) can be made fully accessible, but shared use trails should be ADA compliant.

Bicyclists

There are two primary goals in developing bicycle trails. The first is to accommodate current bicycle users. The second is to encourage an increase in their level of use. Both goals rely on enhanced safety, but experienced bicyclists will have very different needs than novice riders. As a consequence, trails development must address the needs of various skill levels. To assist in this process, bicyclists have been classified as follows:

Group A – Advanced Bicyclists - Advanced cyclists are highly skilled riders who prefer roads to trails. They have experience operating a bicycle under most traffic conditions. They are best served by improvements to the existing street system, because they seek direct access to destinations with the opportunity to operate at maximum speeds and with minimum delays. This group seeks sufficient operating space on the roadway or shoulder, to reduce the need for either the bicyclist or the motor vehicle operator to change position when passing.

Group B – Basic Bicyclists - Basic cyclists are casual or new adult and teenage riders who are not as confident as advanced cyclists in their ability to operate in traffic. Some will develop the advanced skills of advanced cyclists, but there will always be large numbers of basic bicyclists. They seek comfortable access to their destinations, as directly as possible, but using either streets with low traffic volumes or separate bicycle paths. Where the bicycle route must share the right of way of arterial streets with higher traffic volumes, this group prefers a well defined separation between bicycles and motor vehicles.

Group C – Children - Children are defined as pre-teen riders whose cycling is initially monitored by parents, but who will eventually need independent access to the trail system. This group seeks access to destinations around their neighborhoods, including schools, recreational facilities, shopping opportunities, and other neighborhoods. Like basic cyclists, children prefer low volume/low speed streets, separate paths, and well defined separations between bicycles and motor vehicles.

Standard bicycle trails planning combine's user groups into two broad classes of cyclists – Group A riders and Group B/C riders.

Group A riders are best served by making most (if not all) streets bicycle friendly. This goal is accomplished by wide curb lanes (in urban areas) and paved shoulders (where curbs and gutters are not used) to allow cyclists to share roadways with motor vehicles.

Group B/C riders are best served by providing designated bicycle facilities on key travel corridors. Such corridors should include neighborhood streets (with appropriate traffic calming features) and designated facilities that are carefully separated from vehicular traffic.

This two-tiered approach, if fully implemented, will provide for every street where bicycles are permitted to have at least the design treatments recommended for Group A bicyclists. In addition, a network of selected routes will be enhanced by incorporating the type of designated bicycle facilities that are recommended for Group B/C bicyclists.

FACILITY DESIGN

The nature of the built environment determines how readily accessible it will be to pedestrians and bicyclists. Specific factors include the proximity of destinations to one another, sufficient densities and mixed uses to support transit as well as local commercial activity, and convenient links to other modes of transportation such as trains and buses. Pedestrians and cyclists, however, need more than sidewalks, bike routes, and crosswalks. If these facilities are going to be used, they must also provide an acceptable level of security, comfort, and interest.

General Design Considerations

Trails are but one component of an interrelated system of transportation and recreation facilities and their design needs to provide a deliberate cohesiveness. The pathways system in general and each individual trail should meet the goals and objectives outlined in Chapter IV. In addition, each trail should be designed according to the following guidelines:

- Adhere to the minimum design standards and safety requirements recommended by the American Association of State Highway Transportation Officials (AASHTO), as natural conditions and site specific limitations allow.
- Protect natural and historic areas.
- Ensure connectivity with other facilities and destinations.
- Respect environmental conditions.

Bicycle Facility Design

Bicycle facilities range from pathways that are used by both cyclists as well as pedestrians to on-road facilities for cyclists only.

Shared-Use Trails – Shared-use trails are capable of being used simultaneously by pedestrians and cyclists. They allow for safe movement free from motorized vehicles and the goal should be to make them accessible to persons with disabilities. The safety of users should be carefully addressed at road crossings and intersections.

On-Road Facilities – On-road bicycle facilities provide direct connections within the framework of an existing roadway system. The facilities consist of bicycle lanes as well as marked bicycle routes and their availability is determined primarily by road width. Bicycle lanes are one-way facilities, in separate lanes indicated by on-road markings, where bicycle traffic moves in the same direction as vehicle traffic. Bicycle routes do not

always have on-road markings, but are still officially designated with signs and route markers. On high speed, high volume roads, it may be more appropriate to provide a separate shared-use trail that is physically separated from roadway traffic, but all roads should be evaluated for on-street bicycle facilities.

Pedestrian Facility Design

Walkways provide a travel route in the public right-of-way for people traveling on foot. This basic amenity in urban areas needs to include design features that make them safe, secure, and comfortable.

Sidewalks or Walkways – Sidewalks and walkways provide pedestrian access for all types of foot traffic. Their width should be coordinated with the available utility strip so the sidewalk does not preclude the viability of street trees.

Crosswalks – Marked crosswalks indicate the preferred location for pedestrians to cross a street; provide curb ramps for wheelchairs, strollers, handcarts, and bicycles; and help to designate where motorists will yield to pedestrians (consistent with any signs or signals).

Transit Stops – Most pedestrians and cyclists will not be able to access all of their desired destinations on foot or bicycle. Conveniently located transit stops (for both bus and rail service) are necessary to provide additional modal links. Bus stops should be in highly visible locations where pedestrians and cyclists can reach them by accessible travel routes. A complete trails system is clearly essential to support a public transportation system.

Overpasses/Underpasses – Overpasses and underpasses provide complete separation of pedestrians and cyclists from vehicular traffic, but should be used only where no other pedestrian facility is possible. Overpasses/underpasses typically include elevators and/or extensive ramping (and so are prohibitively expensive). Grade separation is most feasible where off-road bicycle/foot trails must cross highways, high speed/high volume arterial roadways, or railroad tracks.

Roadway/Intersection Design

Pedestrians and cyclists are affected by traffic volumes and vehicle speeds. Statistically, a person is more likely to be injured or killed in an automobile accident – either as a pedestrian, a passenger, or a driver – than they are likely to be injured or perish in a fire. Standards for safety along residential streets, however, are far lower than for fire safety within dwellings. If a community desires to establish and maintain a pedestrian/bicycle facilities network, it needs to take the lead to address user safety in roadway design as well.

Streets already serve multiple functions. They provide the surface and structure for selected modes of transportation. They provide public access to destinations. They

provide right-of-way for utilities, both above and below ground. Streets also help to define a community's sense of place. They provide a setting for activities and celebrations (Soap Box Derby, First Night, July 4th, block parties and the Christmas Parade). Safe, tree-lined streets are also places where neighbors simply stop to chat. The importance of streets to the social fabric of the locality needs to be respected.

Roundabouts – A roundabout is a circular island at an intersection that takes the place of a traffic signal. Traffic maneuvers around the circle in a counterclockwise direction and turns right onto the desired street. Left turn movements are eliminated. Roundabouts are an excellent traffic management feature because they avoid the backups at a traditional traffic signal. They reduce traffic speeds and create a gateway into an area, but they can be difficult for bicyclists and pedestrians. Bicycle paths and pedestrian routes will need to avoid roundabouts in order to maintain acceptable levels of safety.

Traffic Calming Techniques

Traffic calming devices are street design features that encourage people to drive more slowly or to take another route. They are self enforcing features that effectively reduce cut-through traffic and speeding in neighborhoods because the physical design of the street results in the desired effect. Some residential streets in Fredericksburg are long, wide, and smooth – features that encourage speed. In response to the neighborhood setting, these efficient roads are posted for slow speeds. When the posted speed does not relate to the design speed, however, people usually react to the design speed (both deliberately as well as inadvertently) and exceed the posted limit. Traffic calming results in a street that is less efficient, in order to restore the neighborhood quality of a residential area. These modifications are made in the existing right-of-way, can be landscaped to enhance the neighborhood, and will keep a road open.

There are a series of principles applicable to implementing traffic calming measures, as follows:

- Vehicle speed is more critical than traffic volume, in terms of safety, and should be addressed first.
- Traffic calming devices should incorporate neighborhood input.
- Traffic calming should fit into, and enhance, the existing street.
- Traffic calming devices should be predictable and easy to understand.
- Devices that meet multiple goals will be more acceptable. A raised crosswalk, for instance, has a clear goal understandable to motorists. A speed bump, on the other hand, will be perceived as a nuisance.
- Devices must accommodate emergency vehicles.
- Treatments need to be appropriately spaced (300 to 500 feet apart) to have the desired effect.
- Devices should not be under-designed or they will fail to be effective.
- Traffic calming measures should accommodate bicyclists and improve pedestrian conditions.

- Traffic calming is meant to encourage the use of faster arterial routes. If a measure is likely to divert traffic to another local street, a wider application should be considered so a problem is not shifted from one part of a neighborhood to another.

Traffic calming measures effectively change a driver's perception of the street, to reduce the vehicle speed. Reduced speeds in neighborhoods increase pedestrian and bicycle safety. There are a variety of measures that are used for calming vehicular traffic, but they all derive from a few basic principles. These range from narrowing the street, deflecting the vehicle path, incorporating raised devices, and adding complementary effects through gateways and landscaping.

Nature Trails

Fredericksburg includes a significant amount of land that consists of wetlands, floodplains, and otherwise sensitive natural areas. The proposed shared-use paths and the dedicated bicycle facilities will avoid these types of areas. Nature trails, however, are primitive walking trails not suitable for bicycles or other wheeled conveyances, such as wheelchairs. They can be located in natural green space and in floodplains as long as their surface is a pervious one and the trail alignment conforms to the existing terrain. The overriding goal must be to provide for the enjoyment of the natural environment while minimizing erosion. Care must be given to shoring up stream banks and installation of culverts, consistent with U.S. Army Corps of Engineers requirements. In addition, especially sensitive areas may require the use of boardwalks.

Access by Persons with Disabilities

The Americans with Disabilities Act Accessibility Guidelines apply to newly built or altered structures, including trails, to ensure they can be used by persons with disabilities. Although some nature trails may be exempt from ADA guidelines, they should be designed to accommodate as many users as possible. Shared-use trails should also be designed to be accessible to mobility impaired users to the fullest extent feasible.

III. EXISTING CONDITIONS

Fredericksburg is located at the falls of the Rappahannock River (a designated State Scenic River). In this transition zone, the southern portion of the City is characterized by the gentle slopes of the Coastal Plain, while the rolling hills and plateaus in the northern and western portions of the City are more characteristic of the Piedmont. The Fredericksburg pathways system will need to effectively link these different elevations with easily traveled bicycle/foot routes.

Fredericksburg is also situated midway between Richmond, Virginia and Washington D.C., along the heavily traveled Interstate-95. Consequently, regional growth is rapid. The burgeoning population puts pressure on the local road network as well as increases the demand for recreational facilities. Concurrently, the area's historic resources continue to attract large numbers of visitors. The *2000 Virginia Outdoors Survey* shows that visiting historic sites ranks 5th among state residents for outdoor activities. More significantly, walking for pleasure ranks as a first choice, in this survey, while bicycling ranks 6th. Clearly, these combined elements suggest that a well-integrated multi-use trail system could effectively attract more visitors as well as serve the growing resident population. The *2000 Virginia Outdoors Survey*, however, also indicated that the area's wealth of resources were only marginally served by existing trails. This plan will help the City to meet these growing needs.

Fredericksburg has already taken a series of steps to develop multimodal transportation facilities within a pedestrian friendly environment. Individual initiatives have included retrofitting the downtown rail platform for commuter rail use, bringing the entire rail complex up to ADA standards (for both VRE and AMTRAK), incorporating bicycle carriers on FREDericksburg Regional Transit buses, ensuring bus routes serve all City neighborhoods, retrofitting all sidewalks with curb ramps, and constructing pedestrian/bicycle trails along designated rights-of-way.

TRAILS IN PLACE

The City of Fredericksburg installed the Canal Path Trail in 1983, linking neighborhoods, medical facilities, commercial areas, and recreational areas along a scenic and historic waterway. This initial project highlighted the potential of these types of amenities and remains well used. The City did not immediately construct additional trails, but the idea of a comprehensive trail network carried over into successive Comprehensive Plans and was revisited in an updated trails plan in 1996. As a result of the 1996 plan, pedestrian and bicycle facilities were incorporated into the Cowan Boulevard construction project. Furthermore, Mary Washington Hospital followed the City's lead and included similar facilities in their extension of Mary Washington and Sam Perry Boulevards. These new facilities made a significant contribution to the overall pathway system and renewed interest in developing still more facilities. These individual projects are described further, below:

Table 1. Existing Trails

NAME	TYPE		LOCATION	LENGTH
Canal Path Trail	Separate Use Path	Shared-	Rappahannock Canal, from Fall Hill Ave. to Princess Anne St.	1.75 miles
Cowan Boulevard Trail	Separate Use Path	Shared-	Powhatan St. to Central Park	1.7 miles
Mary Washington Blvd. and Sam Perry Blvd. Trails	Separate Use Paths	Shared-	Cowan Blvd. to Canal Path Trail and Jeff. Davis Hwy	.75 miles
Alum Springs Trails	Natural Paths	Walking	Alum Springs Park	1.0 mile
Mott's Run Trails	Natural Paths	Walking	Mott's Run Reservoir Park	5.0 miles
Smith Run Trail	Natural Path	Walking	Hugh Mercer School to battlefield protection area	0.7 miles
Mary Washington Hospital Trail	Natural Path	Walking	Wooded area near hospital	0.5 miles
Battlefield Trails	Natural Paths	Walking	Fredericksburg and Spotsylvania National Military Park	Various
Dixon Park	Circuit		Dixon Park	1.0 mile

Canal Path Trail

This separate shared use path follows the route of an historic canal through several residential neighborhoods. It crosses the Jefferson Davis Highway through an underpass, but is cut by Washington Avenue and Fall Hill Avenue (where they connect to Prince Edward Street). There are two foot bridges across the canal to connect the Canal Path to Normandy Avenue and Dale Street. A crosswalk is needed where this trail intersects Princess Anne Street. A safe crossing is also needed at the Fall Hill Avenue end of this trail and is currently proposed to be accomplished with a culvert, to be installed when the Fall Hill Avenue bridge is replaced.

Cowan Boulevard Trail

The Cowan Boulevard improvements included installation of a shared use trail on one side of the roadway and a sidewalk on the other, for most of its length. These facilities safely cross Interstate-95 on a new bridge, providing a critical east-west link. The existing trail ends at the intersection with Powhatan Street/Keeneland Road. A connection across the Jefferson Davis Highway is needed and is described in Chapter V.

Mary Washington Boulevard and Sam Perry Boulevard Trails

The extension of Mary Washington Boulevard and Sam Perry Boulevard to Cowan Boulevard included installation of a shared use trail on one roadway and a sidewalk on the other, to tie in with the same type of facilities on Cowan Boulevard. Plans call for these facilities to tie in with the Canal Path Trail and Jefferson Davis Highway on their lower end. The link to the Canal Path Trail is not yet constructed.

Nature/Historic Sites Trails

Alum Springs Trails - Dirt walking paths extend along Hazel Run and elsewhere throughout the park. They are not named or marked with signs, but include simple interpretive signs and a number of ruins and natural points of interest.

Mott's Run Trail - Natural dirt trails extend along the shore of the reservoir. They are marked with painted blazes on trees and are individually named and color coded. The Parks and Recreation Department provides a published guide to the trails and associated activities such as an orienteering course and a nature center.

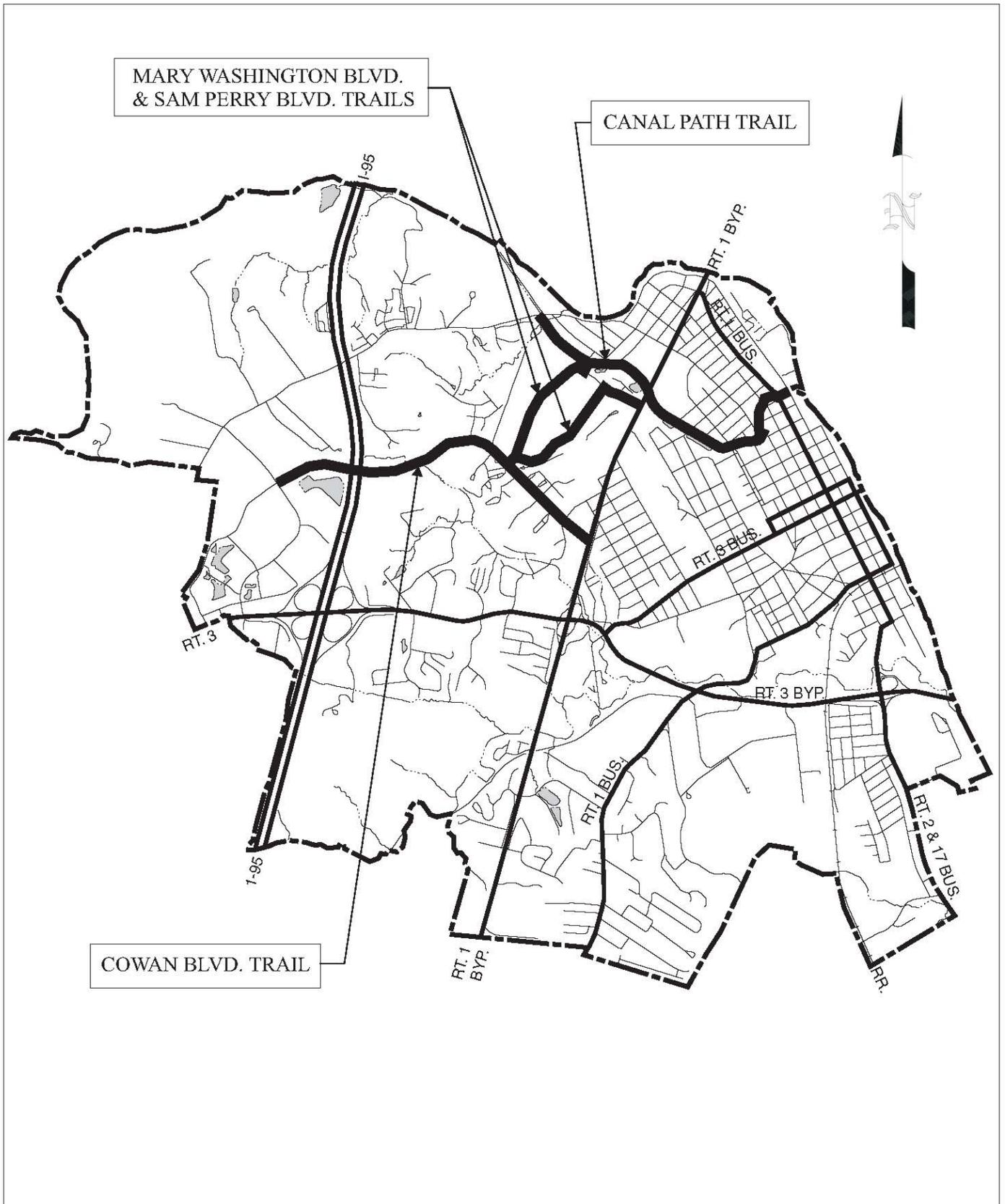
Smith Run Trail - Natural trail that extends from Hugh Mercer School to the Smith Run battlefield site. A substantial wood bridge crosses Smith Run. A short extension of this trail will be constructed into a Civil War battlefield preservation area once that site is deeded to the City of Fredericksburg.

Mary Washington Hospital Trail - This narrow foot path was built by Snowden House and local Boy Scouts. It is currently in disrepair. This trail could be extended to connect to the Sam Perry Boulevard Trail.

Battlefield Trails - Natural dirt trails follow trench lines and terrain features in the Fredericksburg and Spotsylvania National Military Park. These trails extend into Spotsylvania County, within the National Park.

Recreational Tracks

Dixon Park Circuit - An asphalt surfaced trail extends around the circumference of Dixon Park, connecting to various fields as well as providing a path for recreational walking and running.



Map 1. Trails in Place

UNMET NEEDS

Fredericksburg's downtown area remains conducive to foot travel, but current road planning and development typically considers the motorist as the primary, if not sole, user of the transportation system. The existing system of sidewalks allows movement within the downtown area, but are not adequately tied into the existing system. They also do not connect the downtown area with outlying residential areas. In addition, street crossings and intersections throughout the City are inadequate for pedestrian use. Crosswalks are frequently non-existent and often poorly marked. Street corners do not always allow adequate street visibility for people on foot and many traffic signals are not timed to allow pedestrian crossing. In order to make the City more friendly to pedestrians, trails need to be fully connected to one another and existing facilities need to be made more pedestrian friendly.

Cycling is a basic means of getting around, but identifying specific needs has typically been closely linked to standard road planning. The basic methodology has been to project potential bicycle trips as a percentage of existing or planned motor vehicle patterns. Bicycle traffic, however, may not be suitable on routes that are heavily traveled by motor vehicles, such as Routes 1 and 3. Instead, bicycle safety may dictate independent routes for cyclists, to avoid heavy traffic, complex intersections, and numerous entries into commercial parking lots.

More realistically, bicycle traffic is generated by the proximity and accessibility of trip origination points, such as neighborhoods or visitor facilities, to various destinations. A modal split based on vehicular traffic, fits into the existing road planning formulas, but other available data can be used justify an investment in bicycle facilities. A Harris Poll conducted in the 1990s, for instance, revealed that of 82 million Americans over the age of 18, 46 percent rode bicycles. More than this percentage (53 percent) said they would ride a bicycle if they had safe, separate designated trails on which to ride. In addition, 46 percent said they would commute to work by bicycle if safe bicycle routes were available.

Demand for bicycle facilities and pedestrian features is strongest where neighborhoods are within a reasonable distance of a community's activity centers. In this context, though, it is not enough to simply construct a trail to a destination. The connecting link between a trail and a specific site needs to be coordinated to ensure user safety as well as convenience. A coordinated site development review process needs to be implemented to ensure a cohesive and usable trails network is developed in a timely manner and without need for unnecessary retrofits. If safe and efficient links can be established, they will certainly be used.

ATTRACTIONS AND DESTINATIONS

There are a significant number of locations in Fredericksburg that would attract bicycle/foot traffic, if the appropriate facilities were available for pedestrians and cyclists. Origination points include residential neighborhoods throughout the City as well as

visitor facilities, such as local hotels as well as visitor parking areas, and the rail station. The following destinations are listed under the following general headings:

- Schools -
 - Hugh Mercer School
 - James Monroe High School
 - Lafayette Upper Elementary School
 - Old Walker-Grant School
 - University of Mary Washington
 - Walker-Grant Middle School

- Employment and Commercial Centers
 - Celebrate Virginia
 - Central Park
 - Commercial Corridors (Route 1, Route 3)
 - Downtown
 - Fredericksburg Battlefield Industrial Park
 - Mary Washington Hospital
 - University of Mary Washington

- Recreation Facilities -
 - Alum Springs Park
 - City Dock/Riverwalk
 - Dixon Park
 - Dorothy Hart Community Center
 - Hurkamp Park/Farmer's Market
 - Kenmore Park
 - Maury Field
 - Mott's Run Reservoir
 - Old Mill Park
 - Rappahannock Outdoor & Education Center
 - Snowden Park

- Transportation Connections -
 - Rail Station (VRE, AMTRAK)
 - FREdericksburg Regional Transit (Fred Central)

- Regional/Visitor Attractions -
 - Celebrate Virginia
 - Downtown Visitor Center
 - Fredericksburg-Spotsylvania National Military Park
 - Kenmore/Washington Avenue
 - Rappahannock River

CONSTRAINTS

Environmental and Economic Limitations

Trails development requires attention to environmental as well as economic limitations. To avoid detrimental impacts to natural and historic resources, for instance, consideration

must be given to wetlands, wildlife, riparian zones, and historic and archaeological sites when locating and designing facilities. The goal must be to provide access to natural and historic resources, but use trails as a means to protect them and avoid adverse impacts. This requirement dictates that trails be developed with appropriate engineering and constructed according to established standards.

Economic considerations will also have a direct impact on trail use. Experience nationwide has shown that cost-cutting is not conducive to a good trail system. Trails that are substandard or neglected will simply not be used to their fullest potential. It is better not to build a trail than to cut corners on their construction and maintenance. Right-of-way acquisition, whether through easement or in fee simple, can also entail considerable cost. In addition, some trail alignments will encroach on easements held by others, such as utility companies, and appropriate coordination will be necessary if these trails are to get built.

Major Barriers and Intersections

Fredericksburg has always been a crossroads community. Established at the head of navigation on the Rappahannock River, seagoing vessels docked at its wharves to receive goods from the interior. North-south travel crossed the river at the ford near Falmouth. Bridges were built to handle the growing volume of commercial traffic and these were replaced with bigger and better facilities as time, technology, and resources allowed. Today, Fredericksburg is criss-crossed with interstate highways, state routes, bypasses and a railroad. In addition, any trails network must still contend with the Rappahannock River, other streams, and a nineteenth century canal. The following chart lists the various barriers and notes what type of improvements are needed at their various intersections.

Developing trails is not as difficult as overcoming the barriers that can prevent them from being linked together. A cohesive, usable trail system will need to cross busy highways that course through town, safely negotiate heavily traveled arterial roads, as well as span numerous streams that routinely overflow their banks. While adequate bridges will serve to get across waterways of various size, road crossings will require consideration of culverts, bridges, as well as at-grade crossings. Bridges and culverts, for instance, are absolutely required to cross Interstate-95. The Cowan Boulevard bridge accommodates both cyclists and pedestrians and a Fall Hill Avenue bridge will need to provide similar facilities. Connecting the Central Virginia Railway trail to Spotsylvania County, however, can only be accomplished through a culvert under Interstate-95. Routes 1 and 3, can be overcome by appropriate modifications at existing signalized intersections, but other crossings will go under major thoroughways, as has occurred where the Canal Park Trail courses under the Jefferson Davis Highway (Route 1 Bypass). Similarly, a trail along the Rappahannock River, from the existing Canal Park Trail to Celebrate Virginia, will be constructed under Interstate-95. Most other crossings, however, will be able to occur at-grade and will require coordination with existing and anticipated vehicular traffic.

Table 2. Major Intersections

INTERSECTION	ACCOMODATION FOR PEDESTRIANS/CYCLISTS
I-95 at Embrey Dam/Rappahannock Canal Trail	Trail can pass under the interstate bridge
I-95 at Fall Hill Avenue	A new bridge is needed with integral hiking/biking features
I-95 at Cowan Boulevard	New bridge in place with sidewalk and trail
I-95 at State Route 3	Not suitable for pedestrians/cyclists
I-95 at the Virginia Central Railway	Any trail into Spotsylvania County will need to pass <u>under</u> the interstate.
Jefferson Davis Highway at Caroline Street/Riverside Drive	Trail can pass under the Falmouth Bridge
Jefferson Davis Highway at Fall Hill Avenue	Improve intersection for pedestrian and bicycle safety
Jefferson Davis Highway at Rappahannock Canal	Trail passes under Jefferson Davis Highway but improved lighting needed
Jefferson Davis Highway at Cowan Boulevard	Improve intersection for pedestrian and bicycle safety
Jefferson Davis Highway at Route 3	Avoid routing pedestrians or cyclists through this area
Jefferson Davis Highway at Virginia Central Railway	Establish at-grade crossing with demand traffic light
Route 3 at Mahone Street	Provide for pedestrian/bicycle safety when new intersection is designed
Blue & Gray Parkway at William Street/Greenbrier Drive	Improve intersection for pedestrian and bicycle safety
Blue & Gray Parkway at Lafayette Boulevard	Improve intersection for pedestrian and bicycle safety
Blue & Gray parkway at Dixon Street	Sidewalks are already in place along Dixon Street and safely pass under the parkway
Rappahannock River at Falmouth Bridge	Improve existing bridge sidewalks to enhance pedestrian and bicycle safety
Rappahannock River at Chatham Bridge	Improve existing bridge sidewalks to enhance pedestrian and bicycle safety
Rappahannock River at Ferry Farm Crossing	Provide accommodations for bicycles if ferry service is reestablished by George Washington's Fredericksburg Foundation
Rappahannock Canal at Fall Hill Avenue	Install culvert when canal bridge is replaced, to allow pedestrians/cyclists to travel <u>under</u> Fall Hill Avenue

IV. GOALS AND OBJECTIVES

COMMUNITY VISION

A comprehensive trail system is a long-term undertaking. Each section must be developed as opportunity presents itself and funds become available. Exceptional care must be taken, however, to ensure that this seemingly disjointed effort results in a well integrated whole. This end result can be readily achieved as long as the layout of the trail network is sound and there has been proper planning for signs, trail specifications, and other unifying features.

During the Summer of 2005, the Pathways Committee conducted a survey to ascertain the desires and goals of the community concerning a trail system. Counting families, nearly 500 people were represented by the survey results. These results indicated that the top three desired activities were walking, cycling, and nature appreciation. The preferred destinations were downtown, parks, and shopping areas. The most desired design elements were paved surfaces, natural surroundings, adequate signs, benches, and trash receptacles. The main concerns were security, road crossings and intersections, connections, cleanliness, and visual access to the Rappahannock River.

GOALS AND OBJECTIVES

The following goals and objectives provide a basis for public policies to develop and maintain the Fredericksburg Pathway System.

Goal 1 - Develop a Trail System for Bicycle/Foot Traffic

Objectives:

Provide non-motorized access and coordinated transportation links to neighborhoods, shopping areas, schools, recreation areas, and work places.

Adhere to pedestrian and bicycle facility standards detailed in the American Association of State Highway and Transportation Officials (AASHTO) and the Manual for Uniform Traffic Control Devices (MUTCD), while recognizing that physical constraints in some locations will preclude full implementation of such standards.

Reduce traffic congestion by providing effective transportation alternatives such a bicycle/foot trails, bicycle lanes, and pedestrian-friendly street crossings.

Develop educational/tourism opportunities through unobtrusive access to natural and cultural resource areas.

Facilitate trail development through public/private partnerships.

Incorporate bicycle routes into construction plans when specified roadways are built or improved.

Define trail routes and specifications so land developers can incorporate them into planned development and plan reviewers can ensure consistency.

Ensure safe pedestrian access (sidewalks, crosswalks) to all bus stops and schools.

Avoid adverse impacts to public greenspace during trails development.

Ensure that the pathway system accommodates children traveling to and from schools and recreational activities.

Encourage citizen volunteer participation in the planning, construction, and operation of the trails system.

Encourage the walkability and bikeability of City streets, by establishing appropriate bicycle facilities, incorporating traffic calming features, and improving the pedestrian safety of street crossings and intersections.

Provide sufficient benches and trail signage to meet user needs.

Goal 2 –Maintain Established Trails

Objectives:

Ensure a periodic maintenance program is established for each trail section and trail link (such as bridges and road crossings).

Systematically assess the physical and structural condition of bicycle/foot trails and ensure any required maintenance is accomplished.

Ensure conformity with applicable access standards.

Promote trail use by providing bicycle parking facilities at destination points and monitoring the need for additional benches, signs, and safety features to meet user needs.

Provide for trails cleanliness by providing trash receptacles at appropriate locations.

Remove encroaching vegetation and tree roots that can damage trails.

Maintain grass borders and trim designated slopes and banks.

Monitor signs, gates, and trash receptacles for vandalism and other damage.

Locate and mitigate erosion problems in a timely manner.

Encourage community participation in pathways maintenance and cleanliness.

Goal 3 – Promote User Safety

Objectives:

Identify and eliminate operational hazards.

Provide for user safety where at-grade crossings occur.

Enhance public awareness of alternative transportation modes.

Document accident patterns to help determine appropriate safety improvements.

Monitor trees and limbs for unsafe conditions.

Consider the effects of an aging population when replacing/renewing such safety devices as curbs, lane markings, signals, and signs.

Avoid vehicle/pedestrian conflicts by maintaining, as much as possible, a physical separation between bicycle/foot traffic and motor vehicles.

Ensure safe and easy trails use, through adequate signage and trail surface markings.

Provide educational materials to ensure all trail users know the rules of the road.

Remove debris and other obstacles following heavy weather.

Develop policies and procedures that enhance the safety of pathway users.

Goal 4 – Continue to Improve Trails and Trail Access.

Objectives:

Ensure new development and new activity centers are designed to accommodate bicycle/foot access in the most convenient manner possible.

Establish linkages between the bicycle/foot trail system and new development.

Ensure all new trail sections adhere to established trail specifications and incorporate established sign standards to ensure the individual parts of the system combine to become a cohesive whole.

Ensure trails have only minimal impacts on natural and cultural resources.

Ensure new development can accommodate trails access by obtaining right-of-way at the early stages of the development process.

Encourage site design that supports bicycle/pedestrian access.

Ensure continuous public input to pathways development and use.

PERFORMANCE MEASURES

The following criteria are to be considered for each bicycle/foot trail within the Fredericksburg Pathways system:

Accessibility – A transportation system’s accessibility is measured both by how the system can be physically reached as well as by what destination opportunities are available within a given range (in both space and time). Physical access to the system will be determined by the range encompassed by a 20-minute walk to an origination point. Destination opportunities will be determined by those within a range identified by a 20-minute walk, a 20-minute bicycle ride, or a 20-minute transit trip.

Directness – Bicyclists want direct and quick routes and will not use even the best facility if it unreasonably increases their travel distance or time of travel. Directness is evaluated by comparing the facility with available alternatives, and the user’s needs (recreation or transportation).

Continuity – Any bicycle/pedestrian facility should have as few gaps as possible. Where gaps do exist, they will need to be adapted (with either short term alternatives or long-term solutions) to ensure they do not include areas that are unpleasant or dangerous to the user.

Consistency – Bicycle facilities should be relatively consistent in design (separate path, bicycle lane, etc) within any given corridor. Switching facility types within a corridor can create unsafe conflicts as well as confusion.

Route Attractiveness – Users will be attracted to facilities that are visually pleasing, well maintained, and physically safe. These factors will help users to view trails as a means of transportation and enhance their use.

Low Conflict - Trails networks should minimize conflicts between users and motorists. Physical separation from vehicular traffic, intersection improvements, and adequate trail widths will all serve to reduce conflicts.

Ease of Implementation – Implementation of individual projects is determined by the availability of appropriate right-of-way, the degree of difficulty in coordinating between bicycle facilities and vehicle traffic patterns, and how readily various constraints (environmental, topographic, and funding) can be overcome.

Multimodal Coordination – The effectiveness of various transportation modes is enhanced through a careful coordination of facilities. Multimodal coordination can occur through installation of bicycle racks at specific destinations and in developing facilities to accommodate both bicycles and foot travel.

Multi-jurisdictional Coordination – Fredericksburg area jurisdictions have identified connections between planned bicycle facilities and specified these in regional transportation planning documents. In addition, local jurisdictions are coordinating passage of the East Coast Greenway through the region.

Safety and Security – Facilities need to ensure user safety. This emphasis on safety will include not only facility design and development but the provision of user education and law enforcement.

V. PROPOSED TRAIL SYSTEM

PATHWAYS SYSTEM OVERVIEW

The Fredericksburg Pathways system is designed to provide non-motorized access throughout the City. Anticipated users include residents traveling to local destinations as well as visitors exploring historic and natural attractions. The overarching theme of accessibility defines the overall pathways, but the individual components of the system will be a variety of trail types, to accommodate and adapt to existing topography and infrastructure.

The proposed pathway system consists of approximately 45 miles of trails, both existing and proposed, within the City of Fredericksburg. This system will include 17 miles of shared-use trails, 8 miles of on-road bicycle facilities, 14 miles of nature/historic sites trails, and at least 6 miles of trails within the developments of Celebrate Virginia and Idlewild. These trails will form a complete network of loops and connections that will provide all of the benefits listed in Chapter I.

The most common type of bicycle/pedestrian facility is a separate, but shared-use path, which entails a physical separation between the pathway and vehicular traffic. Separate paths can be within a roadway right-of-way (separated from traffic by a curb, a guard rail, or similar barrier) or can be laid out along an independent right-of-way.

Shared use facilities accommodate cyclists and pedestrians on the same trail. Other facilities, however, are for one type of user only. Sidewalks already provide dedicated walking space, but cyclists need similar consideration. Dedicated bicycle facilities can be established on the roadways themselves. Bicycle lanes in these shared roadways would conform to the existing traffic patterns and adhere to specific design standards.

PATHWAYS SYSTEM MAP

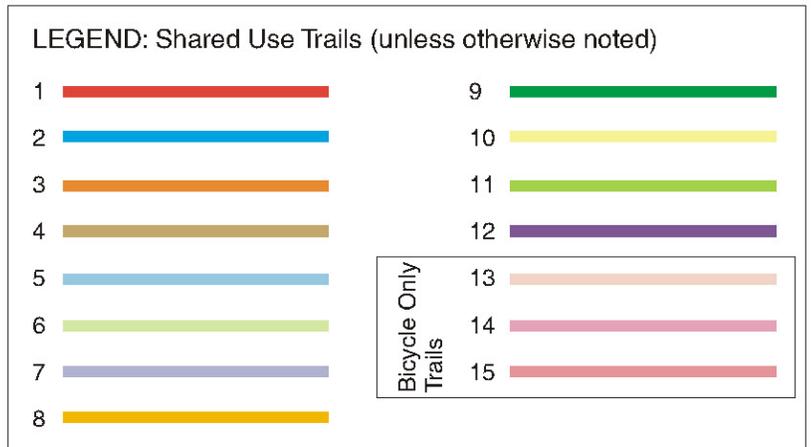
The map on page 30 shows the available and proposed shared-use trails and bicycle lanes within the City limits. The proposed nature trails are not shown. The blocks east of the Route 1 Bypass (Jefferson Davis Highway) invariably include sidewalks, which provide for a community accessible to walkers and cyclists. Sidewalks are not consistently found, however, in the neighborhoods and commercial areas west of the Route 1 Bypass. As a consequence, this trails system takes on increased importance as a means to provide these areas with non-motorized access.

PROJECT DESCRIPTIONS

Projects are categorized in the following sections by facility type. Each project is then described individually. Details include endpoints, length, type of trail, potential constraints, and a systematic analysis of each facility within the context of established performance criteria.



Map 2:
The Fredericksburg
Pathways System



Legend for Map 2.

1. Canal Path
2. Cowan Boulevard Trail
3. Mary Washington/Sam Perry Boulevards Trail
4. Embrey Dam/Rappahannock Canal Trail
5. Fall Hill Avenue Trail
6. Rappahannock River Heritage Trail
7. Virginia Central Railway Trail
8. North-South Trail
9. Lafayette Boulevard Trail
10. Cowan Boulevard/William Street Connector
11. William Street/Plank Road Trail
12. Springwood Drive Trail
13. Downtown Loop
14. Alum Springs Loop
15. Downtown-Dixon Park Route

Separate Shared – Use Trails

A shared-use trail is a bicycle/pedestrian travelway that is physically separated from motorized traffic by open space or a barrier. They are typically designed for two-way travel. The recommended width is 10 feet, with two foot graded shoulders, but they can be wider where heavy volumes of bicycle/foot traffic is anticipated. Such facilities can also be narrower if physical barriers are an issue or if bicycle/pedestrian conflicts will be minimal.

When shared-use trails are located adjacent to a roadway, there should be at least a 5 foot separation between the trail and the road. When this minimum separation is not feasible, a physical barrier should be incorporated, to ensure user safety.

Table 3. Separate Shared-Use Trails

Facility	Route	Length	Page
Embrey Dam/Rappahannock Canal Trail	Fall Hill Avenue to Celebrate Virginia	1.5 to 2.5 miles (depending on tie-in with Celebrate Virginia)	33
Fall Hill Avenue Trail	Canal Park Trail to Carl D. Silver Parkway	1.7 miles	36
Rappahannock River Heritage Trail	Ford Street to the intersection of Canal Park Trail and Fall Hill Avenue	1.6 miles	39
Virginia Central Railway Trail	Rail freight station (406 Lafayette Boulevard) to Interstate-95	3.5 miles	42
North-South Trail	Fall Hill Avenue to Virginia Central Railway Trail	1.9 miles	45
Lafayette Boulevard Trail	South City limit to Blue and Gray Parkway	1.5 miles	48
Cowan Boulevard/William Street Connector	Cowan Boulevard at Powhatan Street, to William Street	0.6 miles	51
William Street/ Plank Road Trail	Woodlyn Drive to William Street/Old William Street intersection	0.6 miles	54

Embrey Dam/Rappahannock Canal Trail

Type: Separate shared use trail

Location: Fall Hill Avenue to Celebrate Virginia

Length: 1.5 to 2.5 miles, depending upon where it ties in with the Celebrate Virginia project

Description: Establish an independent trail on its own right-of-way along the Rappahannock Canal, past the Embrey Dam site, to Celebrate Virginia.

Construction Conditions: Removal of the Embrey Dam has opened the potential for establishing a multi-use path between the existing Canal Path Trail and the tourism destination of Celebrate Virginia. The link across Fall Hill Avenue is planned to be established with a culvert when the roadway bridge is replaced. Additional considerations will be wetlands and drainage provisions as the trail is established along the river. Care must be taken not to compromise historic resources such as the remaining dam structures and any remnants of the old canal.

Consistency with Applicable Performance Criteria:

Accessibility – The Embrey Dam/Rappahannock Canal Trail will connect a major tourism facility with numerous visitor attractions in downtown Fredericksburg along a scenic route.

Directness – The proposed trail will be the most direct pedestrian/bicycle link possible along the Rappahannock River to the Canal Path Trail.

Continuity – The proposed trail will follow its own right-of-way and will comprise a single entity along its entire length.

Consistency – The proposed trail will be a single facility, with a consistent surface treatment.

Route Attractiveness – This trail will follow the route of an historic canal and extend along the Rappahannock River. The path will be under tree cover. The area where the old Embrey Dam stood is relatively open, but this terrain is expected to grow up quickly in trees within a few years.

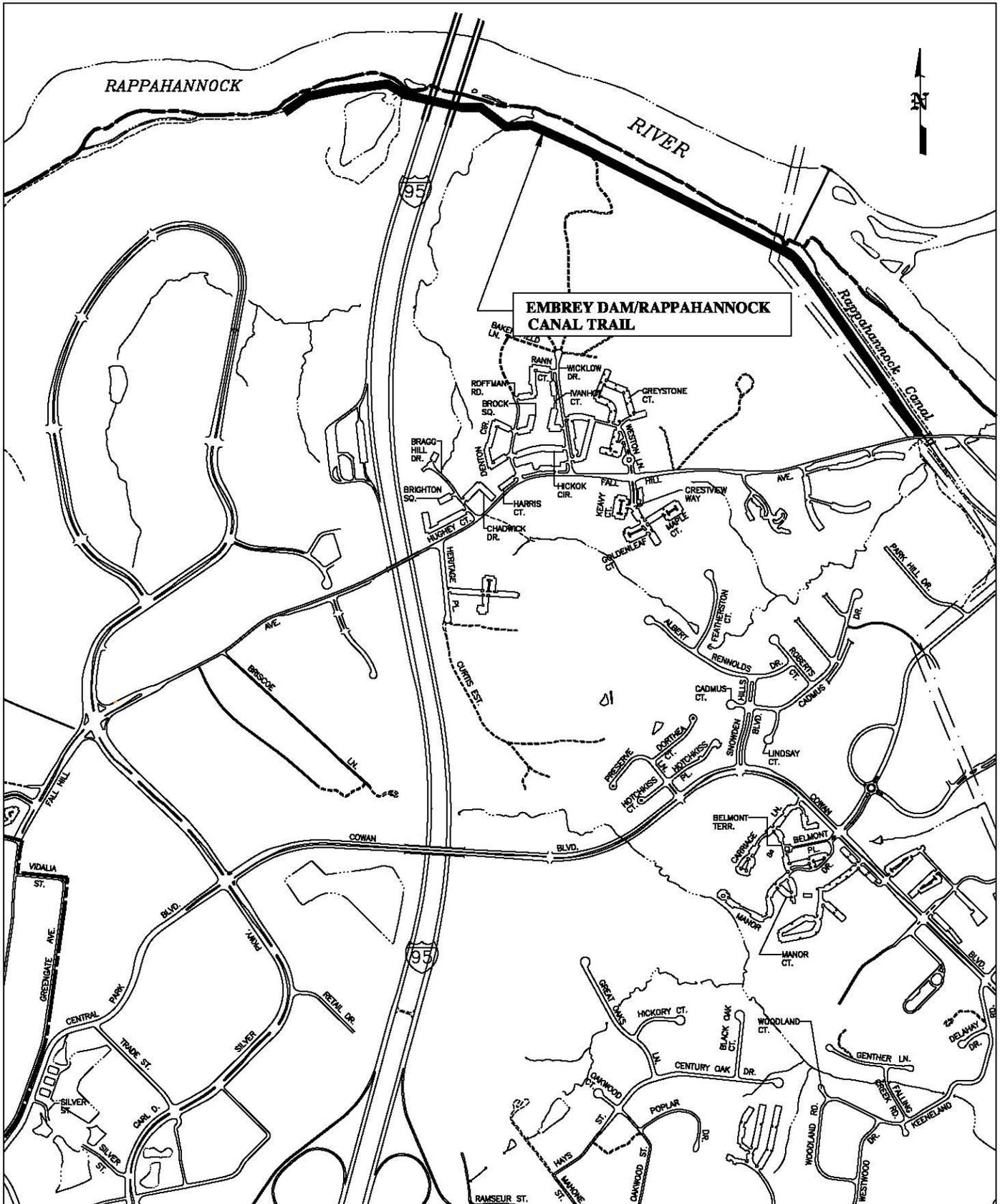
Low Conflict – There will be no modal conflicts along this route.

Ease of Implementation – Careful planning during the Embrey Dam removal project resulted in a cleared and graded route that can be readily adapted for a permanent trail. Most of the necessary right-of-way is already in public ownership and the owners of Celebrate Virginia are also interested in establishing a trail, to link their development to downtown Fredericksburg. A single, privately owned property extends across the trail route and must be acquired, either in fee simple or through an easement.

Multimodal Coordination – There are no proposed multimodal connections.

Multi-jurisdictional Coordination – There are no proposed multi-jurisdictional connections.

Safety and Security – Once a culvert is in place at the Fall Hill Avenue bridge, the Embrey Dam/Rappahannock Canal Trail will not have any vehicle conflict points. The trail route does not typically flood, but visitors will need to be cautioned about using the facility when the river is running high.



Map 3. Embrey Dam/Rappahannock Canal Trail.

Fall Hill Avenue Trail

Type: Separate shared-use trail
Location: Canal Path Trail to Carl D. Silver Parkway
Length: 1.66 miles (along roadway); longer if trail follows alternate route
Description: Construct a separate path south of Fall Hill Avenue when that roadway is improved.

Construction Considerations: Improvements to Fall Hill Avenue will be accomplished in conjunction with an extension of Mary Washington Boulevard. This combined project is necessary to preclude adverse traffic impacts to Normandy Village. As a consequence, however, the Fall Hill Avenue Trail will need to cross a four lane divided roadway between the Canal Path Trail and Forest Village Apartments. The gradient of Fall Hill Avenue is also excessive for a bicycle route, so an alternate route behind Forest Village Apartments will need to be considered. A major barrier at Interstate-95 will also need to be overcome.

Consistency with Applicable Performance Criteria:

Accessibility – The proposed trail will link the many apartments along Fall Hill Avenue to the Canal Path Trail as well as to the ball fields at Snowden Park and to commercial activity and employment in Central Park.

Directness – The trail will be established within an existing travel corridor, although it may be necessary to route the trail around the back of the Forest Village Apartments. Moving away from the road may be necessary to deal with the terrain, which changes from an elevation of 57 feet at the Canal Path to 250 feet at the Snowden Park ball fields, over the course of 3,300 feet along Fall Hill Avenue.

Continuity – Constructing the trail on the south side of Fall Hill Avenue will reduce modal conflicts. While a road crossing will be necessary at an extended Mary Washington Boulevard, a trail south of Fall Hill Avenue will be on the same side of the road as three major apartment complexes, Snowden Park, and Central Park.

Consistency – A trail in the Fall Hill Avenue corridor can be a single unified facility. Bicycle lanes and sidewalks will be difficult options to implement due to the severe slope. A separate path is the most viable option.

Route Attractiveness – Fall Hill Avenue is a wooded corridor as it rises out of the Canal valley, then loses its tree cover where apartments have been constructed on the uplands. Scenic vistas could be developed in several locations, depending on the selected route.

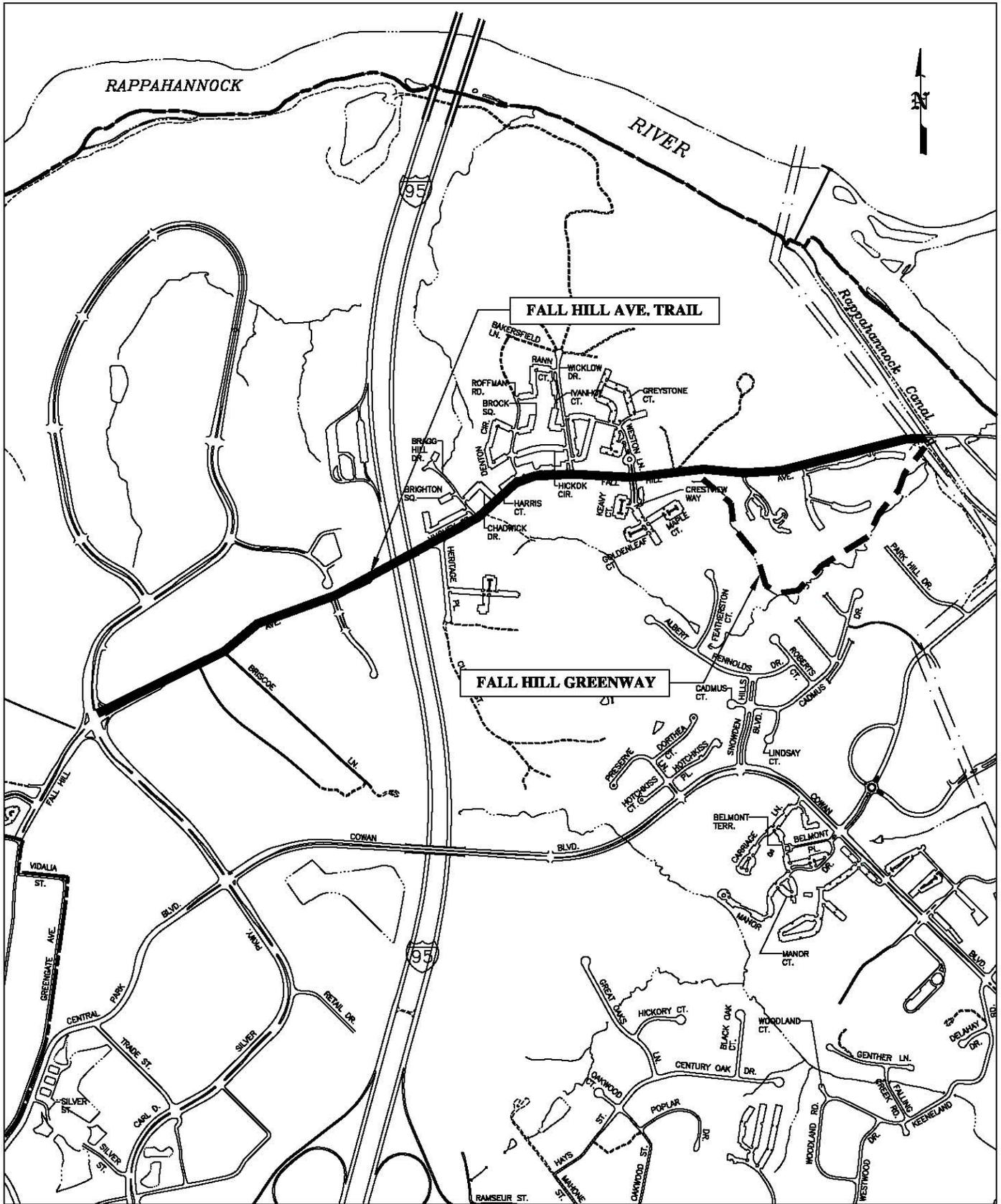
Low Conflict – The proposed trail would be well separated from the vehicular corridor, but would possibly need to be narrower in some locations due to topographical constraints.

Ease of Implementation – The necessary right-of-way is on private property and will need to be acquired during project implementation.

Multimodal Coordination – The trail should be a shared-use trail, to accommodate both bicyclists and pedestrians.

Multi-jurisdictional Coordination – The proposed trail will connect to other facilities and destinations within the City of Fredericksburg only.

Safety and Security – The Fall Hill Avenue Trail will be separated from vehicular traffic, once it has crossed an extended Mary Washington Boulevard.



Map 4. Fall Hill Avenue Trail

Rappahannock River Heritage Trail

Type: Combination of separate path as well as bicycle lanes.
Location: Ford Street to intersection of Canal Path Trail and Fall Hill Avenue.
Length: 1.5 Miles

Description: Install a crosswalk where the Canal Path Trail meets Princess Anne Street and designate a route to the corner of Ford and Caroline Streets. Construct a separate path on the south side of Caroline Street to Mill Park Terrace, cross Caroline Street at the entrance to Old Mill Park and continue along the north side of Caroline Street and Riverside Drive, from the entrance of Old Mill Park to the intersection of Riverside Drive and Fall Hill Avenue. From this point, the preferred route is to follow Fall Hill Avenue (on its north side) to the Canal Path. Because the river cuts in close to the road, for a short distance, an alternate route is to install a crosswalk at Wellford Street and install a bicycle lane along Wellford Street, Hanson Avenue, and Normandy Avenue to its intersection with Fall Hill Avenue. This alternate route is the more feasible route until the physical obstacle along the preferred route can be overcome.

Construction Considerations: The corner of Ford and Caroline Streets will need to be bumped out to accommodate a trail around the corner of a stone retaining wall. The trail on the south side of Caroline Street avoids wetlands impacts. By crossing to the north side of Caroline Street, at the entrance to Old Mill Park, the trail avoids any conflicts with driveways or other curb cuts. A change in elevation occurs in the vicinity of the Falmouth Bridge. At Wellford Street, there are two options. The most cost effective alternative is to establish bicycle lanes on Wellford Street to Hanson Avenue, along Hanson Avenue to Normandy Avenue, and along Normandy Avenue to Fall Hill Avenue. This route would be 1,950 feet long (.37 miles). The alternative, but preferred, route would be to maintain the separate path on the north side of the road and continue for 2,600 feet (.49 miles) from Wellford Street to the Rappahannock Canal. This option has a major obstacle to overcome where the Rappahannock River cuts in close to Fall Hill Avenue.

Consistency with Applicable Performance Criteria:

Accessibility – The proposed trail will connect Old Mill Park and the Canal Path Trail, increasing the accessibility of the surrounding neighborhoods to both of these recreational opportunities.

Directness – The new trail will follow existing roadways which are already well used travel corridors.

Continuity – A crosswalk will need to be established at Princess Anne Street, to link the existing Canal Path Trail to Ford Street. Another crosswalk will be needed at Mill Park Terrace, to link this trail to Old Mill Park and the Riverside Drive Trail. Locating the separate trail between the Rappahannock River and the roadway ensures that there will be no breaks in that section of this facility. The bicycle lanes will follow an existing

roadway with crosswalks needed at Riverside Drive and Wellford Street and at Hanson Avenue and Fall Hill Avenue. There is a bridge across the Rappahannock Canal, connecting the Canal Trail to Normandy Avenue, as well as a bridge across the Canal adjacent to Fall Hill Avenue.

Consistency – A shared use path will be approximately the same width as the Canal Path Trail and can be kept consistent along Caroline Street, from the corner of Ford Street to Mill Park Terrace. The route down Ford Street will need to be accommodated along the sidewalk or within the roadway as a bicycle lane. This trail entails two types of facilities, a separate shared use path as well as bicycle lanes. The transition from one to the other occurs at a corner, however, allowing a user to adapt to the change. The alternate route that would continue the separate path along the river would overcome this change in facility types.

Route Attractiveness – The proposed path will be located within the scenic Rappahannock River corridor. It will pass through a wooded corridor, interspersed with historic mill sites and then break out on river bluffs overlooking the river.

Low Conflict – Establishing the trail on the west side of Caroline Street avoids wetlands and the entry drive to Old Mill Park. A proposed townhouse development on the west side of the road will introduce a 30-foot wide driveway that will need to be crossed. The path on the north side of Riverside Drive, will avoid driveways or breaks in the curb. The bicycle lanes are routed to Hanson Avenue, in order to avoid the dangerous crossing (due to inadequate sight distance) at Riverside Drive and Fall Hill Avenue.

Ease of Implementation – Right-of-way for the proposed trail will need to be acquired. The proposed townhouse development provided an eight-foot wide trail alignment across their frontage, which will accommodate approximately 250 feet of the trail. The necessary rights-of-way are on publicly owned property. The alternative route continues the separate shared use path past Wellford Street, following Riverside Drive to Fall Hill Avenue. The trail would be routed between these roads and the river, avoiding street crossings, but requiring a substantial boardwalk type structure where the river cuts in close to the roadway. This structure will need to be strong enough to withstand flooding and shearing since the river flow exerts a direct impact on this vulnerable site.

Multimodal Coordination – The trail will be a pedestrian/bicycle route.

Multi-jurisdictional Coordination – The proposed trail will connect to other facilities and destinations within the City of Fredericksburg only.

Safety and Security – Most of the trail will be a path that is physically separated by a curb from vehicular traffic. The section of this route that must be developed on-street will adhere to standard bicycle lane criteria. A guardrail will be needed at the corner of Ford and Caroline Streets, where the trail will be narrow because of the existing stone retaining wall.

Virginia Central Railway Trail

Type: Separate shared use trail

Location: Old railroad freight station (at 406 Lafayette Boulevard) to the west City Limit at Interstate-95.

Length: 3.5 miles

Description: Construct a trail along the rail bed of the historic Virginia Central Railway. This recreational corridor extends beyond the City limits for another 30 miles to the Town of Orange.

Construction Considerations: Most of this trail route is a graded rail bed, where the rails and ties have been removed. Some areas have eroded, however, and others have been altered by earth moving associated with nearby development. Significant man-made barriers exist at the Blue and Gray parkway and the Jefferson Davis Highway. The right-of-way also crosses Hazel Run in four locations. One crossing, at Lafayette Boulevard already has a bridge with a sidewalk on one side and room for a shared use path on the other. The three additional Hazel Run crossings occur between I-95 and Jefferson Davis Highway and have a combination of stone and concrete abutments in place that can potentially be reused. When the trail is extended into Spotsylvania County, a crossing will be needed at Interstate-95. There are several granite culverts along the railway that date to its period of construction in the mid nineteenth century. Most of these are still functional but some will need to be inspected and repaired in order to continue to be useful components of this facility.

Consistency with Applicable Performance Criteria:

Accessibility – The trail will be accessible from downtown Fredericksburg and residential neighborhoods, including the Idlewild development.

Directness – The trail will open up a new travel route from the Idlewild development to downtown Fredericksburg.

Continuity – This trail will provide exceptionally long sections of uninterrupted travel. Intersections will occur at the Route 1 Bypass (Jefferson Davis Highway) and the Blue and Gray Parkway.

Route Attractiveness – The trail courses through mature woods, a battlefield, as well as historical urban areas. The route generally follows Hazel Run and presents numerous opportunities for historical interpretation.

Low Conflict – Conflict will occur primarily at the trail's urban end, requiring coordination with commercial parking lots and crossings at two busy intersections (Blue and Gray Parkway and Jefferson Davis Highway).

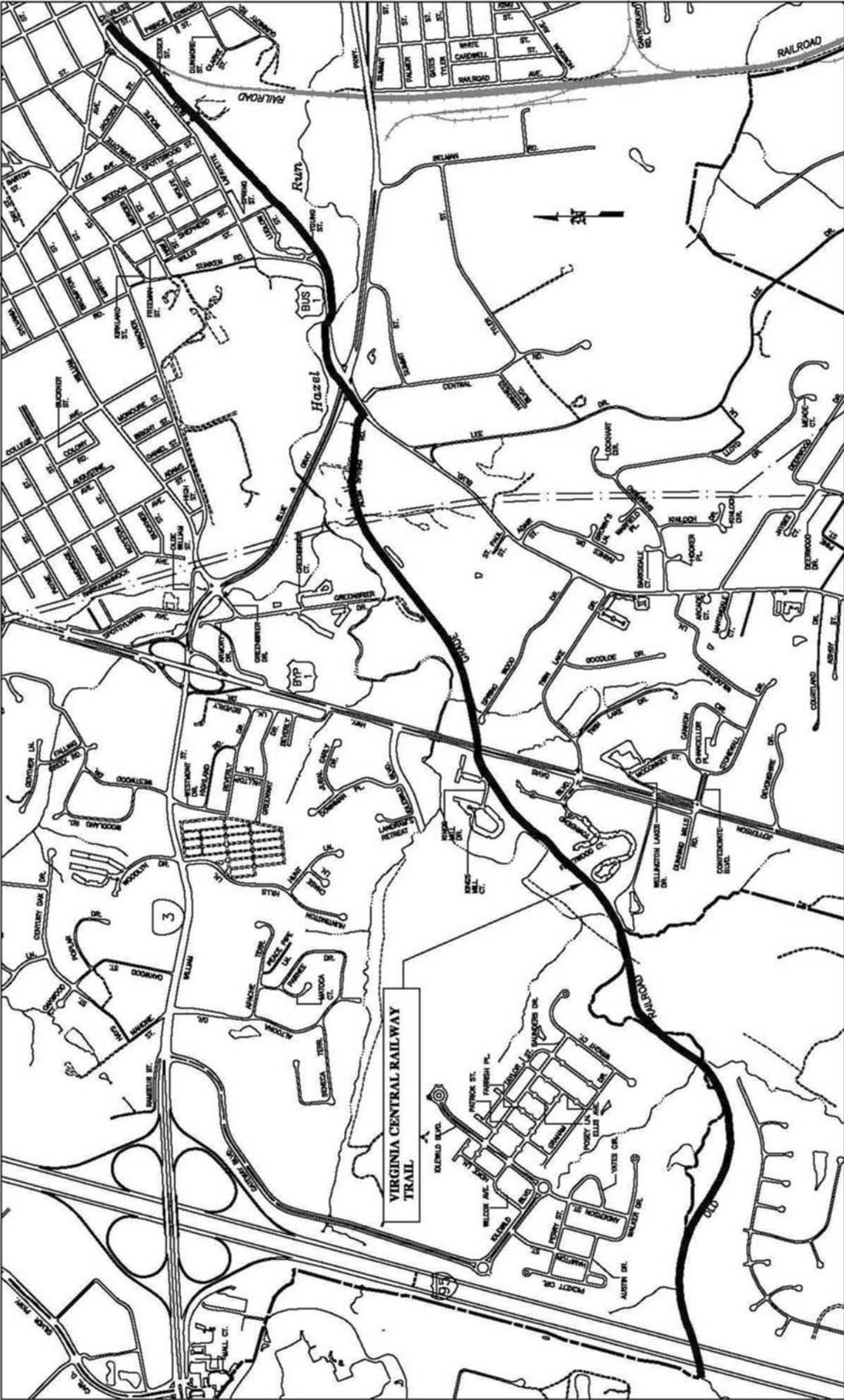
Ease of Implementation – A large portion of the required right-of-way is publicly owned. Construction will be relatively basic on the sections of the right-of-way that are

intact, but eroded and disturbed areas will require additional effort to make them usable. Major obstacles will be the two busy highways.

Multimodal Coordination – This trail will connect several residential areas with the downtown rail station. Additional bicycle parking facilities will need to be placed at the rail station when this project is completed.

Multi-jurisdictional Coordination – The Virginia Central Railway bed extends from Fredericksburg through Spotsylvania County, to Orange County. Each jurisdiction has expressed interest in the potential for a recreational trail to extend its full length.

Safety and Security – The existing bridge abutments at the Hazel Run crossings will need to be evaluated for their suitability for reuse. User safety at the two roadway crossings is also critical.



Map 6. Virginia Central Railway Trail

North-South Trail

Type: Separate shared use trail
Location: Fall Hill Avenue to Virginia Central Railway
Length: 2.9 miles – 0.75 miles from Fall Hill Avenue to Cowan Boulevard; 0.70 miles from Cowan Boulevard to Route 3; and 1.47 miles from Route 3 to the Virginia Central Railway.

Description: Between Route 3 and Fall Hill Avenue, incorporate a separate shared use trail along one side of an extended Mahone Drive and a sidewalk along the other side. Between Route 3 and the Virginia Central Railway (VCR), incorporate a shared-use trail along Gateway Boulevard into the Idlewild development. Continue along Idlewild Boulevard to the second roundabout, then establish a shared use path in the greenway to the VCR Trail at the one location where this latter trail crosses to the north side of Hazel Run.

Construction Considerations – Gateway Boulevard is an established roadway with a sidewalk on one side. This sidewalk could be widened to establish a shared-use path or a separate shared-use path could be constructed on the west side of the road, to connect to a shared-use trail to the VCR. Mahone Street is planned as a developer funded project and actual construction will depend on the private need for this roadway during the development process. Safe crossings will also be required at the trail intersection with Cowan Boulevard and Route 3.

Consistency with Applicable Performance Criteria:

Accessibility – The proposed trail will provide a critical north-south link, between the Idlewild and Altoona neighborhoods and Cowan and Fall Hill Avenues. In addition, this facility will link neighborhoods north and south of Route 3 to the Virginia Central Railway Trail, which will provide access to downtown Fredericksburg.

Directness – The trail will follow a shared-use path and Idlewild and Gateway Boulevards from the Virginia Central Railway Trail to Route 3 and then the proposed travel corridor of Mahone Street (extended) between Route 3 and Fall Hill Avenue.

Continuity – The trail will connect with similar facilities at Cowan Boulevard and Fall Hill Avenue. A Route 3 crossing is a major problem, but a critical need. The trail will also connect with the Idlewild trails system.
-use path along its entire length.

Consistency – The trail will be a shared-use path along its entire length.

Route Attractiveness – The Virginia Central Railway and Idlewild are wooded areas. The route will need to negotiate a commercial area near Route 3, but will run adjacent to a preserved and wooded historic area near Cowan Boulevard. Additional wooded areas will remain intact north of Cowan Boulevard.

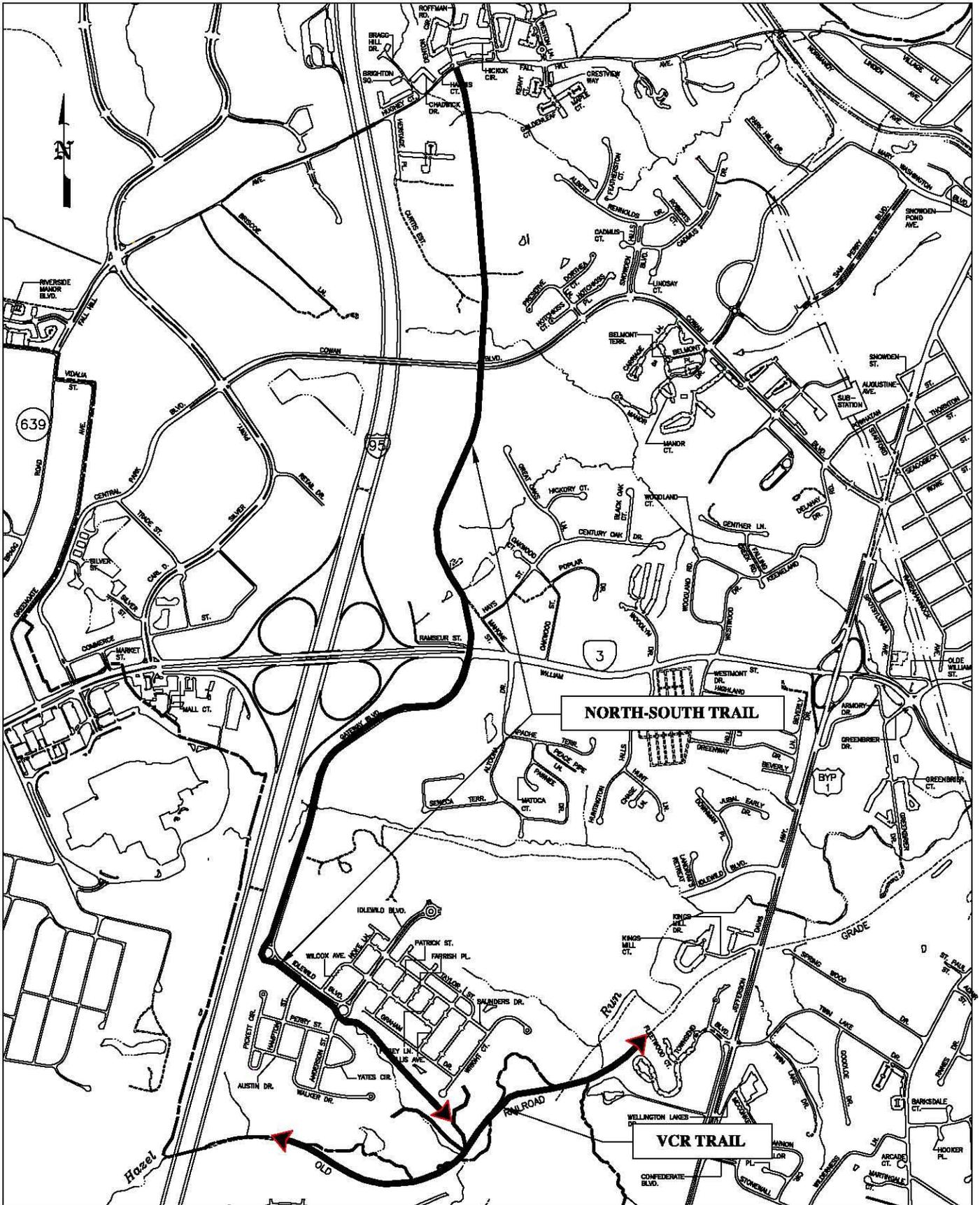
Low Conflict - This trail route is not yet developed, but potential conflicts are anticipated near Route 3 and at the intersection with Cowan Boulevard.

Ease of Implementation – North of Route 3, the necessary right-of-way will be obtained and the planned facilities constructed by private developers, as Mahone Street is constructed. South of Route 3, the trail will follow an existing right-of-way as well as course through public green space.

Multimodal Coordination – The trail will accommodate both bicycle and foot travel.

Multi-jurisdictional Coordination – There are no opportunities for multi-jurisdictional links with this project.

Safety and Security – The trail north of Route 3 will be separated from the vehicle travel lanes. Intersections will be signaled and signed. The trail south of Route 3 will be clearly marked.



Map 7. North-South Trail

Lafayette Boulevard Trail

Type: Separate shared use path
Location: South City limit to the Virginia Central Railway trail connection at the Blue and Gray Parkway
Length: 1.5 miles
Description: Incorporate a sidewalk on one side of Lafayette Boulevard and a shared use trail on the other side, when that roadway is widened and improved.

Construction Considerations – Improvements to Lafayette Boulevard will need to be coordinated with the existing Blue and Gray Parkway. A bicycle lane and a sidewalk are already in place at the Hazel Run bridge. From the Hazel Run bridge, an off-road connection will need to be made to the Virginia Central Roadway bed that continues into downtown Fredericksburg.

Consistency with Applicable Performance Criteria:

Accessibility – The proposed sidewalk and trail will link numerous neighborhoods along Lafayette Boulevard with downtown Fredericksburg and the rest of the pathway system. This trail would also offer potential links to schools.

Directness – The sidewalk and trail will be constructed within an established travel corridor that is already very heavily used. Because of property ownership issues and topographic limitations, there will be no opportunities for deviating from the existing right-of-way. Consequently, the pedestrian/bicycle facilities will bear the full brunt of a significant change in elevation between Hazel Run (38 feet) and the uplands (220 feet) that occurs over a distance of only 3,500 feet.

Continuity – Lafayette Boulevard is accessed by numerous subdivision roads and driveways. Modal conflicts will characterize much of this route, but providing bicycle/pedestrian facilities is critically important as this road is already heavily used by people on foot and on bicycles. The many roads and driveways can also be viewed as access points to the proposed sidewalk and trail.

Another significant trail along the Central Virginia Railway route, from the Idlewild development, will connect to the Lafayette Boulevard trail just east of the Blue and Gray Parkway.

Consistency – A sidewalk and a bicycle trail can be kept consistent through the Lafayette Boulevard corridor. This standardization will support a consistent use of safety features, which will enhance their effectiveness.

Route Attractiveness – Lafayette Boulevard retains an eclectic local charm that has not been overwhelmed by national retailers. It is a developed route except for a section that is fronted by a National Park (Fredericksburg Battlefield).

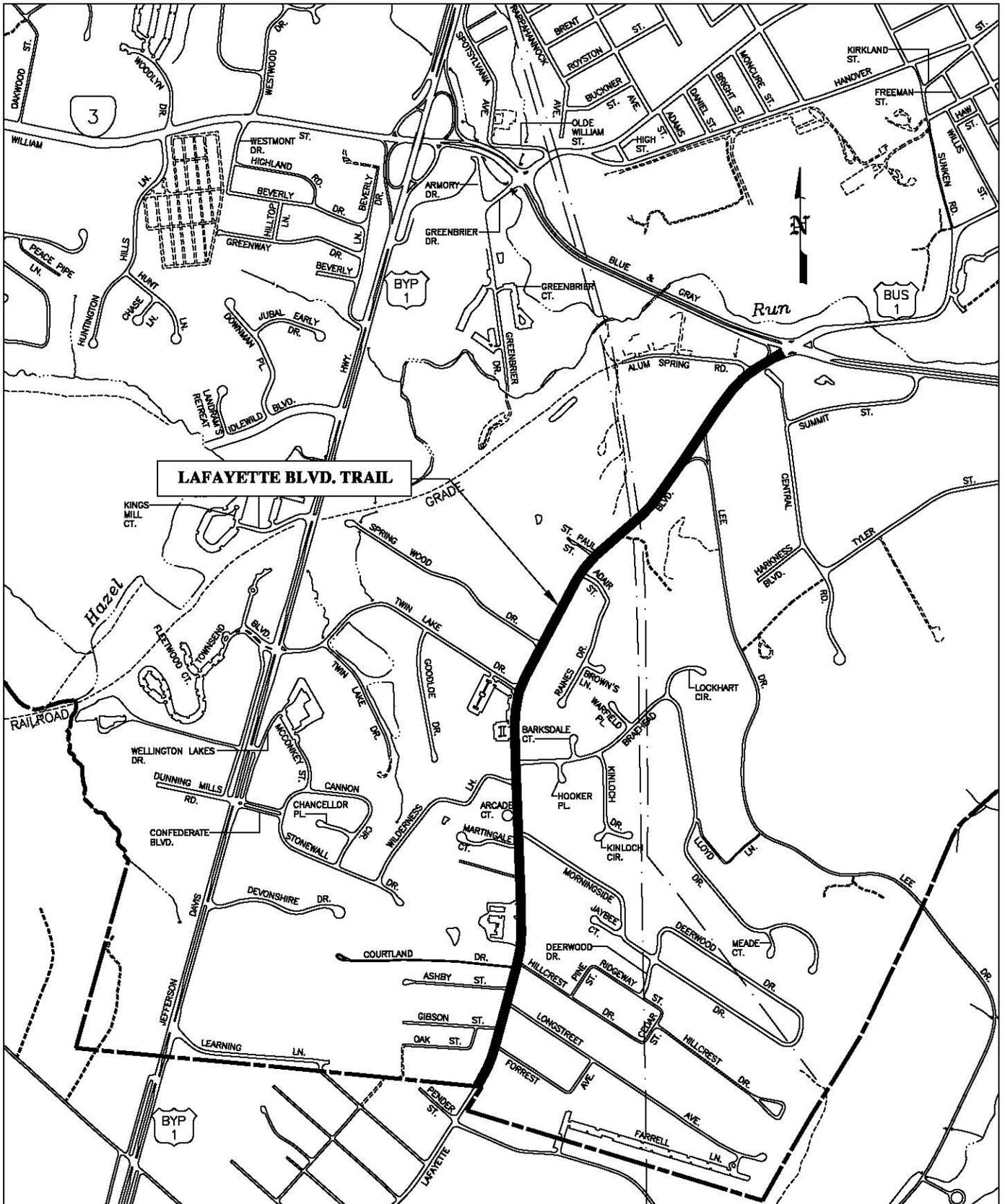
Low Conflict – As noted above, there will be numerous conflicts with subdivision roads and driveways. A comprehensive safety program will need to be implemented during construction of the sidewalk and the shared use trail.

Ease of Implementation – The sidewalk and trail rights-of-way will be acquired in conjunction with the road improvement project.

Multimodal Coordination – A Lafayette Boulevard sidewalk and shared use trail will provide access to the downtown rail station, which provides both AMTRAK and VRE service. Bicycle racks were installed at the rail station in 1996 and additional bicycle parking facilities can be added when this trail is completed.

Multi-jurisdictional Coordination- The Lafayette Boulevard bicycle trail could be readily extended into Spotsylvania County should that jurisdiction decide to develop similar facilities. This section of Lafayette Boulevard may also become part of the East Coast Greenway (discussed further under Regional Connections).

Safety and Security – The proposed sidewalk and shared use trail will be constructed within a busy vehicular corridor with more than a dozen connector and subdivision roads along the way. Appropriate striping, barriers (including trees), and signs will be needed to ensure user safety. The crossing at the Blue and Gray Parkway will be important for both the Lafayette Boulevard Trail as well as the Central Virginia Railway Trail, from Idlewild.



Map 8. Lafayette Boulevard Trail

Cowan Boulevard/William Street Connector

Type: Separate shared use trail

Location: Along Cowan Boulevard, from Powhatan Street, across the Jefferson Davis Highway and extending to William Street.

Length: .6 miles

Description: Extend the Cowan Boulevard shared use trail to Jefferson Davis Highway, provide a signalized crossing across the highway, and continue construction of a shared use path to William Street, either following the existing power easement to Rappahannock Avenue or using Spotsylvania Avenue.

Construction Considerations: The right-of-way along Cowan Boulevard is cleared. Safe crossings will need to be established at Powhatan Street/Keeneland Road and at Jefferson Davis Highway. The route between Jefferson Davis Highway and William Street will require permission from Virginia Power to establish a trail within their easement. If Rappahannock Avenue is used, a short connection will need to be made from the end of that street to William Street. A short segment of connecting sidewalk will also need to be constructed along the north side of William Street, between High Street and the Blue and Gray Parkway.

Consistency With Applicable Performance Criteria:

Accessibility – This connector will be accessible from neighborhoods and apartment complexes on both sides of Jefferson Davis Highway.

Directness – The trail will provide an important north-south link in the shortest distance possible.

Continuity – Two barriers exist along this alignment at Powhatan Street/Keeneland Road and Jefferson Davis Highway. Both can be overcome with crosswalks.

Consistency - The trail will be identical to the existing Cowan Boulevard shared use path.

Route Attractiveness – This connector will be a utilitarian route that will link different portions of the overall pathway system. There are no anticipated opportunities for vistas or interpretive panels.

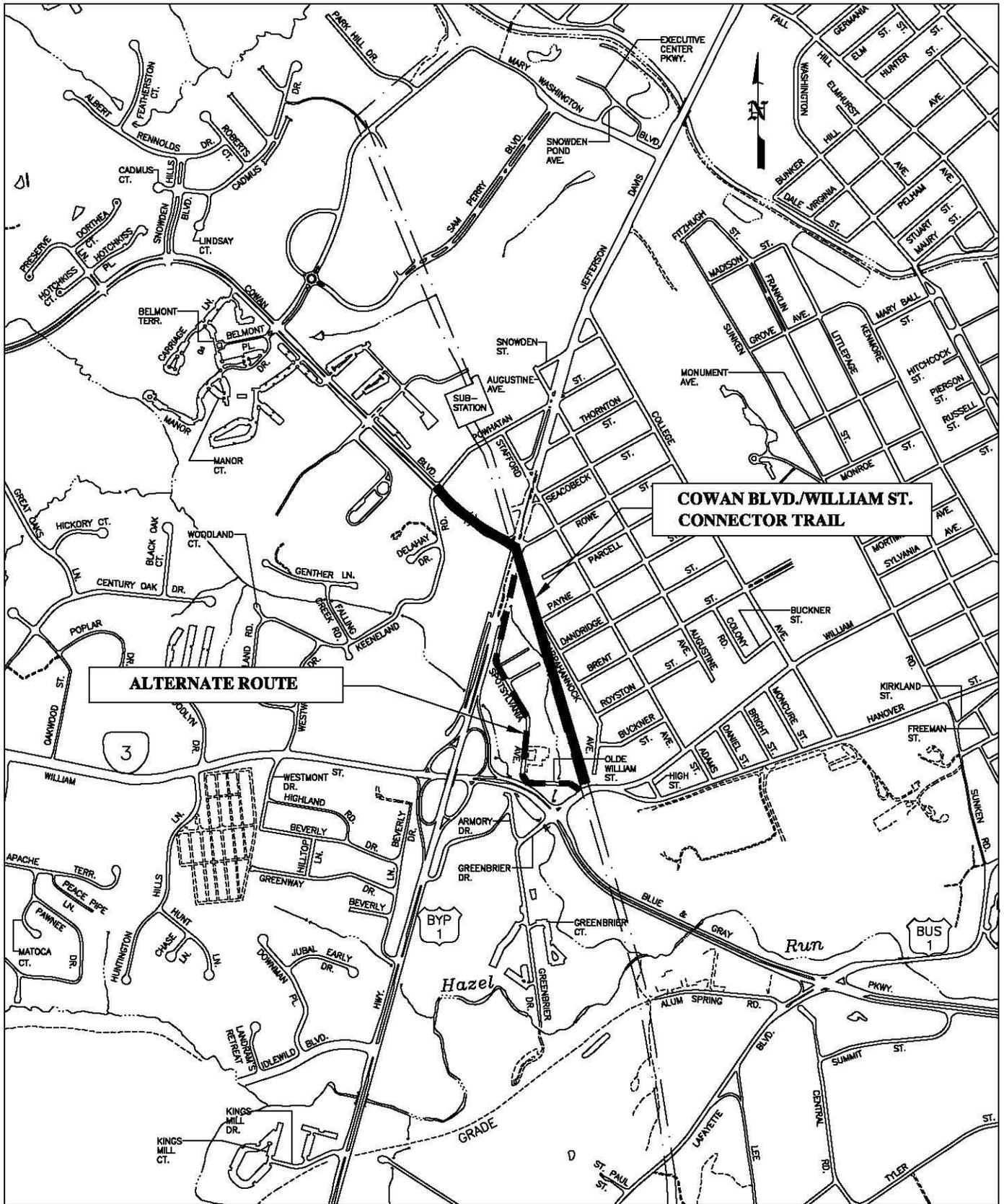
Low Conflict – Conflicts with motorized vehicles will occur at both proposed intersections.

Ease of Implementation – Permission will be needed from both Virginia Power (for use of their easement) and from private property owners.

Multimodal Coordination – The trail will accommodate both bicycle and foot travel.

Multi-jurisdictional Coordination - There are no opportunities for multi-jurisdictional links.

Safety and Security – The trail will be separated from vehicle travel lanes except at the two intersections. Appropriate striping and signs will be needed at Powhatan Street/Keeneland Road. Striping and signalization will be needed at Jefferson Davis Highway.



Map 9. Cowan Boulevard/William Street Connector

William Street/Plank Road Trail

Type: Separate shared-use path

Location: Woodlyn Drive to the William Street/Old William Street Intersection

Length: 0.6 miles

Description: Incorporate a separate shared-use trail on the north side of William Street, when that roadway is widened and improved, when adjacent property is redeveloped, and when the Jefferson Davis Highway/William Street interchange is improved.

Construction Considerations: The William Street corridor is Fredericksburg's primary east-west route while Jefferson Davis Highway is one of the City's main north-south routes. Both roads require significant improvements, but are listed as separate projects in the regional long-range transportation plan. As a consequence, construction of this shared-use trail will need to be coordinated with both roadway projects.

Consistency with Applicable Performance Criteria:

Accessibility – The proposed trail will provide a critical link between numerous apartment buildings and neighborhoods west of Jefferson Davis Highway with the downtown community that is east of that north-south highway.

Directness – The trail will be established within an existing travel corridor that is already heavily used. Because of property ownership issues and topographic limitations, there will be no opportunities for deviating from the existing right-of-way. Consequently, the shared use trail will have a significant change in elevation between Woodlyn Drive (214 feet) and the William Street/Old William Street intersection (91 feet), within a distance of only 3,200 feet.

Continuity – The proposed trail will serve many Fredericksburg residents, but there will be modal conflicts to address at the Jefferson Davis Highway/William Street interchange. This trail will connect to the Cowan Boulevard/ William Street Connector in the vicinity of William Street.

Consistency – A shared-use trail on the north side of William Street can be kept consistent for the length of the proposed route.

Route Attractiveness – The William Street corridor between the uplands and the Smith Run valley is characterized by wooded slopes and will remain reasonably attractive if the trees along the corridor are maintained during any redevelopment.

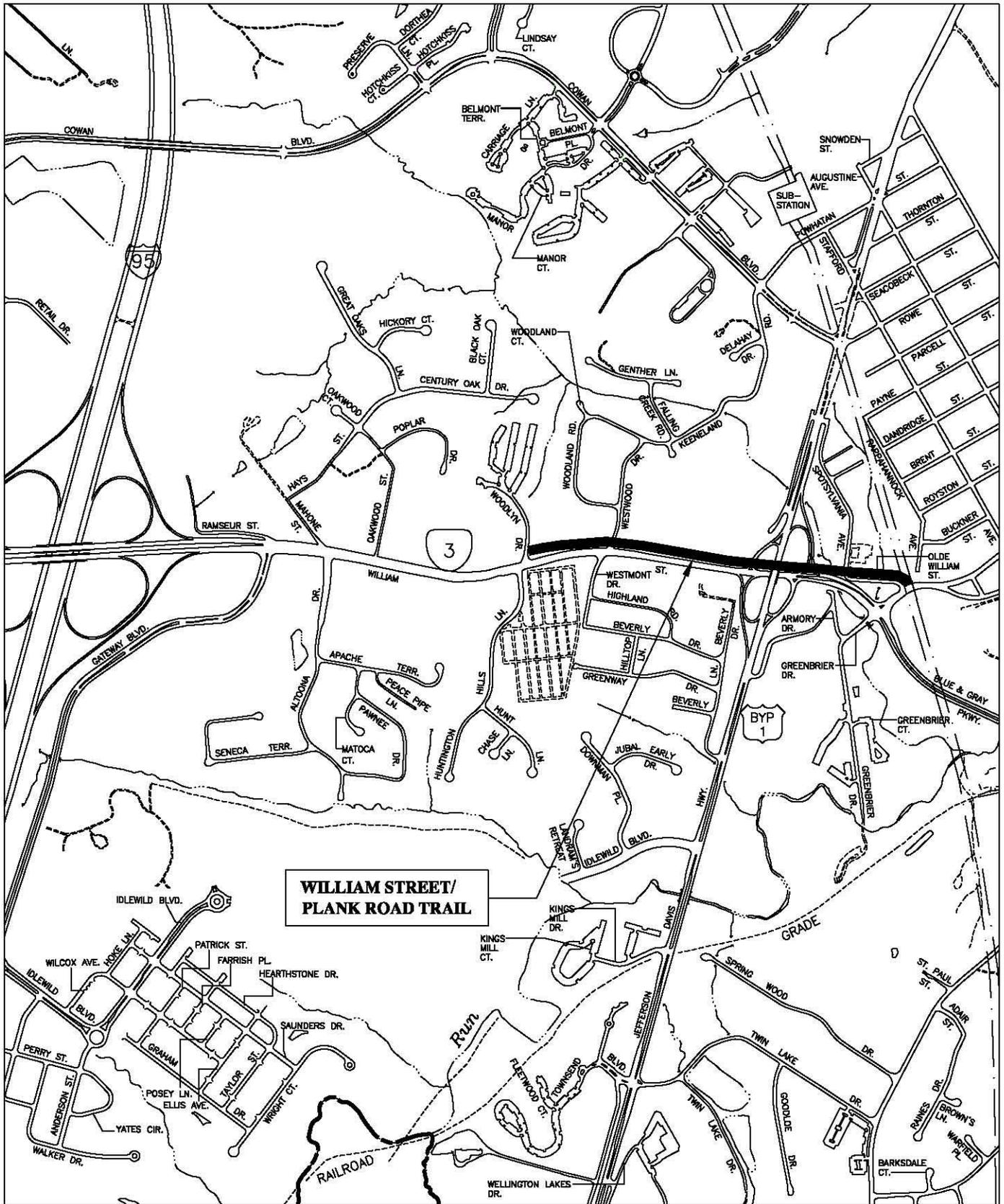
Low Conflict – As noted above, there will be a significant modal conflict between the proposed shared use trail and the Jefferson Davis Highway/William Street interchange. This conflict will need to be addressed when the interchange is improved.

Ease of Implementation – The right-of-way for the shared use trail will be acquired in conjunction with the related road improvement projects.

Multimodal Coordination - The proposed shared use trail will improve access from residential areas west of Jefferson Davis Highway with the downtown rail station, which provides both AMTRAK and VRE service. The trail will also accommodate both bicycle and foot travel.

Multi-jurisdictional Coordination – There are no opportunities for multi-jurisdictional links with this project.

Safety and Security – The proposed trail will be constructed within a busy travel corridor. Appropriate striping, barriers (including trees), and signs will be needed to ensure user safety.



Map 10. William Street/Plank Road Trail

Shared Roadways

On road bicycle facilities provide the most effective bicycle network because they connect with everything that is accessible by motor vehicle. Their limitation is that they should not be used by pedestrians. Pedestrian access should continue to be provided through sidewalks and shared-use trails. The road width is the critical variable for a roadway to be able to accommodate bicycle travel. There are four basic shared roadway facilities, as follows:

Shared Roadway-Paved Shoulders – There are four basic shared roadway facilities. The first are paved shoulders, consisting of roadway shoulders that are at least four feet wide, to accommodate bicycle travel. Such features are suited to roads without curb and gutter and where vehicular volumes and speeds are high. The roads within the City of Fredericksburg that would be appropriate for paved shoulders would be routes that extend into the neighboring counties, such as Route 2/17.

Shared Roadway-Wide Outside Lane – Another type of shared roadway facility is called a wide outside lane. Roads without designated bicycle lanes, but with an outside or curb lane wider than 12 feet, can accommodate bicycle travel. A 14 foot wide lane width, not including the gutter pan, is recommended for shared use. Wider lanes can be useful to address specific conditions such as steep grades or potential hazards, but the lane should be brought back to no more than 14 feet again, to discourage two motor vehicles from using one lane.

Signed Shared Roadway – Preferred bike routes are designated with signs, to indicate to users that the route has advantages over alternatives. These routes are not necessarily ideal, but provide continuity to other (better) facilities, mark a common route for bicyclists through a busy corridor, and alert motorists of bicycle activity.

Shared Roadways-Bicycle Lanes – Bicycle lanes are incorporated into a roadway design and are quite appropriate in urban and suburban settings. Bicycle lanes should be one-way facilities, carrying bike traffic in the same direction as motor vehicle traffic. If on-street parking is permitted, the bicycle lane should be placed between the parking lane and the travel lane. Bicycle lanes should never be placed between the parking lane and the curb. A minimum of 13 feet should be allowed for a combined parking and bicycle lane, with the pavement striped to delineate the two uses.

The recommended width for bicycle lanes will vary, depending on roadway configuration as well as traffic volumes. The following are minimum widths for bicycle lanes:

- Four feet on roads with a curb and gutter
- Five feet where bike lanes are adjacent to on street parking or other static obstructions.
- Six feet where vehicle speeds exceed 50 mph or substantial truck traffic is present.

Table 4. Shared Roadways

Facility	Route	Length	Page
Springwood Drive Trail	Lafayette Boulevard to Virginia Central Railway	0.4 miles	59
Downtown Loop	Downtown to Canal Park Trail and back	2.6 miles	61
Alum Springs Loop	Downtown to Alum Springs Park and back	3.5 miles	63
Downtown-Dixon Park Route	Downtown to Dixon Park and back	1.5 miles	65

Springwood Drive Trail

Type: Shared Roadway
Location: Lafayette Boulevard to Virginia Central Railway Trail
Length: 0.4 miles
Description: On-road bicycle lanes on the Springwood Drive pavement

Construction Considerations: The proposed bicycle lanes will share the Springwood Drive pavement. A short connecting link will need to be established at the end of Springwood Drive, to connect to the Virginia Central Railway Trail.

Consistency with Applicable Performance Criteria:

Accessibility – This trail will connect directly to the Virginia Central Railway Trail in Alum Springs Park.

Directness – Springwood Drive will reduce travel time between residential neighborhoods along Lafayette Boulevard and Alum Springs Park and the Virginia Central Railway Trail.

Continuity – This trail will provide a direct connection between two planned pedestrian/bicycle facilities (Lafayette Boulevard Trail and the Virginia Central Railway Trail).

Consistency – The Springwood Drive Trail will consist of bicycle lanes on an existing roadway, to link two trails that are proposed to be separated from any roads.

Route Attractiveness - This relatively short link will be more functional than attractive.

Low Conflict – This short link will occur on a quiet neighborhood street. Clear striping on the road surface will minimize conflict between cyclists and vehicular traffic.

Ease of Implementation – The proposed facility will be established on existing public right-of-way. The link between the road ending and Alum Springs Park, however, will need to be acquired and improved.

Multimodal Coordination – There are no opportunities for multimodal connections.

Multi-jurisdictional Coordination – There are no opportunities for inter-jurisdictional connections.

Safety – A crosswalk will be established at Lafayette Boulevard, with all necessary signage. Provision of this short cut between the planned Lafayette Boulevard Trail and the Virginia Central Railway Trail will allow pedestrians/cyclists to avoid the Lafayette Boulevard/Blue and Gray parkway intersection area if they do not need to cross there.

Downtown Loop

Type: Shared Roadway

Location: Downtown to Canal Path Trail and back

Length: 2.6 miles

Description: On-road bicycle lane running north along Sophia and Caroline Streets to the Canal Path Trail then south from the Canal Path Trail along Prince Edward Street, across Lafayette Boulevard to Charles Street and back to Sophia Street, via Frederick Street.

Construction Considerations: This designated bicycle trail will consist of painting on-road bicycle lanes traveling one way only along the specified route. Appropriate signs will also need to be installed and painted on the roadway.

Consistency with Applicable Performance Criteria

Accessibility – This facility will provide a bicycle link between Downtown and the Canal Path Trail.

Directness – The bicycle lanes follow existing roadways.

Continuity – The loop will provide bicycle lanes along existing City streets.

Route Attractiveness – The route is on historic downtown streets, with river views along Sophia Street.

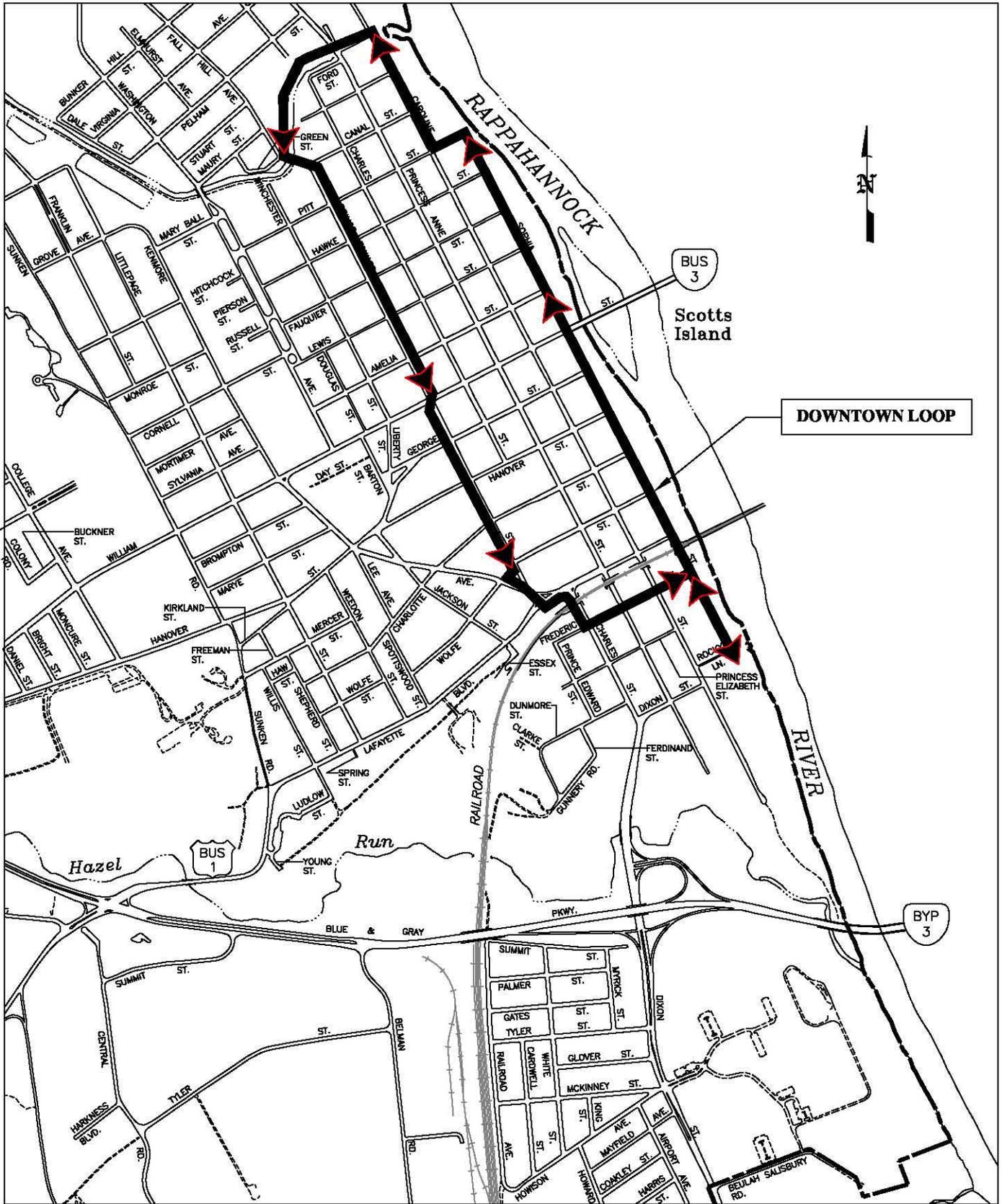
Low Conflict – On-road bicycle lanes are open to conflict between cyclists and motor vehicles, but potential problems can be reduced by clearly marked bicycle lanes and appropriate signs.

Ease of Implementation – Establishing this route along Sophia Street will require that vehicular parking along the north side of Sophia Street be eliminated. In practical terms, however, few spaces will be lost. Caroline and Prince Edward Streets are wide enough for a one-way bicycle lane on one side of the street, outside the parking lane.

Multimodal Coordination – There are no opportunities for multimodal coordination.

Multi-jurisdictional Coordination – The downtown loop will connect to the Chatham Bridge link to Stafford County.

Safety – Properly marked bicycle lanes and appropriate signage are key determinants of user safety. An evaluation of each traffic signal along this route is also in order, to ensure pedestrian/bicycle safety. Finally, Prince Edward Street should be evaluated for traffic calming devices.



Map 12. Downtown Loop

Alum Springs Loop

Type: Shared Roadway
Location: Downtown to Alum Springs Park and back
Length: 3.5 miles
Description: On-road bicycle lane running west along Amelia and William Streets to the Blue and Gray Parkway. Continue along Greenbrier Drive to Alum Springs Park. Return along Greenbrier Drive and Hanover Street.

Construction Considerations: This designated bicycle trail will consist of painting on-road bicycle lanes along the specified route and installation of appropriate signs

Consistency with Applicable Criteria:

Accessibility – This facility will provide a bicycle link between Downtown and Alum Springs Park.

Directness – The bicycle lanes will follow existing roadways.

Continuity – There are no gaps along the proposed route.

Consistency – The loop provides bicycle lanes on existing City streets. Some sections, however, may be too narrow for marked lanes and will need to be designated as marked bicycle routes only.

Route Attractiveness - The route begins and ends in historic downtown Fredericksburg and travels into the wooded Greenbrier Drive corridor and Alum Springs Park.

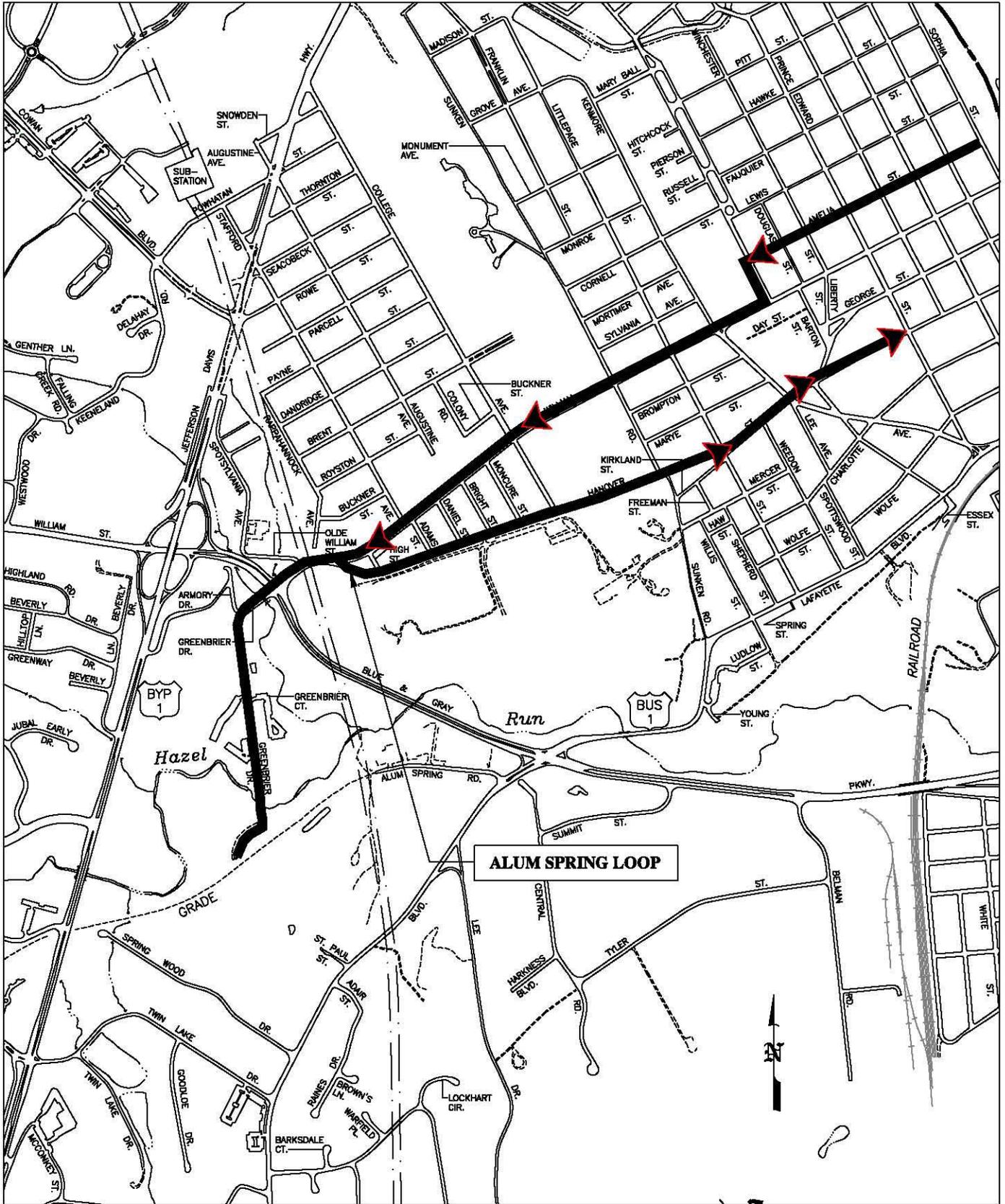
Low Conflict – On-road bicycle lanes are open to conflict between cyclists and motor vehicles, but potential problems can be reduced by clearly marked bicycle lanes and appropriate signs. Hanover Street, however, is not wide enough for bicycle lanes, east of Kenmore Avenue, so this section of the route will need to be designated a marked bicycle route only.

Ease of Implementation – Establishing this route will require careful attention to the William Street/Blue and Gray Parkway intersection and to the Hanover Street corridor (which is not wide enough to accommodate a bicycle lane).

Multimodal Coordination – There will be no opportunities for multimodal connections.

Multi-jurisdictional Coordination – There will be no opportunities for multi-jurisdictional connections.

Safety – Properly marked bicycle lanes and appropriate signage are key determinants of user safety. An analysis of the William Street/Blue and Gray Parkway intersection is needed and further evaluation of the Hanover Street corridor is warranted.



Map 13. Alum Springs Loop

Downtown-Dixon Park Route

Type: Shared roadway

Location: Downtown to Dixon Park and back

Length: 1.5 miles

Description: On-road bicycle lane running along Princess Anne Street to Dixon Street and then to Dixon Park. Return along Dixon and Caroline streets.

Construction Considerations – This designated bicycle trail will consist of painting on-road bicycle lanes along the specified route and installation of appropriate signs.

Consistency with Applicable Criteria:

Accessibility – This facility will provide a bicycle link between Downtown and Dixon Park.

Directness – The bicycle lanes will follow existing roadways.

Continuity – There are no gaps along the proposed route.

Consistency – The proposed trail provides bicycle lanes on existing City streets.

Route Attractiveness – The route travels through downtown neighborhoods. The Dixon Street corridor, however, is a very basic thoroughfare.

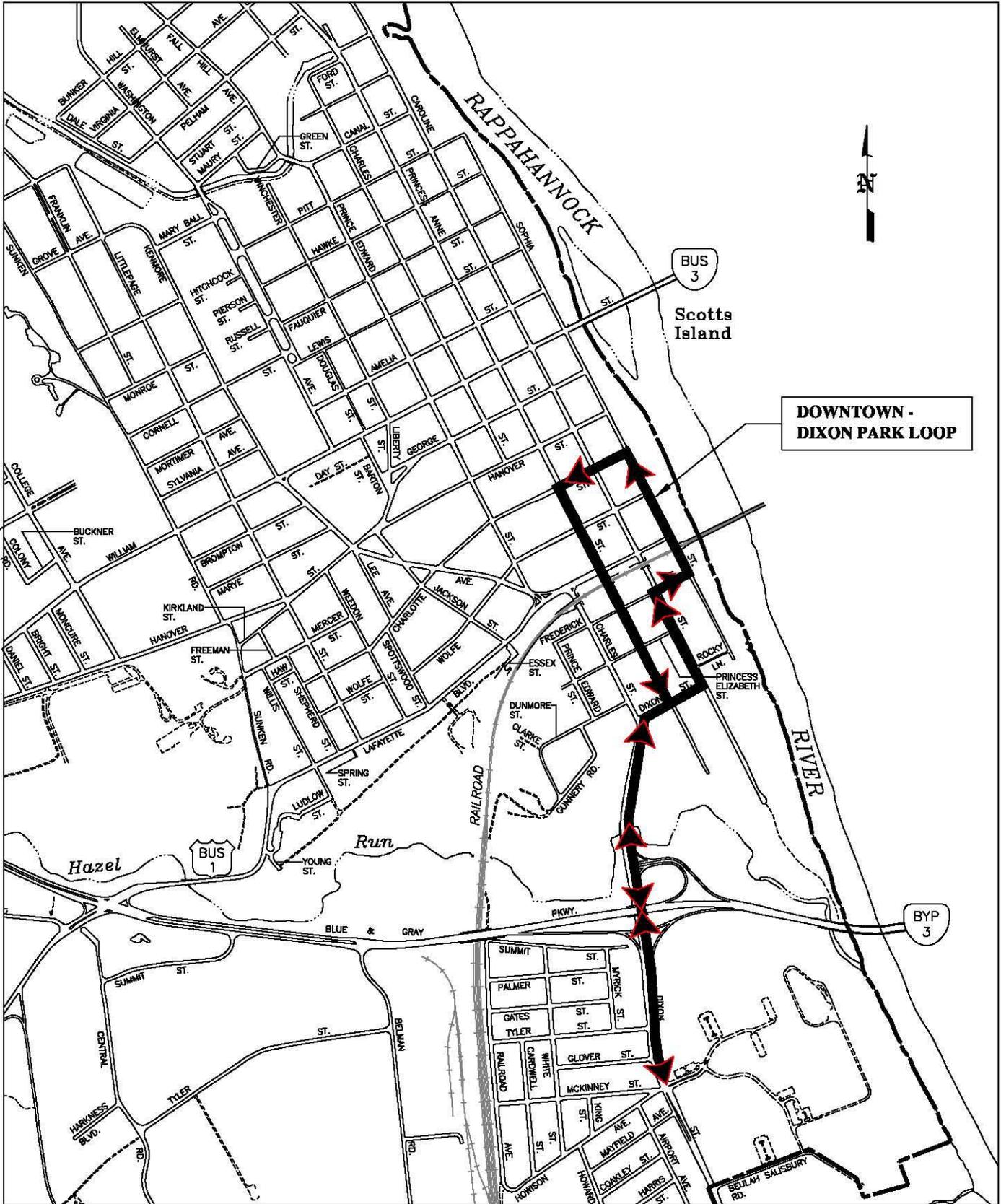
Low Conflict – On-road bicycle lanes are open to conflict between cyclists and motor vehicles, but potential problems can be reduced by clearly marked bicycle lanes and appropriate signs.

Ease of Implementation – The proposed trail can be established on existing public right-of-way.

Multimodal Coordination – The proposed route passes the downtown rail station.

Multi-jurisdictional Coordination – The Dixon Street portion of this trail could potentially be extended into Spotsylvania County, to provide a bicycle component on the Tidewater Trail (Route 2/17)

Safety – Properly marked bicycle lanes and appropriate signage are key determinants of user safety.



Map 14. Downtown-Dixon Park Route

Nature/Historic Sites Trails

Nature trails are an integral part of the pathways system. They offer residents an opportunity to get away from the streets and traffic and walk in areas that are largely unaffected by the urban landscape. Nature trails are narrower than shared-use trails, with a width not exceeding four feet. They have a natural surface and follow the contours of the natural terrain. Their construction has a minimal impact on the environment. Users are generally walkers and hikers, although some nature trails may be open to mountain bikers.

Table 5. Nature/Historic Sites Trails

Facility	Route	Length	Page
Celebrate Virginia Trails	Visitor trailheads to Embrey Dam/Rappahannock Canal Trail	Various	68
Hazel Run Trail	Rappahannock River to Interstate-95	4.6 miles	70
Fall Hill Greenway	Canal Path Trail to Snowden Park	1.0 miles	72
Idlewild Trails	Housing clusters to Virginia Central Railway Trail and to Hazel Run Trail	Various	74
Smith Run Trail (extension)	Existing trail end into future Smith Run Battlefield Park	0.3 miles	76
Dixon Park Trail	Caroline Street to Dixon Park	0.6 miles	78
Rappahannock River Trails	Along riverbank in various locations	Not yet determined	80

Celebrate Virginia Trails

Type: Nature and historic sites trail system

Location: Easement area of Celebrate Virginia, South.

Length: To be determined

Description: A trails network will be developed within the Celebrate Virginia easement area, to link visitor lodging with natural areas and historic sites between the uplands and the Rappahannock River.

Consistency with Selected Performance Criteria:

Accessibility – The trails network will be accessible from visitor accommodations in Celebrate Virginia. A link to the Embrey Dam/Rappahannock Canal Trail will also connect this trails network with the rest of Fredericksburg that lies east of I-95.

Continuity – The trails network will include a variety of trail types. Some will be somewhat primitive, for hiking only. Others will accommodate bicycles and some will be shared-use facilities.

Route Attractiveness – The trails will course through wooded uplands, across floodplains, and along the intervening slopes with scenic views of the Rappahannock River. The trails will also provide access to historic sites.

Ease of Implementation – The trails network will be established on a floodplain (prone to periodic flooding) as well as on the slopes between the floodplain and the uplands (prone to erosion). Trail construction and selection of trail surfaces will be needed to address both areas of concern.

Safety and Security – The trails will be located within a visitor/tourism campus.

Map 15. Celebrate Virginia Trails [Map not yet available in electronic format.]

Hazel Run Trail

Type: Primitive hiking trail

Location: Along Hazel Run, from the Rappahannock River to Interstate-95.

Length: 4.6 miles

Description: Establish a foot path along Hazel Run, following natural terrain contours.

Consistency with Selected Performance Criteria:

Accessibility – The trail would be accessible from Dixon Park, Old Walker-Grant School, Alum Springs Park, the Altoona and Idlewild neighborhoods, and portions of the Virginia Central Railway Trail.

Continuity – The trail will be a primitive hiking trail that will connect to similar trails from Altoona and Idlewild. It will need to share the Central Virginia Railway shared-use Trail alignment in some areas where a separate trail is not feasible.

Route Attractiveness – Hazel Run is a perennial stream in a wooded setting. There are numerous vistas and rock outcroppings. Historic sites include an extensive Confederate winter encampment site and the Virginia Central Railway bed.

Ease of Implementation – The trail route will be within the Hazel Run Resource Protection Area, a Chesapeake Bay Program designation that allows passive recreational facilities such as pathways. Hazel Run is subject to severe erosion due to inadequate stormwater management at the Spotsylvania Mall. As a consequence, any trail improvements will need to be able to withstand these impacts.

Safety and Security – A natural path in an isolated woodland setting is open to abuse. A primitive trail can also be hazardous to careless hikers. The characteristics of the trail will need to be posted at its access points.

Map 16. Hazel Run Trail [Map not yet available in electronic format.]

Fall Hill Greenway

- Type:** Natural walking trail
Location: Canal Path Trail, at Fall Hill Avenue, to Hills at Snowden and back to Fall Hill Avenue Trail.
Length: 1.0 miles
Description: Establish a natural surface foot path along an unnamed streambed.

Consistency with Selected Performance Criteria:

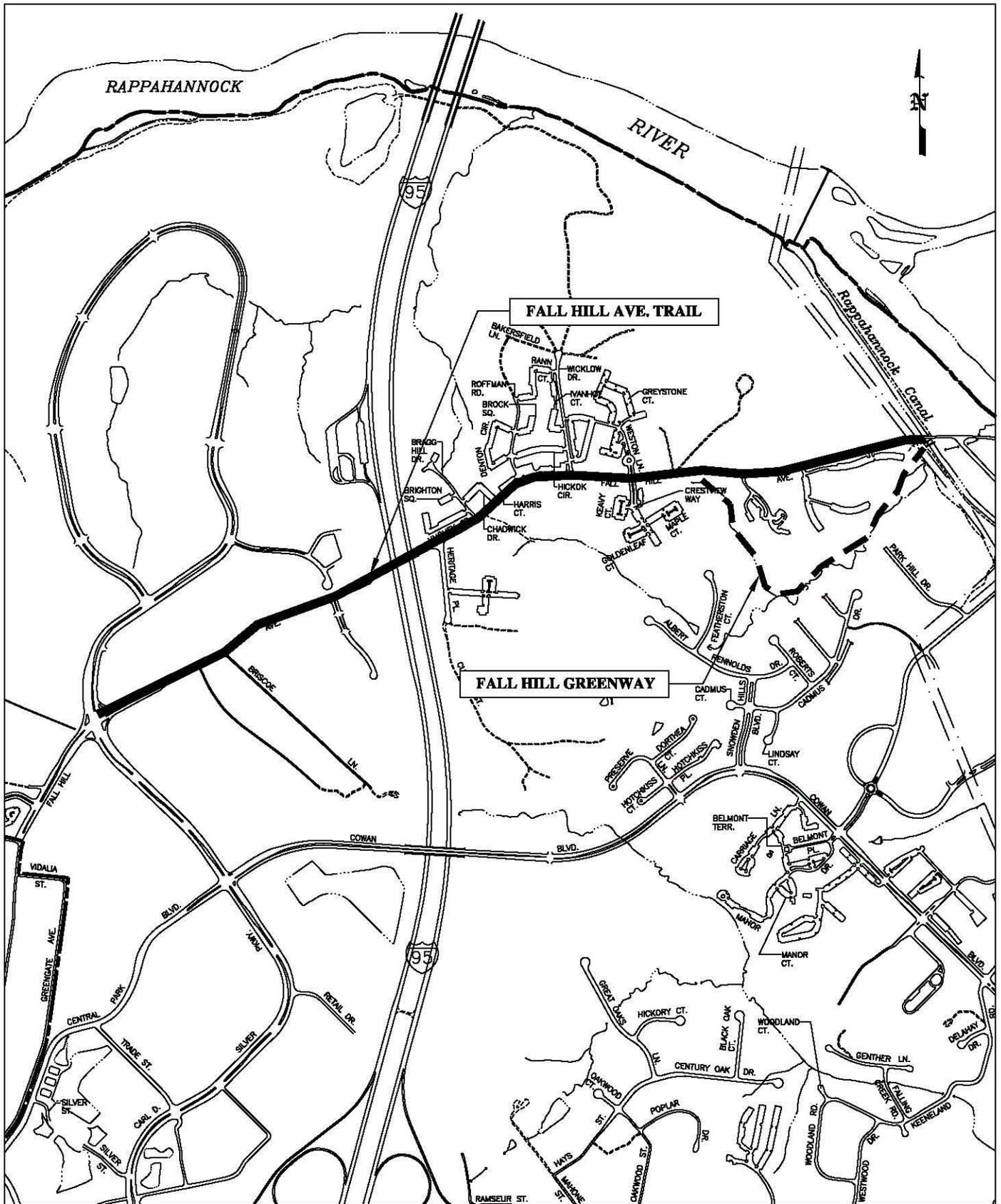
Accessibility – The trail will be accessible to the Hills at Snowden neighborhood and link them to the larger city-wide trails system.

Continuity – The trail will provide an unsurfaced, primitive link to surfaced shared-use trails along the Rappahannock Canal (Canal Path Trail) and Fall Hill Avenue.

Route Attractiveness – The trail will follow a natural streambed through wooded terrain.

Ease of Implementation – This trail route is within a Resource Management Area, a Chesapeake Bay program designation that allows passive recreational facilities such as pathways. Attention will need to be directed at avoiding erosion during construction and subsequent trail use.

Safety and Security – A natural path in an isolated setting is open to abuse. The characteristics of the trail will need to be posted at its access points.



Map 17. Fall Hill Greenway

Idlewild Trails

Type: Hiking trails system

Location: Preserved natural areas within the Idlewild development.

Length: Various

Description: A trails network will be developed within the Idlewild development, to accommodate nature walks, access to historic sites, and to provide a link to the Virginia Central Railway Trail.

Consistency with Selected Performance Criteria:

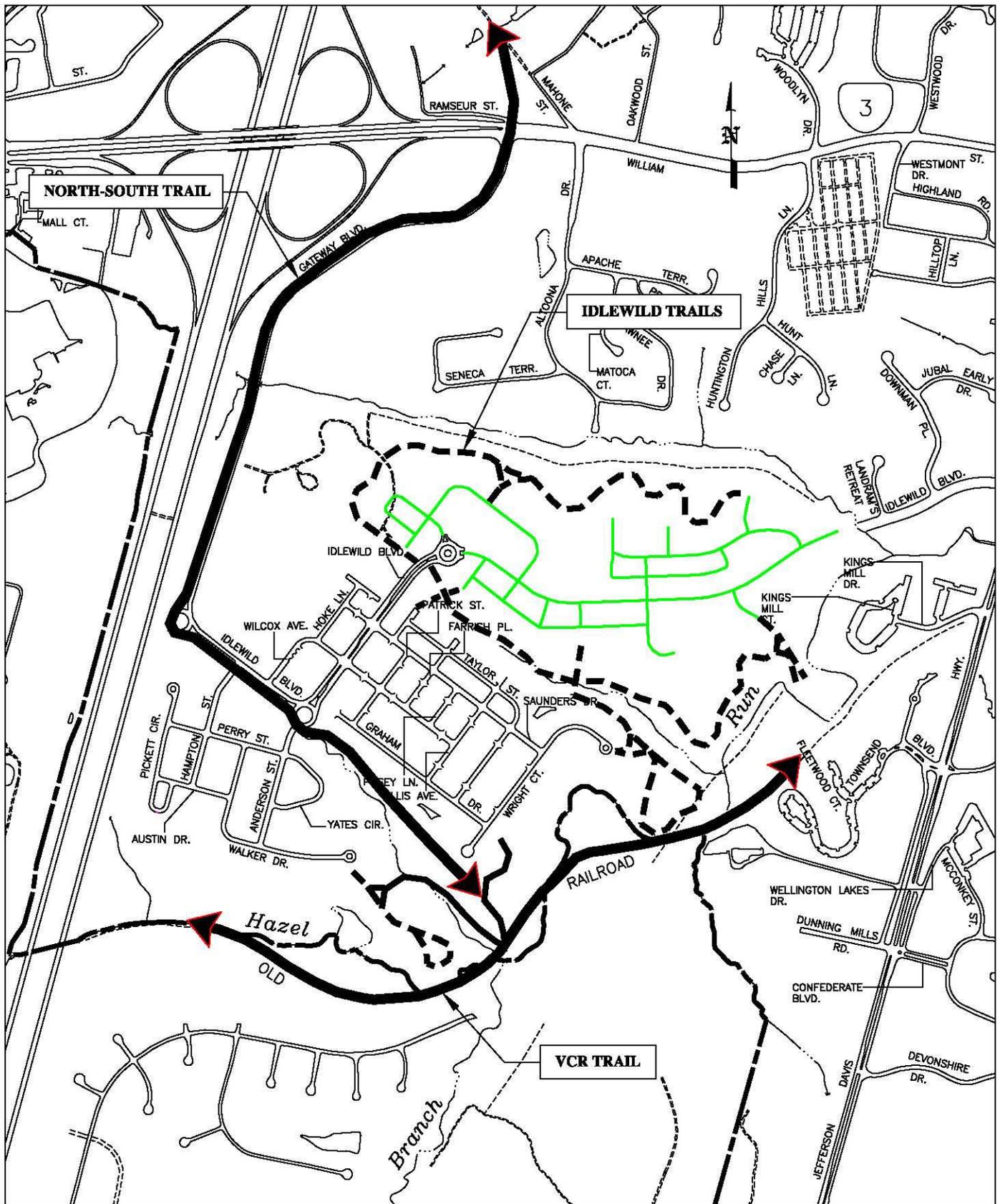
Accessibility – The trails network will be accessible from the Idlewild neighborhoods. A link to the Virginia Central Railway will connect this development with downtown Fredericksburg.

Continuity – The trails network will primarily consist of hiking trails. The link to the Virginia Central Railway Trail, however, will need to accommodate bicycle riders as well. In addition, this link will need to connect with the North-South Trail.

Route Attractiveness – The trails will run through natural areas that exhibit the characteristics of the transition zone between the Virginia Piedmont and Tidewater region. The setting is a wooded area with numerous rock outcroppings. The Virginia Central Railway is also a significant and substantial historic feature, with granite culverts that are still functional.

Ease of Implementation – The trails network will be established in areas with moderate slopes. Trail construction will need to ensure that conditions are not created that will cause subsequent erosion.

Safety and Security – The trails will be established around a populated residential neighborhood.



Map 18. Idlewild Trails

Smith Run Trail (extension)

Type: Natural and historic sites trail

Location: Smith Run valley

Length: 0.3 miles

Description: Extend an existing foot trail into a battlefield preservation area as well as provide connections to adjoining residential neighborhoods, such as Great Oaks, Westwood, and the apartments and neighborhoods along Cowan Boulevard.

Consistency with Selected Performance Criteria:

Accessibility – This hiking trail is accessible from Hugh Mercer School as well as the Great Oaks neighborhood (by crossing the earthen dam at a stormwater pond on Smith Run).

Continuity – The extended trail will be a natural foot path, consistent with the existing foot path.

Route Attractiveness – The trail will remain in a wooded area, while extending into a historic area that will be interpreted through wayside exhibit panels.

Ease of Implementation – Establishing a footpath through a mature woodland is readily accomplished with hand tools. Trail construction will need to ensure that conditions are not created that will cause subsequent erosion.

Safety and Security – The proposed trail will extend into an area that will become a public park.

Dixon Park Trail

Type: Nature trail

Location: The southern end of Caroline Street to Dixon Park

Length: 0.6 miles

Description: Construct a foot trail along the Rappahannock River from the lower end of Caroline Street, across Hazel Run, across the outfall of the municipal wastewater treatment plant, to Dixon Park.

Consistency with Selected Performance Criteria:

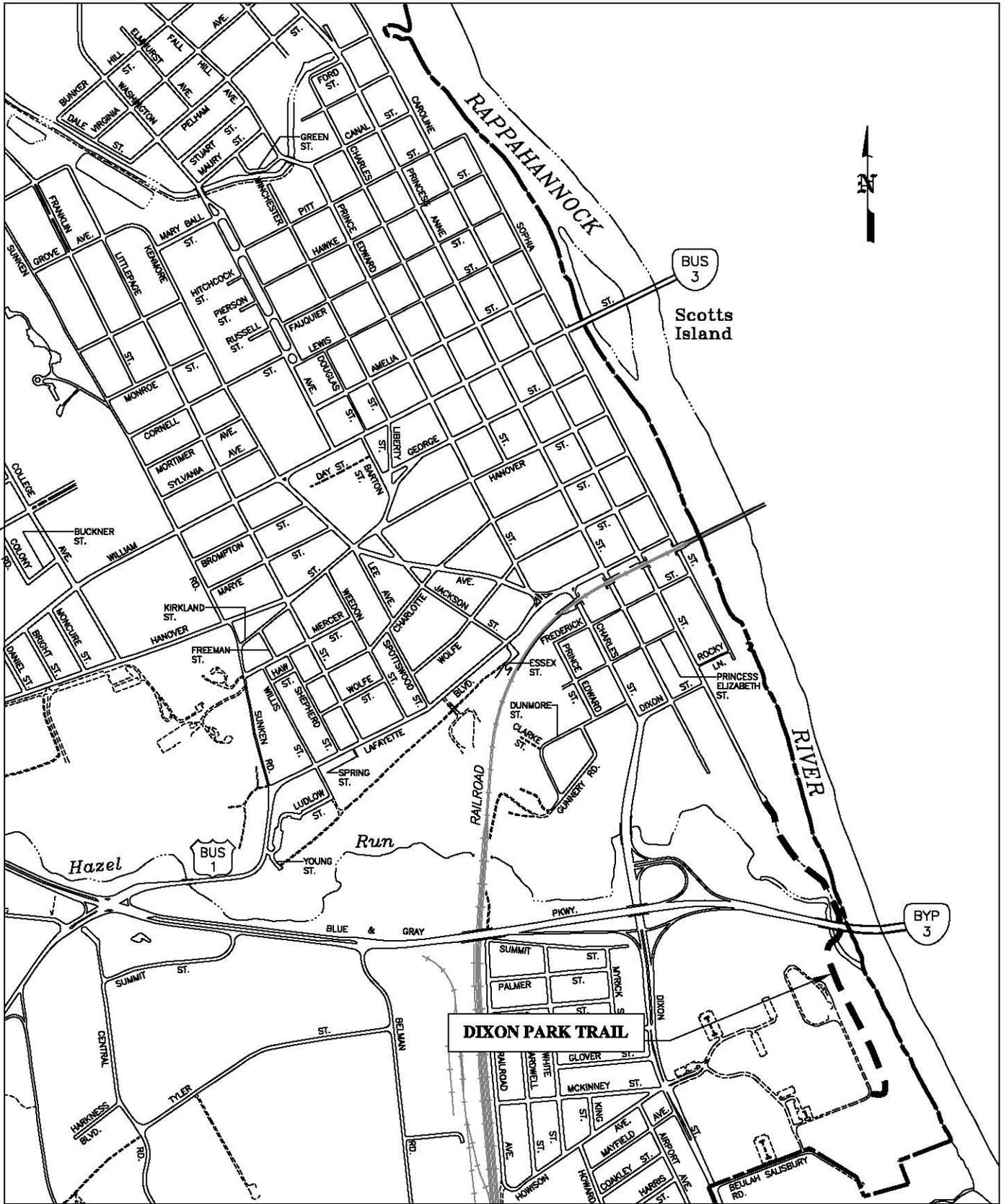
Accessibility – This trail will be accessible from neighborhoods and apartments.

Continuity – This trail cannot be used without comprehensively addressing each obstacle (Hazel Run, wastewater treatment plant outfall, change in elevation). Once completed, the trail will have no gaps.

Route Attractiveness – The trail will course through a wooded floodplain with numerous river vistas. No wayside exhibit panels will be installed within any floodplain, though.

Ease of Implementation – The proposed trail route lies within the floodplain of both the Rappahannock River and Hazel Run, so the trail surface will need to be able to withstand routine flooding. In addition, a substantial bridge will be needed at Hazel Run which can withstand the combined flood flows of Hazel Run as well as the Rappahannock River. A second bridge will be needed to cross the outfall of the municipal wastewater treatment plant. Switchbacks will also be needed to bring the trail from the floodplain (13 feet above mean sea level) to the recreational complex plateau (50 feet above mean sea level).

Safety and Security – The trail will not be safe at times of high water. In addition, a natural path in an isolated setting is open to abuse. The characteristics of the trail will need to be posted at its access points.



Map 20. Dixon Park Trail

Rappahannock River Trails

Type: Primitive hiking trails

Location: Within the Rappahannock and Rapidan Rivers corridor

Length: To be determined.

Description: Establish foot trails along the Rappahannock and Rapidan Rivers, to accommodate hikers and backpackers. Such trails will need to be developed in a manner that is consistent with adopted access policies for the City's riparian lands.

Consistency with Selected Performance Criteria:

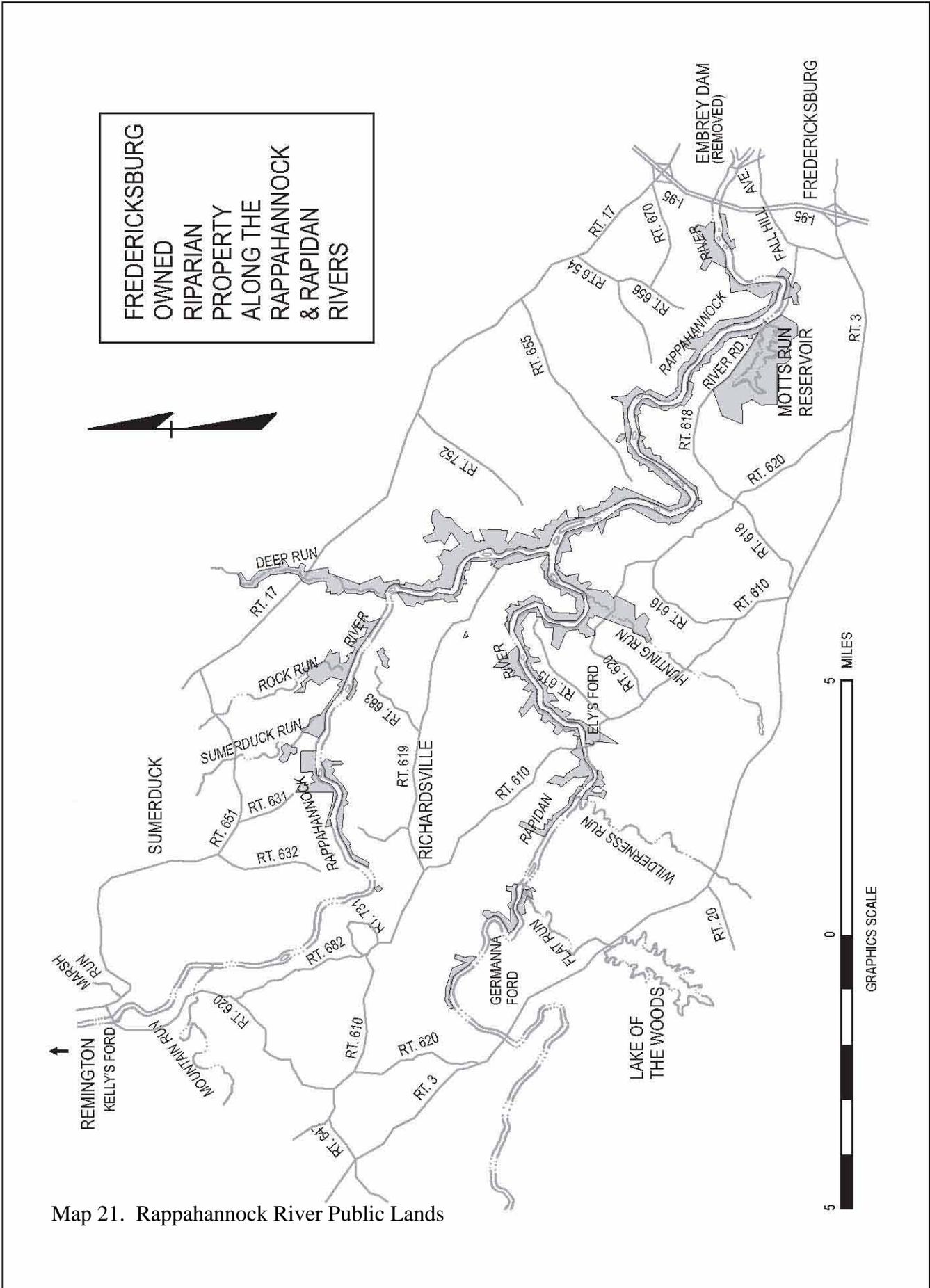
Accessibility – Due to the topography of the river corridor, available access points are limited. Providing any additional access must be carefully planned within the context of the City's riparian property policies, to maintain the natural integrity of the river resource.

Continuity – A primitive trail will have no gaps, but the terrain varies and so will the difficulty of the trail.

Route Attractiveness – The Rappahannock River corridor is an intact natural area, replete with historic resources.

Ease of Implementation – The trail will course through primitive country where heavy equipment will not be available to modify the terrain. Riparian property owned by the City of Fredericksburg rarely includes the flat upland areas. The public lands are more readily characterized by steep slopes, rock cliffs, wetlands, and visible (as well as underground) historic resources. These conditions will require careful planning and close supervision during any trail building activity. In some areas, the only viable trail route may be on private property and permission will be required if that alignment is to be used.

Safety and Security – The trail will be characterized by isolation and difficult terrain. The characteristics of the trails will need to be posted at their access points.



Map 21. Rappahannock River Public Lands

REGIONAL CONNECTIONS

Chatham Bridge Link

- Type:** Safety improvements to an existing facility
- Location:** The existing bridge spans the Rappahannock River, connecting the City of Fredericksburg and Stafford County.
- Length:** 0.16 miles
- Description:** The Chatham Bridge is a concrete structure that accommodates four lanes of traffic and has narrow 4-foot sidewalks on either side. Unless a new pedestrian bridge is to be constructed, planning must focus on improving the existing structure to accommodate suitable pedestrian and bicycle connections between Fredericksburg and Stafford County. Options include guard rails (or similar device) on the existing sidewalks, to provide a physical barrier between pedestrians and vehicular traffic. The other option would be to redeck the bridge, reducing the four lanes to three, which would allow the narrow sidewalks to be expanded to a more suitable width.

Consistency with Applicable Performance Criteria

Accessibility – There are very few links across the Rappahannock River that are suitable for pedestrians and bicyclists. Of the four existing bridges (I-95, Falmouth, Chatham, and Mayfield), only two can be used by pedestrians/bicyclists (Chatham and Falmouth). As a consequence, both bridges need to be enhanced for accessibility and safety as much as is practicable.

Directness – The Chatham Bridge is a direct link between the two jurisdictions.

Continuity – The sidewalks on the Chatham Bridge tie in directly with the City sidewalks. Connections will need to be established on the Stafford side, when that jurisdiction establishes its riverside trails to Falmouth and to Ferry Farm.

Consistency – The existing bridge sidewalks are very narrow. Bicyclists need to dismount and walk their bikes across.

Route Attractiveness – The Chatham Bridge crosses the scenic Rappahannock River. There are vistas looking up river and down as well as views of historic downtown Fredericksburg.

Low Conflict – Because the bridge sidewalks are narrow, the potential exists for numerous conflicts. The historic bridge, however, cannot be easily widened. Initial plans are to install guard rails along the bridge sidewalks. Another option for reducing pedestrian/bicycle conflicts with motor vehicles would be to reconfigure the bridge to three vehicle lanes and widen the existing sidewalks.

Ease of Implementation – The physical constraints of the bridge will challenge implementation of this link. Redecking and expanding the sidewalks would be the most expensive option, but could also be the most effective. A simpler option would be to leave the existing sidewalks intact and install guardrails. These barriers would protect the pedestrians/cyclists as well as reduce vehicle speeds on the bridge.

Multimodal Coordination – Multimodal coordination will not be feasible on this relatively short link.

Multi-jurisdictional Coordination – The Chatham Bridge provides a much needed pedestrian connection between Fredericksburg and Stafford. This link is already the Bike 1 Route and is also the proposed route of the East Coast Greenway.

Safety and Security – The Chatham Bridge already has sidewalks on either side, but they are extremely narrow. A physical barrier between the sidewalks and the vehicle lanes is a critical component of this project, whether the bridge retains its four vehicle lanes or is reconfigured to three lanes.

Falmouth Bridge Link

- Type:** Safety improvements to an existing facility
- Location:** The existing bridge spans the Rappahannock River, connecting the City of Fredericksburg and Stafford County.
- Length:** 0.16 miles
- Description:** The Falmouth Bridge is a concrete structure that accommodates four lanes of traffic and has narrow 4-foot sidewalks on either side. Unless a new pedestrian bridge is to be constructed, planning must focus on improving the existing structure to accommodate suitable pedestrian and bicycle connections between Fredericksburg and Stafford County. Options include guard rails (or similar device) on the existing sidewalks, to provide a physical barrier between pedestrians and vehicular traffic.

Consistency with Applicable Performance Criteria

Accessibility – There are very few links across the Rappahannock River that are suitable for pedestrians and bicyclists. Of the four existing bridges (I-95, Falmouth, Chatham, and Mayfield), only two can be used by pedestrians/bicyclists (Chatham and Falmouth). As a consequence, both bridges need to be enhanced for accessibility and safety as much as is practicable.

Directness – The Falmouth Bridge is a direct link between the two jurisdictions.

Continuity – The sidewalks on the Falmouth Bridge tie in directly with the City sidewalks. Connections will need to be established on the Stafford side, when that jurisdiction establishes its own riverside trails.

Consistency – The existing bridge sidewalks are very narrow. Bicyclists need to dismount and walk their bikes across.

Route Attractiveness – The Falmouth Bridge crosses the scenic Rappahannock River adjacent to an historic ford. There are vistas looking up river and down as well as views of historic Falmouth.

Low Conflict – Because the bridge sidewalks are narrow, the potential exists for numerous conflicts. One option would be to install guard rails along the bridge sidewalks. If the Falmouth Bridge is ever expanded or replaced, suitable accommodations will need to be made for pedestrians and cyclists.

Ease of Implementation – The physical constraints of the bridge will challenge implementation of this link. Removing a lane of traffic is not an option on this busy roadway. Installation of guardrails on the existing sidewalks would protect the pedestrians/cyclists as well as reduce vehicle speeds on the bridge.

Multimodal Coordination – Multimodal coordination will not be feasible on this relatively short link.

Multi-jurisdictional Coordination – The Falmouth Bridge will provide a much needed pedestrian connection between Fredericksburg and Stafford.

Safety and Security – The Falmouth Bridge already has sidewalks on either side, but they are extremely narrow. A physical barrier between the sidewalks and the vehicle lanes is a critical component of this project, until the bridge is either expanded or replaced.

EAST COAST GREENWAY

The East Coast Greenway (ECG) is taking shape as the urban alternative to the Appalachian Trail. The East Coast Greenway Alliance, a national non-profit member organization envisions a 2,600-mile linear route through cities, suburbs, villages, and countryside, from Canada to the Caribbean. The Alliance works through state committees to partner with national, state, and local organizations, agencies, and governments to close gaps and ensure high-quality maintenance. Over 400 miles of related trails are proposed to be established in Virginia.

The State Committee to establish the Greenway in Virginia is headed up by David Brickley, who has worked with the National Park Service to designate 17 miles of the Mount Vernon Trail as Virginia's first segment of the ECG. This trail, which parallels the George Washington Memorial Parkway along the Potomac River, links to Washington D.C. The State Committee is working with the Park Service to extend the trail from Mount Vernon to U.S. Route 1 and then south to Fredericksburg. This Mount Vernon Trail is part of the planned Potomac Heritage National Scenic Trail, which will turn east at the Rappahannock River.

The ECG will enter Fredericksburg across the Chatham Bridge. The City's segment of the trail could follow either the Virginia Central Railway Trail or the Lafayette Boulevard Trail to the south, but coordination will be required with Spotsylvania County. At present, there is no planned route between Fredericksburg and Richmond.

In Richmond, the Greenway divides into two routes. One route follows along or near U.S. Route 1 and is strongly supported by the southside counties. The other route turns southeast, toward Williamsburg (hence the name Virginia Capitol Trail) and then south. This coastal route will follow the Dismal Swamp Canal into North Carolina.

Where feasible, the Greenway Alliance seeks to develop trails that are 12 feet wide. The Chatham Bridge and existing downtown street widths will preclude attaining this standard in Fredericksburg, but these limitations are not unusual in a historic urban setting.

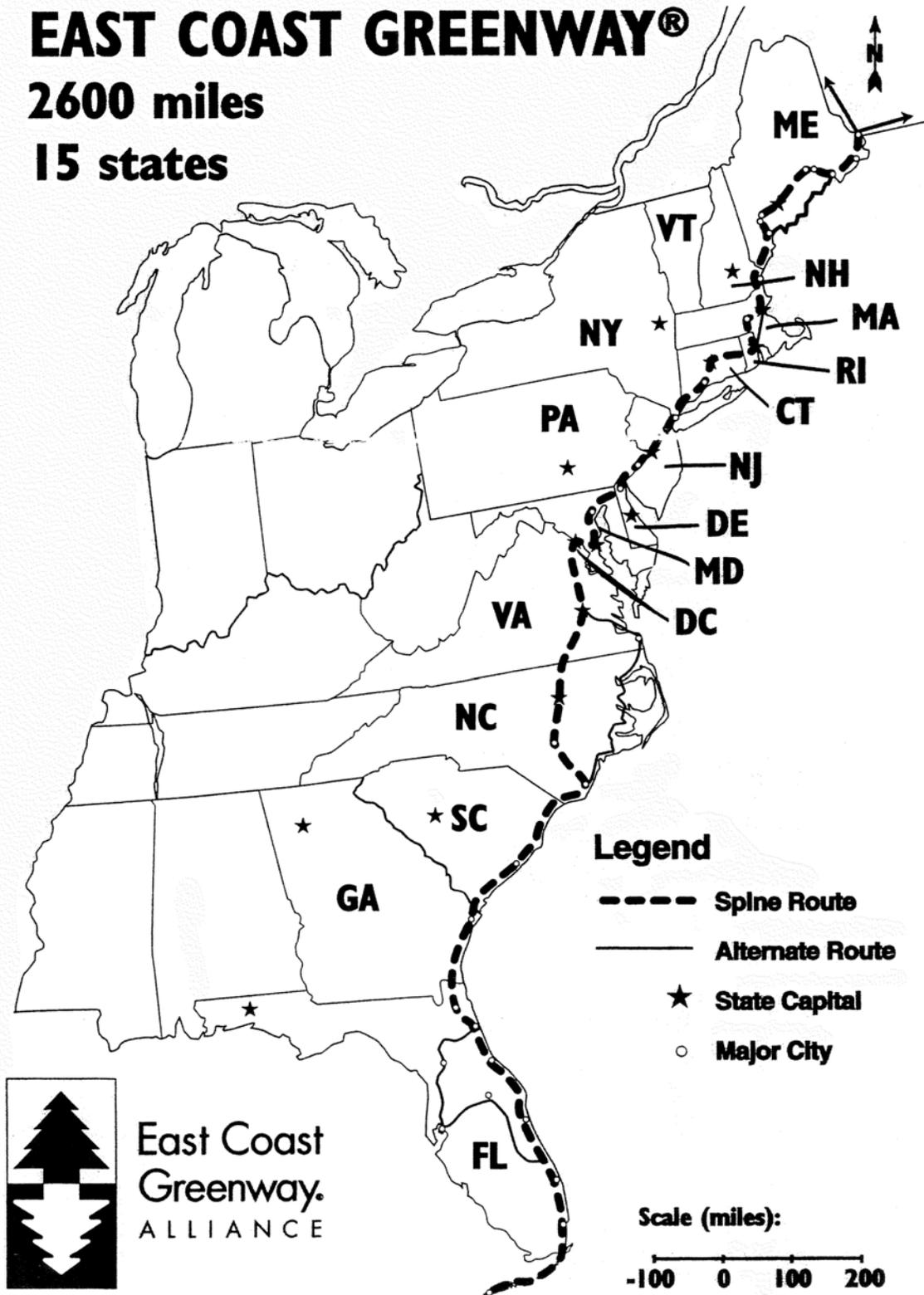
PROJECT COSTS

Cost estimates for the identified projects are based on average construction costs for the varying types of facilities and typical local right-of-way acquisition costs. Other considerations in estimating costs are the existence or need for drainage structures, the feasibility for access by construction equipment, and the potential need to relocate utilities. The cost for reconfiguring/adapting intersections has not been factored into these estimates.

EAST COAST GREENWAY®

2600 miles

15 states



Map 22. East Coast Greenway

Table 6. Project Costs

Trail	Length In Miles	Right-of- Way Acquisition	Preliminary Engineering (Planning and Design	Construction And Implementation	Total Estimated Cost
Embrey Dam/Rappahannock Canal Trail	2.5	60,000	40,000	420,000	520,000
Fall Hill Avenue Trail	1.7	Part of road project	24,000	238,000	262,000
Rappahannock River Heritage Trail	1.6	0	55,000	425,000	480,000
Virginia Central Railway Trail	3.5	0	82,000	680,000	762,000
North-South Trail	2.9	Part of road project	45,000	406,000	451,000
Lafayette Boulevard Trail	1.5	Part of road project	26,000	252,000	278,000
Cowan Boulevard/William Street Connector	0.6	110,000	10,000	100,800	220,800
William Street/Plank Road Trail	0.6	Part of road project	10,000	88,000	98,000
Springwood Drive Trail	0.4	0	2,000	6,000	8,000
Downtown Loop	2.6	0	10,000	32,500	42,500
Alum Springs Loop	3.5	0	10,000	44,000	54,000
Downtown-Dixon Park Route	1.5	0	10,000	21,000	31,000

VI. IMPLEMENTATION

The preceding pages of this plan offer a vision for developing bicycle and pedestrian trails in the City of Fredericksburg. These facilities will link various destinations, provide recreation and transportation alternatives for a variety of users, and build a safer, healthier, and more livable community. This section of the plan is intended to describe some of the ways in which an adopted plan can be implemented and funded.

KEYS TO SUCCESSFUL IMPLEMENTATION

Coordination and Management – In a study of trails development across the country, all successful trail projects had one common ingredient – an active individual or organization committed to developing a trail system.

Community Support – Successful programs also have active community support. To this end, a volunteer support group, working closely with the City, could play a key role. The City and trails support group would be able to identify user groups and gain their support, emphasize the benefits that a trail system provides, and continue to build community support throughout the building process and beyond.

Realistic Budget – Although the City should be committed to constructing a quality trail system, the budget does not always match the vision. People will use quality trails, while avoiding shoddy ones. Budgets need to cover the actual costs associated with trail development.

Realistic Schedule – Promised completion dates must be kept, or community credibility will be lost. When the City includes a trail project in the CIP, all efforts should be made to ensure that the project is budgeted, and completed in the allotted time. Although this plan provides priorities for construction, the actual construction schedule should remain flexible to take advantage of funding and other opportunities.

Demonstration Project – Community support will evaporate if physical progress is not evident. As a consequence, it may be useful to identify one project to serve as a demonstration project and to build that project as soon as possible. Three projects suitable for demonstration projects are the Rappahannock River Heritage Trail, the Virginia Central Railway Trail and the Downtown Loop.

Building and Maintaining Momentum. It is much easier to keep momentum alive than to rekindle it once lost. Momentum gained during planning should be continued by quickly initiating construction, and once construction begins there should not be a long gap between projects.

RECOMMENDATIONS

That the City complete necessary renovations and improvements to existing trails.

That the City designate selected undeveloped lands as public green space and define conditions regarding use and development of that space. At the least, such green space should include existing Resource Protection Areas and Resource Management Areas.

That the City of Fredericksburg build a trail system proposed in the plan entitled Fredericksburg Pathways, with a goal of at least 75 percent completion within five years from its adoption.

That the City develop an integrated transportation plan that addresses all transportation needs and plans, to include private motor vehicles, public transportation, school transportation, bicyclists, and pedestrians, through the provision of adequate roads, trails, sidewalks, and parking facilities.

That the Fredericksburg Pathways System be developed with a combination of public and private funding and through volunteer efforts.

That the pathways system be designated as part of the City parks system and that its overall day-to-day operation and maintenance be the responsibility of the City Parks, Recreation and Public Facilities Department, with support provided by other City departments, as appropriate.

That the City establish a pathways advisory committee to oversee trails planning, construction, operation, and maintenance.

That the City encourage volunteer participation and cooperation with the City and give volunteer organizations defined roles in the construction, operation and maintenance of the pathways system.

That the City establish clear operations and maintenance policies.

That the City initiate education and public awareness programs, to include such subjects as bicycle and pedestrian safety, Safe Routes to School, active living and health, and cycling and walking as legitimate modes of transportation.

That the City ensure its land use development procedures, as practiced by the City staff and the Planning Commission, take into account the overall needs of pedestrians and cyclists.

PRIORITIES

A number of factors must be taken into account when determining project priorities – immediate needs, potential sources of funding, links to planned transportation projects,

cost, and difficulty of implementation. In the previous chapters, individual projects were grouped according to type. Grouping by funding source, however, helps in determining trail priorities. Several trails have significant support from developer proffers. Many of the nature trail systems can be built through volunteer efforts. Some trails are tied to transportation projects and can be funded when designated roads are improved or constructed. For all individual trails, necessary barrier and intersection crossings should be implemented at the same time as trail construction.

The following recommended priorities do not necessarily indicate that one priority must be completed before another is begun. Because of the different funding possibilities, projects with different priorities can be built at the same time. The Virginia Central Railway Trail, for example, has associated proffers that will allow this project to be initiated very quickly. The following are the priorities of the Fredericksburg Pathways System.

Improve Existing Trails – The Canal Path is scheduled for repair and improvement in 2006. That improvement is limited to resurfacing, but additional funds should be committed for placing signs on the trail and at the street crossings, painting prominent crosswalks at intersections, and adding at least one additional access point. A crosswalk and signs are also needed at the junction of the Mary Washington Boulevard Trail and the Cowan Boulevard Trail.

Construct Projects Currently in the Capital Improvement Program (CIP) for 2006-2010. Currently identified projects include the Rappahannock River Heritage Trail, the Virginia Central Railway Trail, and the Fall Hill Avenue Trail. Although the Fall Hill Avenue trail is tied to a transportation project, the others can be initiated as soon as funding is in place. The City should aggressively seek outside funding, but always maintain a trails component in the CIP since pathways will provide economic, transportation, and recreational benefits for the entire community.

Construct Bicycle Lanes and Routes – These types of facilities will be constructed on existing pavement and this work can be reasonably accomplished sooner rather than later. There will be issues regarding parking along some streets designated for bicycle lanes, but once those are resolved lanes can be installed fairly quickly. Cost effective projects that would provide immediate transportation and recreation opportunities include the Downtown Loop, the Downtown-Dixon Park Route, the Alum Springs Loop, and the Springwood Drive Trail.

Construct Additional Proposed Trails – Trails in this category include the Embrey Dam/Rappahannock Canal Trail and Cowan Boulevard/William Street Connector, which are not tied to any proffers or transportation projects. The City should include these projects in future CIPs as City-funded projects, even as it actively seeks outside funding assistance for their construction. Other trails in this category are tied to transportation projects and/or anticipated proffers. These trails include the Lafayette Boulevard Trail and the North-South Trail.

Construct Nature Trails – These trails require careful planning and engineering, to avoid adverse environmental impacts, but can then be constructed using volunteer labor, under appropriate supervision, at minimal cost. A volunteer group that wanted to build a trail could provide the work plan, equipment, and labor and receive the City government’s authorization to proceed. These trails could thus be built whenever a volunteer group is ready to undertake a project.

Build Connections to Trails. As trails are completed, they must connect to other trails and to their destinations. The Rappahannock River Heritage Trail must connect to the Canal Park Trail on both ends, which means establishing crossing facilities at the Fall Hill Avenue bridge and at Princess Anne Street. The Mary Washington Hospital Trail must connect to both the Canal Path and to the Cowan Boulevard Trail. Sometimes these connections only require a simple crosswalk and a few signs, but other connections may require a major intersection redesign or entail an entirely new project, such as the Cowan Boulevard/William Street Connector. Whatever the case, the individual trails have limited worth if they are not connected to one another in a safe and seamless manner.

Improve Intersections and Crossings – In order for the trail system to be effective, ways must be found to safely cross major roads and streams. These crossings can be made using one of the following methods, ranging from least costly to most expensive (stream crossings will invariably be bridges):

- Improve existing crossing facilities such as stream culverts.
- Create obvious crosswalks, with motorist warning signs.
- Redesign and modify traffic signals and intersections to make them pedestrian and bicycle friendly.
- Construct separate crossing facilities such as overhead pedestrian bridges.

COORDINATION WITH EXISTING PLANS AND FACILITIES

Individual trails must be linked with one another in order to ensure a successful trail system. Connectivity is also a requirement in other ways. Trails must be fully connected to their destinations and also accessible to users. This accessibility means users should be able to get to trails quickly and easily from neighborhoods or from public facilities such as parking lots.

In addition to physical connections, the trail system should be an integrated part of other City plans such as the Comprehensive Plan and the Transportation Plan. A trails system is not an isolated piece of the City’s infrastructure, but must be coordinated with the transportation system as a whole.

FUNDING

The costs of designing and constructing a pathways system will be substantial. Potential funding sources are relatively easy to identify, but obtaining funds can be difficult. The

following are sources of potential funding for trails and include a combination of public and private funding as well as volunteer efforts.

Public Sector Funding

These sources include the State of Virginia and the Federal Government. There is not one single agency that provides trails funding, since trails may have different aspects that make them of interest to various department sin government – recreation, transportation, environment, historic, and others. Recently adopted policy changes to VDOT call for non-motorized and motorized transportation to receive the same consideration by VDOT, so that facilities for pedestrian and bicycle transportation will be included as part of all transportation projects. There are currently a number of funding programs available in the public sector.

Highway Construction Fund – These funds for highway construction or improvement projects that include bicycle facilities. The proposed project must be in the Virginia Transportation Development Plan for VDOT to sue funds for bicycle facilities. Generally, bicycle trails built with these funds will be co-located with new or improved roads.

TEA-21 Transportation Enhancement Program – This federal program is a result of the Intermodal Surface Transportation Efficiency Act of 1991 (ISTEA) and is managed and administered by VDOT at the state level. In order to be eligible for funding, a project must meet the following criteria:

- A relationship to the surface transportation system.
- Qualifies under one of the Enhancement Program Categories (paved shoulders, bicycle paths, bike lanes, bicycle racks and lockers, development of education materials, safety campaigns and programs, safety training, and activities related to safety enforcement are all eligible projects).
- Formally endorsed by a local jurisdiction or public agency as evidenced by a resolution and commitment of 20% minimum local match.
- Must be endorsed by a local jurisdiction or public agency as evidenced by a resolution and commitment of 20% minimum local match.
- A duly advertised public hearing must have been held on the project.
- Encourage private sector development patterns that achieve the goals of providing people with better access to jobs, services, and trade centers.

TEA-21 Transit Enhancement Program – Funded through the Department of Rail and Public Transportation, this program provides money for enhancements to transit systems including the accommodation of bicycles, bicycle access, and multimodal connections. Projects typically funded include installation of bicycle storage facilities and the installation of equipment for transporting bicycles on mass transit vehicles.

TEA-21 Scenic Byways Program – Funding is available for a variety of categories, including bicycle and pedestrian facilities, related to scenic byways – roads with special

scenic, historic, recreational, cultural, archaeological and/or natural qualities. A local match of 20% is required.

TEA-21 Transportation and Community System Preservation Pilot Program – This program was designed to encourage governments to integrate transportation services with such community needs as community development, environmental protection, preservation of green space, and access to jobs and services.

Congestion Mitigation and Air Quality Improvement Program – This program provides funding through the Congestion Mitigation and Air Quality Improvement Program for areas in Virginia designated as being in non-attainment for national air quality standards.

Recreational Access Program – Funding is available to provide adequate access to public recreational facilities or historic sites operated by a state agency, a locality, or a local authority. Access includes a bicycle facility. Maximum available funds are \$60,000 with no required match.

State Aid Transit Grants – The Virginia Department of Rail and Public Transportation also administers state aid grant programs. Approximately \$100 million in state grant money is available each year for transit systems including bicycle accommodation. Although no minimum match is required, a local match of 20% is more likely to receive funding than a project with a match of 5%.

Virginia Recreational Trails Fund – The Virginia Department of Conservation and Recreation (DCR) administer the Virginia Recreational Trails Fund. Grant money through this program is available for the purpose of providing and maintaining recreational trails and trail-related facilities. Eligible activities include, but are not limited to the following:

- Development of urban trail linkages near homes and workplaces.
- Maintenance and restoration of existing recreational trails.
- Easement acquisition and development for trail/trail corridors in a state or local trail plan.
- Construction of new trails that meet identified needs on a state, county, municipal, or private lands.
- Construction of new trails on federal lands if certain conditions are met.

Hazard Elimination Safety Program – Part of the federal Highway Safety Improvements Program, HES provides funding to improve areas where there is an abnormally high incidence of crashes. Eligible projects include turn lanes, traffic signals, signs, bicycling hazards, and roadway geometry. Maximum available funds are \$500,000 with a 10% match.

402 Highway Safety Program Annual Grants – Overall, the diversity of eligible programs ranges from drunk driving prevention to motorcycle safety and child

safety/safety belt use. Bicycle and pedestrian safety is also an eligible program. Each application must identify a specific use (i.e. bicycle safety) and present a plan to address that issue. Proposals may address efforts to start a new program or they may look at expanding an existing program.

402 Highway Safety Program Mini Grants – Similar to the annual grant program except that monies are available throughout the entire year while funds last. This enables localities and others to react to safety issues that may suddenly arise in their communities.

Table 7. Public Funding

PROGRAM	DUE DATE	MATCH	ADMINISTRATOR
TEA-21 Transportation Enhancement Program	January 31	20%	VDOT
TEA-21 Transit Enhancement Program	January 31	5%	VA Dept of Rail & Public Transportation
TEA-21 Scenic Byways Program	June 15	20%	VDOT
TEA-21 Transportation and Community System Preservation Pilot Program	January 31	None	FWHA Division
Congestion Mitigation and Air Quality Improvement Program	Varies	0.4%	VDOT
Recreational Access Program	None	None	VDOT
State Aid Transit Grants	March 1	Varies	VA Dept of Rail and Public Transportation
Virginia Recreational Trails Fund	January 31	20%	Dept of Conservation and Recreation
Hazard Elimination Safety Program	June 30	10%	VDOT
402 Highway Safety Program Annual Grants	April 14	None	DMV
402 Highway Safety Program Mini Grants	None	None	DMV

Private-Sector Funding

Private-sector funding sources may include funds contributed by small businesses, corporations, and grant foundations, civic organizations and citizens. The following entities are potential donors to bicycle and pedestrian facilities:

Corporate Donations – Corporate foundations may be locally based or national, and grant amounts can range from the hundreds well into the millions of dollars. Corporate foundations generally like to see evidence that there is substantial local public and political support for the proposed project. This support most often comes in the form of funds raised from the community and/or appropriated by local government. Most corporate foundations do not fund maintenance activities, but are still very interested in how the project will be maintained once it is built. The Robert Wood Johnson Foundation, for example, is a private, non-profit organization that seeks to improve the health and health care of Americans. It prioritizes grants into four goal areas, one of which is to promote healthy communities and lifestyles.

Civic Organizations – Local civic organizations that will benefit from a bicycle and pedestrian project should be mobilized behind specific projects. These organizations may include bicycle clubs, naturalists, scout troops, bird clubs.

Citizens – There are many ways in which local citizens can become involved with bicycle and pedestrian projects. Working through civic organizations is one way to contribute. Other strategies include creation of a volunteer support organization where individuals and families can become members.

Individuals and groups should also be encouraged to work with the City in creating and operating a trails system. Appropriate activities include construction and maintenance of signs, picnic tables, benches, nature trails, etc. A detailed accounting of the work completed and hours worked should be kept in order to estimate the monetary value of the volunteer work. Many grant programs (public and private) allow the value of volunteer efforts to help satisfy a dollar match that is required in the grant. Working closely with City officials, volunteers can provide valuable support that can enhance the City's efforts.

IMPROVING EXISTING CONDITIONS

As the City grows, continuous attention must be directed toward the trail system as a whole. As the trail system expands, for instance, installed signs will need to be reviewed to ensure they still provide adequate direction and/or include updated information. In addition, the needs of trail users must be fully considered during site planning and development and when infrastructure is repaired, modified or constructed.

VII. ADMINISTRATION

The Fredericksburg Pathways Plan sets forth an ambitious vision for a high quality trail system. The design guidelines, implementation strategies, and funding options will help to ensure the quality of each trail on the day it opens. Long term quality is equally important, and once a trail is opened it must be operated and maintained in such a way as to provide a quality facility for many years to come.

OPERATIONS AND MAINTENANCE

The day-to-day management of a trail system includes law enforcement, special events, map and informational brochure updates, and other matters. Specific policies regarding use of the trails will need to be developed in conjunction with trail development and a large part of operations will be the implementation of these policies.

Maintenance includes the actions taken to ensure the trails are kept in a safe and usable condition. These efforts include mowing and brush removal, repairing and replacing signs and benches, repairing trail surfaces, and trail reconstruction. Lifetime maintenance costs should be considered during detailed trail planning.

Roles and Responsibilities - In order for a trails system to be operated and maintained effectively, it must be placed under the responsibility of one agency or organization, even though others may have a significant role.

Some cities have found it helpful to establish an advisory committee as a standing oversight body to coordinate timely construction of the trails system, to promote their use, and to provide a forum for continued citizen and governmental input. If the City desires to form such a committee, its members could include several citizen members, members of the trails support group and other interested groups (such as cyclists), and members from City Council, Parks and Recreation, Planning, Tourism, and the Police departments.

Operations and Maintenance Policies

These recommendations should be viewed as guidelines intended to assist in the operation and maintenance of the pathways system.

Establish Operations and Maintenance Policies - Policies should be written as soon as possible after the authorization of the pathways system. A formal document should set forth policies pertaining to the pathways system as a whole and for each individual trail or type of trail. Policies should also address operational rules and maintenance responsibilities. The policy then becomes the adopted directive for ongoing administration of the trail system. The City should establish clear operations and maintenance policies that address the following items:

- Permitted uses on each trail – identification of the activities allowed, which may include cycling, walking, jogging, pets, mountain biking, in-line skating, etc.
- User fees, if any – who will pay, how much, and in what manner.
- Marketing of the trail system – enhancement of economic and health benefits by encouraging trail-related activities.
- Policing and security on the trail system – may include an emergency response plan, trail patrols, and safety measures such as call boxes.
- Issues related to crossings of each trail – may apply to new driveways and streets, whether and new crossings are allowed, the permitting process for new crossings, and issues of responsibility and liability of new crossings.
- Liability – although mostly determined by existing laws, should be fully understood by operating agency.
- Encroachment – definitive policies should exist relating to existing and future encroachments.
- Seasonal maintenance, including snow removal – what seasonal maintenance is needed and who will perform each task.
- Cooperative maintenance agreements – in a partnership between the city and private support groups; policies should spell out who is responsible for specific maintenance.
- Use of volunteers – the role of volunteers in trail operation and maintenance, addressing supervision, accountability, and liability.
- Evaluation of trail conditions – an evaluation schedule for each trail to identify the need for major and minor repairs.
- Short- and long-term maintenance program – a program that provides guidelines for the maintenance requirements of the trail system and each individual trail.

Periodic Maintenance

Maintenance requirements differ according to the type trail, but all trails will require periodic maintenance.

Surfaced Trails - These trails hold up well under most conditions, but are subject to freeze and thaw cycles that cause holes and cracks. The following are guidelines for maintenance of surfaced trails:

<u>Frequency</u>	<u>Maintenance</u>	<u>By</u>
As Needed	<ul style="list-style-type: none"> · Tree & brush clearing, mowing · Sign replacement · Map/signage update · Trash removal · Replacement/repair of trail amenities · Repair of flood damage · Patching & minor repaving 	Volunteers, Parks & Recreation
Seasonal	<ul style="list-style-type: none"> · Snow grooming 	Volunteers, Parks & Recreation

	<ul style="list-style-type: none"> · Snow plowing · Planting, pruning, beautification · Culvert clean-out · Installation/removal of seasonal signs 	
Annual	<ul style="list-style-type: none"> · Surface evaluation · Evaluate support services 	Parks & Recreation
5-Year	<ul style="list-style-type: none"> · Repaint/repair trash receptacles, benches, signs, etc as necessary · Sealcoat asphalt 	Volunteers, Parks & Recreation
10-Year	<ul style="list-style-type: none"> · Resurface/restripe trail 	Public Works
20-Year	<ul style="list-style-type: none"> · Replace or reconstruct trail 	Public Works

Unsurfaced Trails - Less susceptible to freeze/thaw conditions, unsurfaced trails may suffer from runoff in rainy weather, resulting in ruts on the trail. They will need to be designed to minimize erosion, but floods or rains will cause problems that will need attention. Surfaces should be repaired and compacted to maintain a smooth surface. Volunteers could perform most maintenance of unsurfaced trails.

Maintenance Costs

Costs for maintenance vary greatly depending on the type of trail and the conditions. Planners should, however, consider these costs during detailed trail planning to ensure that funding is available to keep trails in usable condition. Maintenance can be broken down into three categories: routine, minor repairs, and major reconstruction.

Routine Maintenance - Most of the routine maintenance for the trail system can be performed by a volunteer group or the Parks and Recreation Department. Routine activities include:

- Annual trail evaluation
- Tree & brush clearing
- Mowing
- Map & signage updates
- Trash removal & cleanup
- Water damage repair, such as culvert cleanout
- Patching
- Snow grooming
- Planting & pruning
- Installation & removal of signs

Annual costs for routine maintenance are estimated as between \$1500 and \$1800 per mile, depending on usage, weather conditions, and other variables.

Minor Repairs. The annual evaluation determines the need for minor repairs. Minor repairs may include:

- Replacement, repair, & repainting of trail support amenities
- Replacement of part of a trail
- Re-stripping of trails or bicycle lanes
- Seal-coating of asphalt

Costs for minor repairs may be estimated based on initial construction costs, adjusted for inflation. Seal-coating may cost from \$6,000 to \$7,000 per mile for a 10-foot wide asphalt trail.

Major Reconstruction. Two maintenance actions are considered major reconstruction: resurfacing of asphalt trails and complete trail replacement.

Typically, asphalt trails need resurfacing every 10 years, depending on how well they have been maintained. This resurfacing is usually an overlay of asphalt on the existing surface. A 1-inch overlay may cost from \$13,000 to \$15,000 per mile for a 10-foot wide trail, and a 2-inch overly could be as much as \$25,000 per mile.

Complete replacement requires removing the existing trail, regrading the trail base, and resurfacing the entire trail. Costs are the same as for initial construction plus demolition of the old trail, adjusted for inflation. Because of the cost involved, trail replacement should be considered well in advance.

EDUCATION AND PUBLIC AWARENESS

A community trails program must provide for educating people about the hazards that may be encountered while using trails, promoting safe conditions, and encouraging more people to walk and ride. The purpose of this section is to highlight the principal issues associated with walking and cycling that have a relationship to education and public awareness. These issues include:

- Safety.
- Acceptance of walking and cycling as legitimate modes of travel.
- Promoting walking as a desirable activity.

To provide a safe environment for pedestrians, planning and engineering professionals, educators, and enforcement officials need to know the characteristics and needs of the pedestrian and cyclist user groups. To interact appropriately and safely with pedestrians and cyclists, motorists need to understand and acknowledge that walking and cycling are accepted and legitimate modes of travel, and that they have a duty to operate their vehicle so as to not endanger pedestrians and cyclists. To be aware of hazards, all pedestrians and cyclists, young and old, need to understand the danger spots and risks that are associated with an environment that favors the automobile.

Education and awareness efforts are important ingredients in a successful transportation program that not only accommodates pedestrians and cyclists, but also encourages these modes of travel. Frequently, however, a lack of information or, in some instances, misinformation, perpetuates unsafe practices. Additionally, because development patterns of the past 50 years have emphasized the automobile, children have become reliant on their parents to drive them to school, dance class, soccer practice, etc. or practice in dealing with various situations.

There are five primary audiences that are the principal targets for education and awareness efforts. These efforts should focus on both pedestrian and bicycle activities.

- Children
- Adults
- Parents
- Motorists
- Transportation Planning and Design Professionals

Safety

Generally, the following actions are recommended to help improve safety for pedestrians:

- Target and eliminate key behaviors that lead to unsafe conditions.
- Encourage schools, safety organizations, and law enforcement agencies to deal with pedestrian and bicycle safety issues and to focus on the most important crash problems.
- Support the development of public awareness campaigns keyed to the most important causes of crashes, injuries, and deaths.
- Encourage the use of safety equipment among pedestrians and cyclists (retro-reflective clothing).
- Educate walkers, bicyclists and motor vehicle users how to safely interact with each other.

Acceptance and Legitimacy

The City can help promote walking as a legitimate mode of travel and recreation by promoting acceptance of the need for all pedestrians to be accommodated by the transportation system. For example, agencies can:

- Develop a means of ensuring public participation in the development and implementation of plans and policies that impact pedestrians and cyclists. Often agencies can create citizen advisory groups to advocate policies, programs and facility improvements that will enhance and promote walking and cycling.
- Develop or revise vision and policy statements to recognize the importance of walking and cycling and the need to integrate these modes into transportation and recreation systems.
- Emphasize pedestrian facility planning, design, and maintenance in all planning.

- Provide training for law enforcement officers in the conduct of safety education and enforcement programs for pedestrians and cyclists.
- Educate planning and enforcement officials — as well as the general public — in the importance of traffic calming as a safety countermeasure.
- Develop and conduct public information and awareness campaigns targeted toward all roadway users, including bicyclists, pedestrians, and motorists, with the intent of modifying behavior and attitudes to provide cooperation among these users.
- Establish a public safety education program using TV, radio, signs, and information materials to teach motorists, bicyclists, and pedestrians how to share the road.
- Develop and conduct public awareness campaigns promoting walking and cycling as means of solving community problems, improving personal health and wellness, and enhancing the quality of life.

Promotion

Usually, as is the case in Fredericksburg, it is enthusiastic citizens who espouse the benefits of walking and cycling and who lobby for improved facilities. The City can support such civic action by establishing an advisory committee. Such a committee could be particularly effective in the area of identifying critical issues and needs that affect pedestrians and cyclists. In addition, the City can initiate the following actions to promote and encourage walking:

- Provide education programs to companies promoting walking or cycling to work.
- Encourage the Chamber of Commerce and other business groups to develop appropriate literature to promote the community as a walkable tourist destination.
- Encourage local organizations to develop walking and cycling tours and maps.
- Encourage and support private sector companies and organizations to become involved in activities designed to facilitate walking and cycling.

SAFE ROUTES TO SCHOOL

Children's lives have altered dramatically over the last few decades. One of the most startling changes is how little independence and mobility they now have compared to the generations who grew up before them. Not so long ago, a vast majority of kids routinely roamed their neighborhoods on foot or bicycle, taking the first steps toward independence. Today, parents chauffeur their kids to nearly all their activities, fearing for their children's safety due to perceived dangers from both crime and traffic. Researchers estimate that while more than two-thirds of all children walked or biked to school as little as thirty years ago, that number has now plummeted to less than ten percent.

A new movement is emerging that is focusing on getting kids back on their feet and back on their bikes. Neighborhood groups, traffic engineers and local officials are working together to make streets safer for pedestrians and bicyclists along school routes, while encouraging both parents and their kids to take advantage of the many benefits of getting

around on foot or by bike. With new interest from transportation professionals, public health advocates, neighborhood improvement groups and local elected officials, communities all across the United States are discovering the many benefits of providing *Safe Routes to School*.

In order to encourage more children to walk or bike, parents need to trust that it is both safe and convenient from a variety of perspectives. A concern among some parents is the threat of violence as well as child abduction. While statistics tell us that abductions are an extremely infrequent occurrence, many parents indeed have legitimate concerns about crime, and violence prevention is an important component of *Safe Routes to School* programs in many areas.

The greatest danger for many children walking or biking to school, however, comes from traffic on neighborhood roads and streets. Parents often cite the fear of traffic as one of their top concerns in allowing their kids to walk or bike to school. They note the importance of stronger education programs for both motorists and children, better enforcement of traffic laws, and projects and programs to help slow down the speed of residential traffic. Indeed, it is exactly this type of comprehensive approach to traffic safety problems that has been shown to be most effective in creating safer streets and promoting increased walking and bicycling among Americans of all ages.

Safe Routes to School is an unusual approach to managing transportation. First, it has support from multiple constituencies (transportation, smart growth, public health and safety advocates, parents, teachers, and children), and has manifested itself in a variety of forms. Second, *Safe Routes to School* programs have gained strength from the local and grassroots level, resonating with the desire to recapture the cherished and independent expression of our childhood – the walk/bike to school. And third, where most other transportation strategies focus primarily on marketing and promotion (e.g., campaigns promoting carpooling and/or riding transit), *Safe Routes to School* has an equal or greater emphasis on the provision of infrastructure improvements for walking and biking. Fueling the interest in *Safe Routes to School* is the increasing recognition of the physical disconnect between our schools and homes due to distance and the often frustrating lack of adequate infrastructure.

The City of Fredericksburg supports the *Safe Routes to School* concept and its institution in the City wherever feasible. In concept, *Safe Routes to School* calls for a focus on outcomes more than activities. The goal is to improve the health and well-being of our children by ensuring that most children can and do walk or bike to school most of the time. This vision for our schools can only be realized by:

- Locating schools in close proximity to the children who attend them
- Providing good facilities for walking and biking to school
- Reducing the threats to health and safety posed by motor vehicles, pollution, and crime
- Fostering a cultural shift that accords high value and broad responsibility for the realization of this goal.

Types of Safe Routes Programs

The desire to reduce pedestrian injuries, restore childhood mobility, improve basic health, and reduce automobile traffic near schools has inspired a wide variety of *Safe Routes to School* programs across the United States. Some *Safe Routes to School* projects have existed under other names for decades, and have just recently been recast as *Safe Routes to School*. Others projects are new to this country.

There are many different components involved in the creation of a *Safe Route to School* program, but generally they can be grouped under four broad approaches:

- The Traffic Calming Model
- The Funding Model
- The Encouragement Model
- The Enforcement Model

Many programs mix aspects of these models, and the different models can also co-exist in a single community. This discussion highlights the differences between the models in order to help proponents of Safe Routes think methodically about what they are doing, and why they are doing it. This means distinguishing between ends and means — or goals and methods. For instance, traffic calming is a means to an end — reducing child/vehicle crashes around schools, and encouraging cycling and walking. It is not an end in itself.

The Traffic Calming Model. The Traffic Calming Model is characterized by 1) measurably reducing crashes, injuries and deaths involving child pedestrians or cyclists near schools, and 2) creating congenial and safe walking and /or cycling routes on primary travel corridors to and from schools so as to measurably increase the share of children walking and cycling to school. The method is to use traffic engineering to change motorist behavior, to reduce speeding and reckless driving near schools, and improve the pedestrian environment. Possible features of this model are as follows:

- Use changes in the physical environment near schools — primarily traffic calming engineering — to slow motor vehicle speeds, and reduce the exposure of child pedestrians to turning and backing vehicles.
- Consider community based planning and consensus building process.
- Consider using Walking School Bus, group rides and other public events to increase political and community support for constructing traffic calming and pedestrian improvements.
- Include increased police traffic enforcement.
- Must eventually include active government participation and funding.
- Can be initiated by civic group, advocates, school or government agency.
- Government funding can be as high as \$100,000 minimum capital and planning cost per school.
- Project funding level: High

- Advocacy experience needed: High.
- Most suitable for city level.

The Funding Model - The Funding Model is characterized by the goals of reducing child pedestrian and cycling crashes, and encouraging cycling and walking to schools throughout the city. Methods are to win funding to create engineering, education and enforcement campaigns to change motorist behavior – especially speeding and reckless driving near schools. Funding also supports programs to create congenial street designs, paths and encouragement to motivate children and parents to get kids out of cars and on foot and bike. Features may include

- Legislation guaranteeing significant levels of funding
- Funding, without legislation, from existing safety and transportation funds. (Examples are Federal 402 safety funds and Federal Transportation Enhancement funds.)
- Must eventually include the active support of local elected officials and include effective implementation plans.
- Can be initiated by civic group, advocates, schools or government agency.
- Likely to involve extensive coalition building among a broad list of proponents from health, education, safety, public interest and local government organizations.
- Government funding level: Very High..
- Advocacy funding level to successfully initiate: High.
- Advocacy experience needed: Very High for legislation; Moderate for 402 and other readily identifiable safety funds.
- Suitable for city level.

The Encouragement Model - The purpose of this model is to change child and parent behavior and to encourage walking or cycling to school. Encouragement campaigns are the cheapest, quickest and easiest way for non-government organizations to direct public and political attention to walking and cycling to school. Encouragement typically takes the form of Walking School Buses and group rides. These can be accompanied by marketing and behavioral change methods ranging from coloring books and prizes for kids, to street fairs, meetings and brochures targeting parents. Encouragement campaigns can be developed into a consensus building and marketing tool to win increased community, political and governmental support for traffic calming and increased police enforcement and engineering changes.

Programs using the Encouragement Model typically include these goals and methods:

- Encourage walking and cycling to school.
- Develop safer walking and cycling corridors.
- Walking School Buses, group bicycling, and a variety of encouragement literature targeted at children and their parents.
- Include a public awareness campaign and outreach to press, community and political leaders.
- Can include the active participation of and funding from government agencies.

- Can be initiated and conducted by civic group, advocates, school or government agency.
- Government funding: Not required.
- Advocacy funding level to successfully initiate: Low.
- Advocacy experience needed: Low.
- Suitable for city level.

The Enforcement Model - Numerous police departments across the country have child traffic safety campaigns. Some (like Chicago's) are called Safe Routes to School. Typically the police use crash maps to find schools with the highest number of children struck by cars. Police enforcement is assigned accordingly. Many enforcement campaigns also include police visits to schools where children are educated on safe cycling and walking and given safety literature and prizes. Enforcement campaigns are often a short term response to community anger after children are killed and injured. More effective campaigns are usually part of a broader, sustained traffic enforcement strategy. The Enforcement Model is meant to change motorist behavior through increased traffic enforcement and modify child and parent behavior to improve cycling and walking safety. Ironically, this approach sometimes results in discouraging children from cycling and walking due to the severe nature of police traffic safety information. Features of this model are:

- Reduce child pedestrian and cycling crashes.
- Increased police traffic enforcement; especially during school hours. Tends to be less than one month in duration.
- Educate children and parents in safer cycling and walking practices.
- Can include media campaign with "Get Tough" message to motorists.
- Must include some commitment by police department and the elected body.
- Advocacy funding level to successfully initiate: Low.
- Advocacy experience needed: Medium to low.
- Employs existing police resources.
- Suitable for city level.

APPENDIX A – DEFINITIONS

AMERICANS WITH DISABILITIES ACT OF 1990 (ADA) – Federal law prohibiting discrimination against people with disabilities. Requires public entities and public accommodations to provide accessible accommodations for people with disabilities.

AMERICANS WITH DISABILITIES ACT ACCESSIBILITY GUIDELINES (ADAAG) – Provides scoping and technical specifications for new construction and alterations undertaken by entities covered by the ADA.

ARTERIAL – Signalized streets that serve primarily through traffic and provide access to abutting properties as a secondary function.

BICYCLE – A vehicle propelled solely by human power upon which any person may ride, having two tandem wheels, except scooters and similar devices. The term “bicycle” for this publication also includes three and four-wheeled human-powered vehicles, but not tricycles for children.

BICYCLE FACILITIES – A general term denoting improvements and provisions to accommodate or encourage bicycling, including parking and storage facilities, and shared roadways.

BICYCLE LANE – A portion of a roadway which has been designated by striping, signing and pavement markings for the use of bicyclists.

BIKEWAY – A generic term for any road, street, path or way which in some manner is specifically designated for bicycle travel, regardless of whether such facilities are designated for the exclusive use of bicycles or are to be shared with other transportation modes.

BULB-OUT – See Curb Extension.

COLLECTOR – Surface street providing land access and traffic circulation within residential, commercial, and industrial areas.

CROSSING ISLAND – Pedestrian refuge with the right-of-way and traffic lanes of a highway or street.

CROSSWALK- Any portion of a roadway at an intersection or elsewhere that is distinctly indicated for pedestrian crossing by lines or other markings on the surface. ns opening under a road or a railway. These features are typically used for drainage, but a large enough culvert can also accommodate a trail.

CULVERT – A transverse opening under a road or railway. These features are typically used for drainage, but a large enough culvert can also accommodate a trail.

CURB EXTENSION – A section of sidewalk extending into the roadway at an intersection or midblock crossing that reduces the crossing width for pedestrians and may help reduce traffic speeds.

CURB RAMP – A combined ramp and landing to accomplish a change in level at a curb. This element provides street and sidewalk access to pedestrians using wheelchairs.

DETECTABLE WARNING – Standardized surface feature built in, or applied to, walking surfaces or other elements to warn pedestrians with vision impairments of hazards on a sidewalk and or loading platform, such as the curb line or drop-off.

FEASIBLE – Capable of being accomplished with a reasonable amount of effort, cost, or other hardship. With regard to ADA compliance, feasibility is determined on a case-by-case basis.

GRADE – The slope parallel to the direction of travel that is calculated by dividing the vertical change in elevation by the horizontal distance covered, measured in percent.

GRADE-SEPARATED CROSSING – A facility such as overpass, underpass, skywalk, or tunnel that allows pedestrians and motor vehicles to cross each other at different levels.

GRATE – A framework of latticed or parallel bars that prevents large objects from falling through a drainage inlet but permits water and some sediment to fall through the slots. Wheelchair casters and tires of road bicycles can get caught in poorly placed grate openings.

GUTTER – Trough or dip used for drainage purposes that runs along the edge of the street and curb or curb ramp.

HIGHWAY – A general term denoting a public way for purposes of vehicular travel, including the entire area within the right-of-way.

INTERMODAL SURFACE TRANSPORTATION EFFICIENCY ACT OF 1991 (ISTEA) – Federal legislation authorizing highway, highway safety, transit, and other surface transportation programs from 1991 through 1997. It provided new funding opportunities for sidewalks, shared use paths, and recreational trails. ISTEA was superseded by the Transportation Equity Act for the 21st Century (TEA-21) in 1998, which was superseded, in turn, by the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users (SAFETEA-LU) in 2005.

INTERMODALISM – A transportation policy that promotes full development of multiple alternative modes of travel, and encourages the optimization of mode or combination of modes for travel mobility, efficiency, sustainability, economy, and environmental health. The availability, effectiveness, and safety of pedestrian facilities contribute to the achievement of intermodalism.

INTERSECTION – Area where two or more pathways or roadways meet.

LOCAL ROAD – Road that serves individual residences or businesses, and/or distributes traffic within a given urban or rural area.

MEDIAN ISLAND – An island in the center of a road that physically separates the directional flow of traffic and can provide pedestrians with a place of refuge and reduce the crossing distance between safety points.

MIDBLOCK CROSSING – A crossing point positioned within a block rather than at an intersection.

MINIMUM CLEARANCE WIDTH – The narrowest point on a sidewalk or trail, created when obstacles such as utility poles or tree routes protrude into the sidewalk or trail and reduce the design width.

NATURE/HISTORIC SITES TRAIL – A trail for pedestrians only that traverses natural areas and/or guides people to historic attractions.

NEW CONSTRUCTION- Project where an entirely new facility will be build from the ground up.

OBSTACLE – An object that limits the horizontal or vertical passage space, by protruding into the circulation route and reducing the clearance width of a sidewalk or trail.

PASSING SPACE- Section of path or sidewalk wide enough to allow two wheelchair users to pass one another or travel abreast.

PATH OR PATHWAY – Track or route along which pedestrians are intended to travel.

PEDESTRIAN – A person afoot or in a wheelchair.

PEDESTRIAN-FRIENDLY ENVIRONMENT – A setting that is characterized by continuous sidewalks and safe, multimodal connections to local destinations.

RAIL-TRAIL – A shared use path, either paved or unpaved, built within the right-of-way of an existing or former railroad.

RAMP – Sloped transition between two elevation levels.

RIGHT-OF-WAY – A general term denoting land, property or interest therein, usually in a strip, acquired for or devoted to transportation purposes.

RIGHT OF WAY – The right of one vehicle or pedestrian to proceed in a lawful manner in preference to another vehicle or pedestrian.

ROADWAY – The portion of the highway, including shoulders, intended for vehicular use.

RURAL – Areas outside the boundaries of urban areas.

SAFE, ACCOUNTABLE, FLEXIBLE, EFFICIENT TRANSPORTATION EQUITY ACT: A LEGACY FOR USERS (SAFETEA-LU) – The federal legislation that authorizes surface transportation programs (including public transportation, highway, safety, and research) through FY2009. It continued the programs initiated through ISTEA and TEA-21.

SHARED ROADWAY – A roadway which is open to both bicycle and motor vehicle travel. This may be an existing roadway, street with wide curb lanes, or road with paved shoulders.

SHARED USE PATH – A bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way. Shared use paths may also be used by pedestrians, skaters, wheelchair users, joggers and other non-motorized users.

SHOULDER – The portion of the roadway contiguous with the traveled way for accommodation of stopped vehicles and for emergency use.

SIDEWALK – The portion of a street or highway right-of-way designed for use by pedestrians.

SIGHT DISTANCE – The length of roadway visible to a driver or pedestrian; the distance a person can see along an unobstructed line of sight.

SIGNED SHARED ROADWAY (SIGNED BIKE ROUTE) – A shared roadway which has been designated by signing as a preferred route for bicycle use.

SUBURBAN – Built up area surrounding a core urban area.

TACTILE WARNING – Change in surface condition providing a tactile cue to alert pedestrians with vision impairments of a potentially hazardous situation.

TRAFFIC CALMING – Traffic calming is the reduction of vehicle speeds through a physical feature along the roadway. These devices are self enforcing because the physical design of the street results in the desired effect.

TRANSPORTATION AGENCY – Federal, state or local government entity responsible for planning and designing transportation systems and facilities for a particular jurisdiction.

TRANSPORTATION EQUITY ACT FOR THE 21st CENTURY (TEA-21) – Federal legislation authorizing highway, highway safety, transit, and other surface transportation

programs from 1998 through 2003. It provided funding opportunities for pedestrian, bicycling, and public transit facilities, and emphasized intermodalism, multimodalism, and community participation in transportation planning initiated by ISTEA.

UNPAVED PATH – Paths not surfaced with asphalt or concrete.

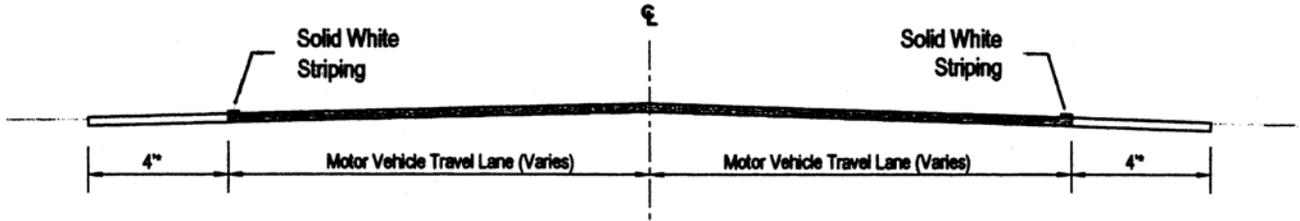
URBAN – Places within boundaries set by state and local officials, having a population of 5,000 or more. Urban areas are often densely populated and contain a high density of built structures.

VERTICLE CLEARANCE – Minimum unobstructed vertical passage space required along a sidewalk or trail. Vertical clearance is often limited by obstacles such as building overhangs, tree branches, signs, and awnings.

VERTICLE CURB- A steep-faced curb, designed with the intention of discouraging vehicles from leaving the roadway.

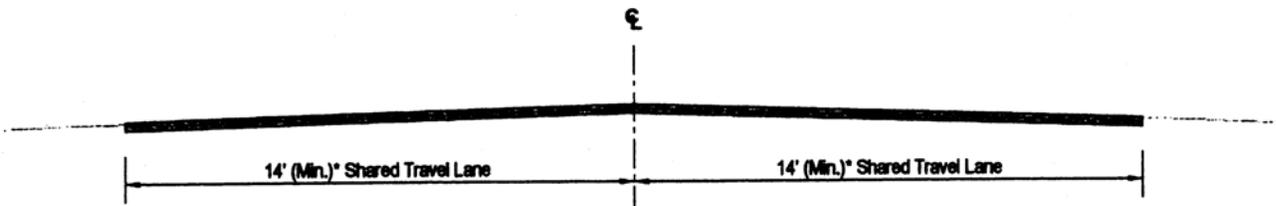
WIDTH, SIDEWALK – Total width of a sidewalk, including obstructions, which begins at the edge of a roadway and extends to the side of a building. Clear width is the portion of sidewalk that excludes obstructions and any attached curb.

APPENDIX B – PATHWAY DESIGN



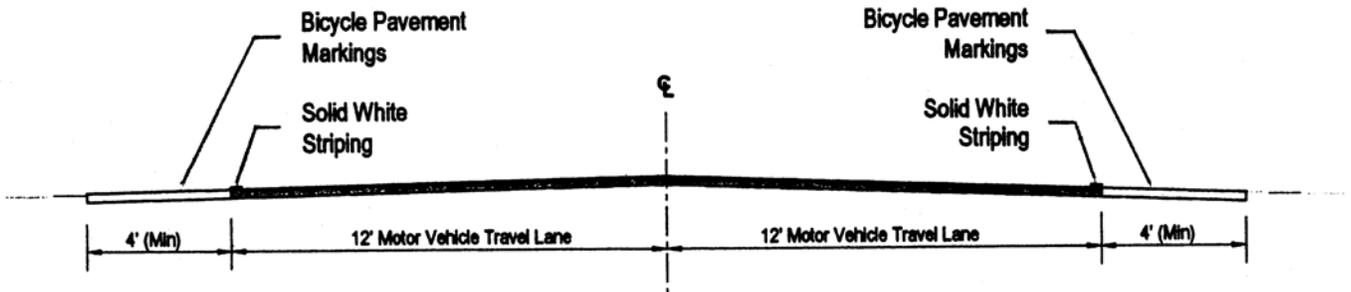
Shoulder Improvements

* Width may vary depending on a combination of potential widening impacts and traffic flow/cross-section characteristics

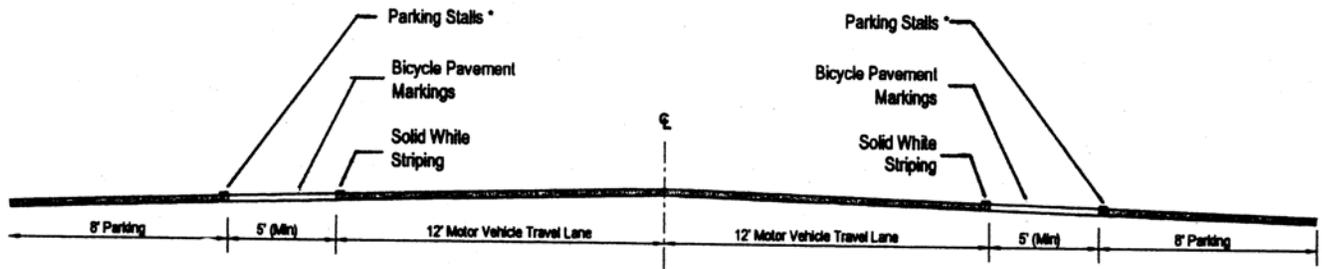


Wide Curb Lane

* Additional width may be needed due to traffic flow/cross-section characteristics

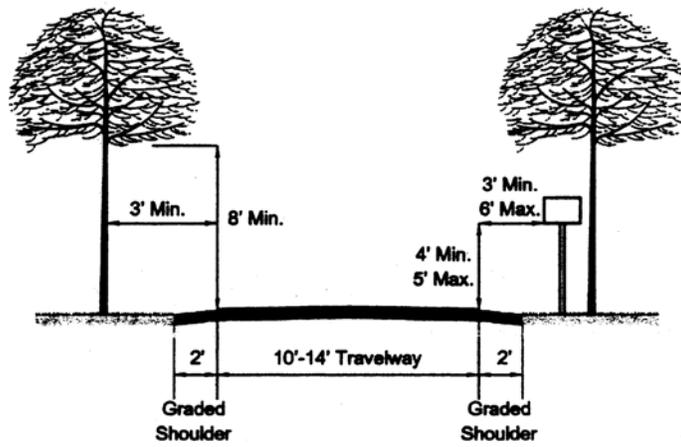


Bicycle Lane



Bicycle Lane with Parking

* Solid white striping may be advisable as parking stall pavement markings are not protective



Shared Use Path

APPENDIX C – SIGN STANDARDS

People need travel information whether they are driving, cycling or walking. A variety of sign types give cyclists and pedestrians the information they need while also informing motorists when they are near facilities for non-motorized users and that the presence of cyclists and pedestrians is legitimate there.

General Standards

In 2003, the Federal Highway Administration adopted the Manual on Uniform Traffic Control Devices (MUTCD). This document provides specifications on the design and placement of traffic control signs, including cycling and pedestrian related signs, placed in the public right-of-way. The MUTCD encourages a judicious use of signs, though. Overuse of signs diminishes their effectiveness so they should be installed only to fulfill a carefully considered need. In addition, signs and signposts can become a source of visual blight as well as act as obstructions to the users they are meant to serve.

Regulatory Signs – Regulatory signs inform users of a legal requirement, such as STOP or YIELD. They should only be used when the legal requirement is not otherwise apparent. Pedestrians may be diverted from unsafe crossings by USE CROSSWALK signs, although care must be taken to avoid excessive diversions.

Warning Signs – Warning signs inform users of unusual or unexpected conditions.

Pedestrian Crossing Signs – Pedestrian crossing signs warn motorists that there is a potential pedestrian conflict area in front of them. In addition, signs at the crossing itself pinpoint where that conflict occurs.

School Warning Signs – School warning signs warn motorists about school bus stops and school zones.

Wayfinding Signs – Most wayfinding signs are installed to direct motorists. They are usually large and mounted high, to be visible relatively far away from a moving vehicle. There are no specific standards for pedestrian wayfinding signs, but they need not be as large as vehicle oriented signs. In addition, distances can be provided in blocks, average walking/biking time, or some other measure that has meaning to pedestrians or cyclists.

Street Name Signs and Traffic Signals – Most street name signs and traffic signals will serve pedestrians, but there are some instances when this is not the case. Signs typically face only the oncoming traffic on one way streets. Since pedestrians will approach signs from both directions, signs should always face both ways. Similarly, signs and signals on mast arms over a roadway may not be visible to pedestrians. Supplemental signs and signals should be used on the street corners.

Pedestrian Signals in a Coordinated Signal System – Coordinated traffic signals are timed in a sequence to enhance the flow of vehicular traffic. Pedestrian signals in such a system, however, can degrade its efficiency. Pedestrian safety does not need to be compromised in the interest of vehicle movement, but integration will require a careful attention to pedestrian volumes and coordination with appropriate pedestrian signal equipment.

Standards Specific to Fredericksburg Pathways

Signs to be erected on the Fredericksburg Pathways System will provide information relating to:

- Direction
- Education
- Safety

A unifying sign theme should be developed and maintained in each of these categories to enhance the continuity of trail sections built at various times and to ensure the overall impression of an integrated whole.

Directional Signs – Directional signs list direction, destinations, and distances along the trail. They should be posted at trailheads and intersections and should list the following information:

- The name of the trail, “Fredericksburg Pathways”
- Two to four well-known destinations along the trail, one or two in either direction, such as road crossings, large institutions such as Mary Washington Hospital, and/or significant historic sites.
- The direction to such destinations indicated by an arrow
- The distances to the listed destinations in miles and tenths of miles
- The City’s trail logo

Although trailhead signs will necessarily be as large as two by three feet, other signs should be smaller to provide information while being less intrusive. The primary heading on directional signs, “Fredericksburg Pathways,” should be 1 to 1 ½ inches high. The message on the sign should be ½, ¾, or 1 inch letters. A combination of the 1 ¼ inch letters for the primary heading and ¾ inch letters for the message has been found to be a good mix on such trails as the Appalachian Trail. Large trailhead signs may require 1 ½ inch letters.

To avoid sign messages from visually running together, adequate space must be left between words, numbers, arrows and lines. On signs with a combination of 1 inch and ¾ inch letters, a ¼ inch space between lines has been found to be adequate. Arrows should be bold enough to be seen easily, generally the same width as the letters, and arrowheads should be as wide as the message letters are high. Each entry on a directional sign should be on a separate line.

Signs should be limited to two colors, a background color and a lettering color. Color choice should be made to avoid confusion with other signs and to provide users with distinct, easily recognizable panels of information.

Educational Signs – Educational signs include interpretative panels to provide information about the various natural and historic sites as well as smaller, inobtrusive signs that educate the user as to trail use. Examples of this latter sign would include such information as, “Foot Travel Only,” and “Earthworks are Susceptible to Erosion, Please Keep Off.”

Safety Sign – User safety signs are standard U.S. Department of Transportation signs that should be installed at road crossings and other locations, as appropriate, to warn motorists as well as trail users of potential danger as well as existing trail conditions.

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AMENDMENTS