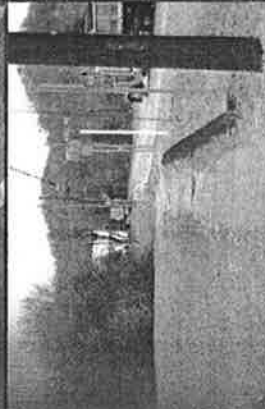


DAMASCUS BICYCLE AND PEDESTRIAN  
*Master Plan*  
JULY 2009



Prepared for:



Prepared by:



Kimley-Horn  
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Toole Design Group

# Acknowledgements

This Plan was prepared under the guidance of the Town of Damascus, the Mount Rogers Planning District Commission, and the Virginia Department of Transportation.

**Prepared for:**

Virginia Department of Transportation  
Mount Rogers Planning District Commission  
Town of Damascus, Virginia



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July 2009

# Table of Contents

Chapter 1: Introduction .....	3
Chapter 2: Existing Conditions .....	6
Chapter 3: Physical Recommendations .....	12
Chapter 4: Policy and Program Recommendations .....	23
Chapter 5: Implementation .....	30
Chapter 6: Conclusion .....	39

## Appendix

Appendix A: Facility Descriptions.....	40
Appendix B: Typical Cross Sections .....	50
Appendix C: Evaluating Locations for Uncontrolled Marked Crosswalks .....	54
Appendix D: VDOT Vehicle Counts and Crash History .....	56



## Chapter 1: Introduction

Damascus prides itself as being “Trail Town, USA.” It is either a major crossroad or a trailhead for the Appalachian Trail, the Virginia Creeper Trail, the Trans-America National Bicycle Trail, the Iron Mountain Trail, the Daniel Boone Trail, the Crooked Road Musical Heritage Trail, and Virginia’s Birding and Wildlife Trail. The Damascus Bicycle and Pedestrian Master Plan builds off of the 2007 Comprehensive Plan and the 2007 Walkable Communities Workshop<sup>1</sup>, providing specific recommendations for on- and off-road bicycle and pedestrian improvements to connect important destinations throughout the community and improve safety and circulation for all users. Using the Virginia Creeper, Iron Mountain, and Appalachian trails as the backbone for this effort, this Plan identifies walking and biking facility recommendations and new routes to improve connections between trails and downtown, the Damascus Middle School, existing and future parks and other destinations.

The 2007 Walkable Communities Workshop provided the general vision for a walkable and bikeable community; this Bicycle and Pedestrian Master Plan provides specific recommendations for improving access to destinations and circulation. In order to make the development of these routes practical and implementable, this Plan builds on existing trail and sidewalk systems and utilizes the full range of options available from off-road shared-use trails to on-road bicycle lanes and sidewalks. Due to the intermittent nature of temporary approaches that can be utilized to accommodate the varied demands placed on the pedestrian and bicycle infrastructure with modest cost and impact to the community.

By presenting practical temporary and near-term recommendations, and a long-term vision, this Plan seeks to improve access and connectivity, making walking and bicycling realistic and comfortable transportation choices for residents and visitors.

### A. Project Goals

According to the 2007 update of the Damascus Comprehensive Plan, “Damascus’ centrality to recreational trails and many outdoor amenities as well as its close proximity to the National Recreation Area, make planned pedestrian and bicycle facilities a necessity.” This pedestrian and bicycle plan will guide the development, maintenance, and future of on- and off-road bike and pedestrian facilities with planned sidewalk and streetscape improvements that will encourage non-motorized travel throughout the Town.

The following goals build on the strengths of the study area and are designed to help achieve the vision for improving pedestrian and bicycle connections between destinations and, over time, completing a bicycle and pedestrian loop around the Town of Damascus, as well as internal connections through Town and between key destinations.



This Plan provides recommendations for on- and off-road bicycle and pedestrian routes to connect important destinations throughout the community

<sup>1</sup> Mark Plotz of the National Center for Bicycling and Walking facilitated a workshop and walking audit of Damascus in the fall of 2007.



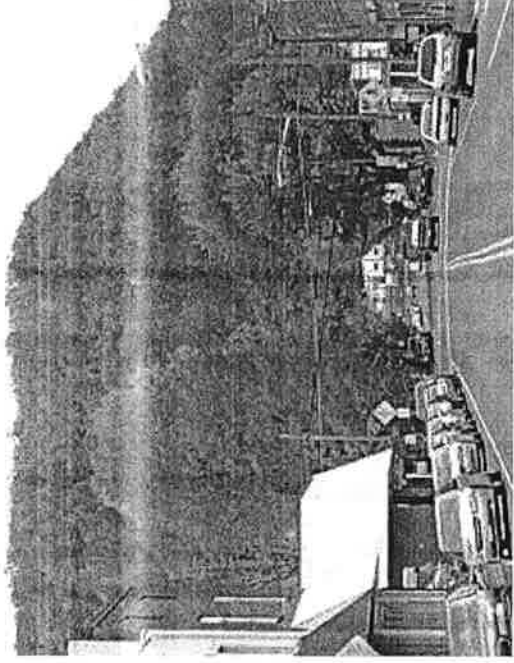
## DAMASCUS BICYCLE AND PEDESTRIAN Master Plan JULY 2009

- Right-size recommendations to match the nature of the problem being addressed
- Encourage tourism and economic development
- Make walking and bicycling a viable transportation choice
- Increase pedestrian and bicycle safety and mobility
- Provide pedestrian and bicycle facilities for all types of users
- Coordinate town, VDOT, and private-sector efforts
- Prioritize improvements based on current and projected need
- Improve quality of life

### B. Planning Process

The planning process for this study involved several different activities and outreach efforts. The process is briefly outlined below.

- **Background Data Collection and Field Analysis:** Background information was gathered for this Plan from previous plans and studies, existing GIS data and maps, interviews with local, regional government and VDOT staff and field surveys. Existing GIS data were provided by the Mount Rogers Planning District Commission and VDOT, including the locations of roadways, railroads, streams, schools, parks, land use and zoning categories and municipal boundaries. Potential roadway improvement projects and vehicle crash data were obtained from VDOT staff. Field work was conducted throughout the study area to document existing conditions for walking and bicycling and to identify opportunities to improve pedestrian and bicycle facilities. This analysis included pedestrian conditions walking along and across roads and on-road bicycling conditions. This process included a detailed analysis of the character of roads throughout the study area.



Downtown Damascus

Source: [www.damascus.org/photoarchives.html](http://www.damascus.org/photoarchives.html)

- **Stakeholder Input:** A stakeholder group provided important guidance and input throughout the planning process. This group included representatives from the Town of Damascus Planning Board, Mount Rogers Planning District Commission and the Virginia Department of Transportation. A kick-off meeting and van tour with the project team was held on December 14, 2007 and team meetings in person or by teleconference were held throughout the planning process. In addition, a second Stakeholder Meeting was held on June 16, 2008 to review and refine recommendations.
- **Planning Commission Presentation:** The draft plan was presented to the Town of Damascus Planning Commission over the course of several meetings in late 2008 and early 2009.



DAMASCUS BICYCLE AND PEDESTRIAN  
*Master Plan*  
JULY 2009

**C. Plan Overview**

Chapter 1 serves as an introduction to the plan. Chapter 2 outlines existing conditions that will serve as the foundation for the recommendations that follow. Chapter 3 provides contains recommendations for the development of an on- and off-road loop trail circumnavigating Damascus as well as numerous spot improvements and temporary measures to enhance the bicycle and pedestrian system. The policy and program recommendations in Chapter 4 provide guidance to local leaders for institutional changes that support improvements to the physical infrastructure. An implementation plan is provided in Chapter 5 which includes the identification of temporary and short-term priority projects and funding sources for implementing the recommendations. Chapter 6 serves as a conclusion to the plan.

## Chapter 2: Existing Conditions

The Town of Damascus has important resources to build on in their efforts to provide pedestrian and bicycle connections between destinations. These include a history of planning documents that support shared-modal planning efforts and a number of nationally recognized hiking and bicycle trails that pass through the town. This chapter describes the existing conditions that serve as the foundation for the Master Plan, as well as barriers and challenges.

### A. Planning Context

Policies have been adopted at all levels of government in order to ensure that communities are designed to support walking and bicycling. Below is a description of selected policies that are most relevant to this Plan.

#### The Town of Damascus

Damascus sits within the Appalachian Mountain Range, specifically the Blue Ridge sub-region in Washington County, VA. The Beaver Dam and Laurel creeks are fed by water that flows out the adjacent Iron Mountains. Approximately 50% of the land in Damascus is in the 100-year flood plain and is not developable.

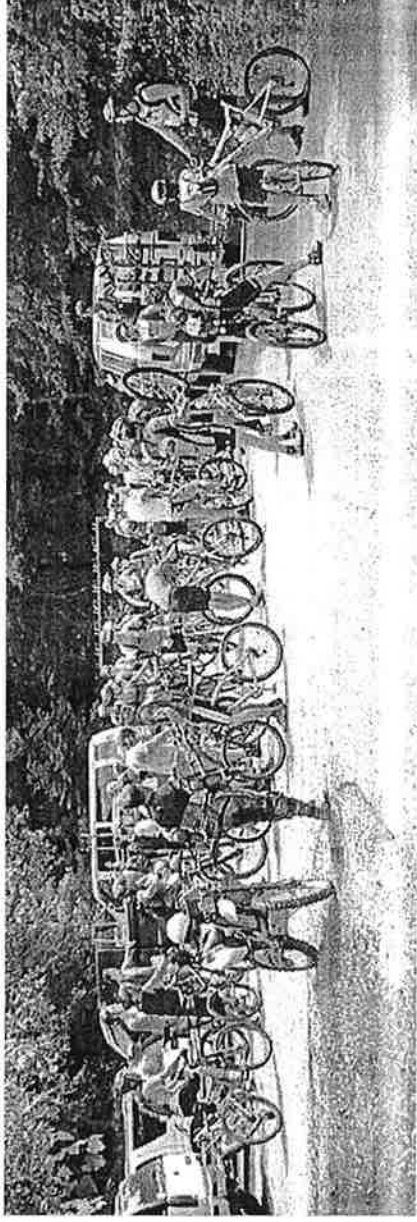


The 2005 U.S. Census listed the population of Damascus as totaling 960 people; and the population is aging with more than 50% 45 or older. The Town's slow but steady population increase has been fueled largely by in-migration, primarily retirees, many of whom discovered Damascus' scenic beauty and amenities via tourism.

A small branch of the Washington County Library lies within the study area. (A new building is being developed through a grant from VDOT). The Holston Family Health Center, also in town, provides medical services for 60 or more patients per day. The Town has two baseball fields in Backer Park and a public pool adjacent to the Creeper Trail. A basketball court is located in the Town Park. This park also has restroom facilities, picnic tables, benches, a playground and a gazebo for every day use and for the seasonal festivals that occur in the spring and summer months.

Economic Trends  
Eco-tourism is the concept on which the economic development of the Town is centered. As described earlier, the close proximity of the Jefferson National Forest and the Mount Rogers National Recreation Area to the Town provides for a wide-range of outdoor activities. Besides being the local access point for many recreational trails, the Daniel Boone Heritage Trail and Crooked Road Music Heritage Trail driving routes also transect Damascus. This combination of scenic driving, hiking, biking, camping and horse enthusiasts attracts more than 250,000 annual visitors, making it a hub of activity for trail enthusiasts and eco-tourists. There are several commercial outfitters in Damascus which provide transportation to hikers and bikers to various trail heads, as well as to Abingdon. The Town is also considering the creation of a tourism bureau to promote the Town's many amenities and to market Damascus' potential as a retirement destination. Major seasonal events are highlighted below:

- Appalachian Trail Days is a festival held each year in May, the weekend after Mothers' Day. The festival has significant sponsorship and brings over 15,000 hikers and tourists to Damascus each year. The festival offers music, children's games, an unusual parade, a hikers' talent show, people-watching, bike rides, hikes, workshops, lots of food, and other family activities.
- The biannual Iron Mountain Bike Race combines cross country and downhill bicycling.



Gathering of Iron Mountain Bike Race participants in the Beartree parking lot  
Source: [www.damascus.org/ironmountain.html](http://www.damascus.org/ironmountain.html)

#### Federal and Commonwealth of Virginia Policies

- *Americans with Disabilities Act*: The U.S. Government established the Americans with Disabilities Act (ADA) in 1990. Its implementing regulations, issued by the Department of Justice in 1991, require that all new and altered facilities - including sidewalks, street crossings and related pedestrian facilities in the public right-of-way - be accessible to and usable by people with disabilities. The Americans with Disabilities Act Accessibility Guidelines (ADAAG) provide the guidance for the design and construction of pedestrian facilities.
- *Federal Highway Administration (FHWA) Virginia Division Office Bicycle and Pedestrian Policy*: The Federal Highway Administration (FHWA) Virginia Division Office established a Bicycle and Pedestrian Policy in 2001. This policy supports including pedestrian and bicycle facilities in all new and reconstructed federal-aid transportation projects except under specific circumstances. This policy states that it will assist VDOT by sharing technologies, helping with planning activities and promoting the safety aspects of walking and bicycling. The FHWA Division policy also states: "Bicycle and pedestrian facilities should be funded at the same federal-state ratio as the typical highway improvement," and "Federal participation will be withdrawn on any major project that severs an existing bicycle or pedestrian route, unless an alternate route exists or is provided."
- *VDOT Policy for Integrating Bicycle and Pedestrian Accommodations*: While local jurisdictions play a large role in establishing transportation priorities in Virginia, the Virginia Department of Transportation (VDOT) is the agency responsible for constructing and maintaining many of the primary and secondary roads throughout the Commonwealth. On March 18, 2004 the Commonwealth Transportation Board adopted a new policy for integrating pedestrian and bicycle accommodations into roadway projects (often termed "incidental" improvements - bikeways and sidewalks that are built as part of new roadway construction or roadway reconstruction). This policy essentially reverses previous VDOT policies which required a great deal of public and political support in order for bikeways and sidewalks to be considered for



inclusion in transportation projects. The new policy states that “VDOT will initiate all highway construction projects with the presumption that the projects shall accommodate bicycling and walking.” This policy also applies to operations and maintenance, including hazard elimination projects and signal installation. The policy provides several exemptions under which facilities are not required. The complete version of VDOT’s Policy for Integrating Bicycle and Pedestrian Accommodations can be found on the VDOT website at [www.virginiaidot.org](http://www.virginiaidot.org).

- **VDOT Roadway Design Manual:** VDOT has established standards for the physical layout of roadways through its Roadway Design Manual. The 2005 version of this manual has incorporated the VDOT Policy for Integrating Pedestrian and Bicycle Accommodations. Several sections of the manual describe in detail how pedestrians and bicyclists should be included in roadway projects. It describes various methods for accommodating bicyclists, such as bicycle lanes, paved shoulders, and wide outside lanes, specifications for shared use paths, and also describes requirements for sidewalks, buffers between sidewalks and roadways, curb ramps, and pedestrian tunnels.
- **Damascus Comprehensive Plan:** According to the 2007 update of the Damascus Comprehensive Plan, “Damascus’ centrality to the recreational trails and many outdoor amenities as well as its close proximity to the National Recreation Area, make planned pedestrian and bicycle facilities a necessity. One of the goals of this plan is to connect outlying residential areas with Laurel Avenue and downtown, the Town Park, Backer Park and regional hiking and biking trails through an established sidewalk and bicycle network.”

#### Roads

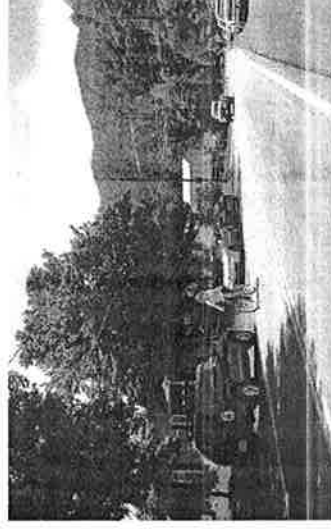
Damascus roads form a traditional grid oriented along Laurel Avenue (US 58). The primary arterial route serving Damascus is US Route 58, which is the main east-to-west corridor for through traffic. US 58 runs northwest to I-81 near Abingdon and east to Volney. In the easterly direction US 58 connects Damascus with Mount Rogers National Recreation Area and the communities of Konnarock and Whitetop. The Daniel Boone Heritage Trail is a regional highway established in the early 1920s to follow the route Daniel Boone took on his journey to Kentucky.

State Route 91 is the major collector in Damascus. The route runs north to I-81 at Glade Spring, which is 13.08 miles in length; and south to the Tennessee line is 1.62 miles. In the southerly direction Route 91 connects Damascus with the Wildlife Management Area of the Cherokee National Forest, the communities of Taylor’s Valley, Virginia and Laurel Bloomingery and Mountain City, Tennessee.

In 2007, the Commonwealth Transportation Board approved improvements (including removing curve and grade hazards and widening the facility) along US 58, from Watauga Road, near Abingdon, to the bridge over the South Fork of the Holston River. Construction of this section of US 58 is not scheduled to begin until FY2013 but continued improvements to the Damascus town line are in the VDOT long-range plan.

#### **B. Existing Bicycle and Pedestrian Facilities**

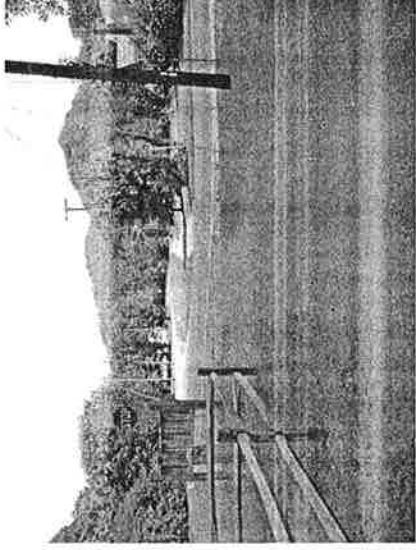
The existing bikeway and pedestrian system in the Town of Damascus has developed over the last 50 to 75 years. Traditional urban-style infrastructure such as curbs, gutters and sidewalks were installed in both the retail and residential portions along Laurel Avenue, the Main Street of Damascus, during the Town’s heyday as a timber town in the first part of the twentieth century. Since its reemergence as a tourist destination, corresponding with the growth in popularity of the



Cyclist riding along US 58/VA 91

Virginia Creeper Trail, bicycle and hiking trails and horse paths have been built throughout the Mount Rogers region traversing some of the most beautiful scenery in Virginia. The on-road and off-road bike paths, horse, and pedestrian trails are a unique and integral part of Damascus' transportation system. The Virginia Creeper Trail, the Appalachian Trail, the Iron Mountain Trail and the Bike 76 Route all interconnect or pass within the corporate limits of the Town.

The Virginia Creeper Trail is a multi-use (footpath, bicycle, horse) trail that connects Abingdon with the Virginia-North Carolina border 1.1 miles east of Whitetop Station, Virginia. Its total length is 33.4 miles. The U.S. Forrest service owns the Virginia Creeper Trail from the Whitetop Station trailhead to the second trestle in Town, the trestle located at the park. Approximately three miles of the Virginia Creeper Trail lies within the corporate limits of the Town. The Town of Damascus owns the former railroad right-of-way from its corporate limits east to Drowning Ford. The Town jointly owns the right-of-way (with the Town of Abingdon) from Drowning Ford west to Abingdon. Since its designation by Congress in 1985 as a National Recreation Trail, there has been a tremendous increase in its use. A U.S. Forest Service Study compiled in 2002 estimated an average usage of over 130,000 per year.



Virginia Creeper Trail crossing of US 58 looking north

The Appalachian National Scenic Trail is a continuous, marked footpath extending over 2,170 miles from Katahdin, Maine to Springer Mountain in Georgia, along the crest of the Appalachian mountain range. In 1968, Congress established a national system of trails and designated the Appalachian Trail and the Pacific Crest Trail (in the west) as the initial components. Virginia has the longest section of the Appalachian Trail, with 536 miles. Approximately 1.2 miles of the trail lies within the corporate limits of the Town. A 1966 Act of Congress designated the area around Damascus as a National Recreation Area. Surveys show that the greatest increase in usage is among weekend and week-long hikers utilizing not only the Appalachian Trail but also the many loop trails to which it connects. In 2007, *Backpacker Magazine* voted the nearby Grayson Highlands stretch of the AT to be the best weekend hike overall of the Trail.

The Iron Mountain Trail is one of many recreational trails created and maintained by the Mount Rogers National Recreation Area and Jefferson National Forest. The trailhead is located at the end of Fourth Street in the Mock Hollow section of the Town where the trail travels down Damascus Drive to join the Virginia Creeper and the Appalachian Trail within the corporate limits. Iron Mountain Trail wanders through the National Recreation Area and joins the Appalachian Trail again near Hurricane Mountain. The Bike 76 Route or Trans America bicycle Trail is presently the only designated on-road bike route in the corporate limits of the Town. The bike route coincides with US 58 to the east of the corporate limits and joins State Route 91 in town where it remains on Route 91 to the town limits and then travels westerly toward Meadowview, Virginia.

#### Signage

Signage for the Creeper Trail is located within the Creeper Trail ROW. The right-of-way is shown on the rail road maps. Other relevant trail signage in the Town includes:

- Signs along Laurel Avenue directing tourists to public parking areas
- A sign for the Appalachian Trail as it enters the southern end of Town Park.
- A sign for the Iron Mountain Trail as it enters the National Forest east of town.

#### Relevant Projects and Plans

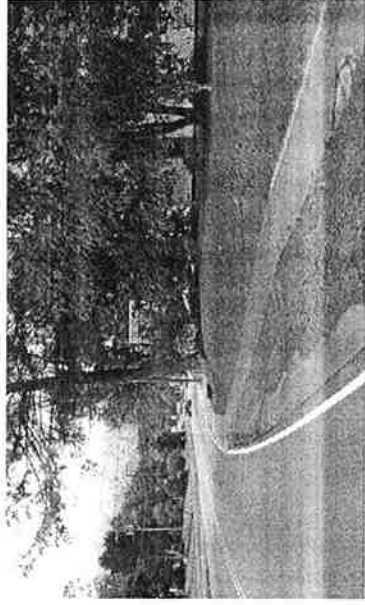
- The bridge where Laurel Avenue crosses Laurel Creek is currently being improved and a wide shoulder is being provided which should be able to accommodate on-road bicycling. The improvement project also includes a pedestrian sidewalk on the northern side of the bridge.
- The future Damascus branch of the Washington County Library is also located along the planned Beaver Dam Creek Trail. It will be on the property adjacent to the southern end of Town Park. It will be completed within the next three years as well. The existing baseball fields, the planned sports complex, and the new library will create pedestrian and bike traffic on the planned Beaver Dam Creek Trail. The County has received a grant from VDOT to pursue the project and an initial plan has been developed.
- The Trail at Beaver Dam Creek is a planned rail-trail conversion that will utilize what remains of the old Virginia-Carolina Railway and the Beaver Dam Railroad railbed, a corridor that ran from Damascus to Shady Valley, Tennessee, a link that was shut down in 1926. This trail has received funding through a SAFETEA-LU grant. The Trail at Beaver Dam Creek will be a multi-use, partially paved recreational trail with handicap accessible trail and fishing pier access. The trail will link to the Virginia Creeper Trail at Beaver Dam Creek where it heads south and circles the old Smethport Extract Company (Bayer Chemical Corporation) site. The trail will then follow Route 716 to the Jefferson National Forest in Phase I, approximately 1 mile. Phases II and III of this project (if supported) will follow Route 716 into the Cherokee National Forest, Backbone Rock, and Shady Valley, Tennessee (TN Route 133), potentially converting nearly 15 miles of abandoned railbed.
- At the southern terminus of the Beaver Dam Creek Trail, Washington County has planned a regional sports complex which is anticipated to be in place in the next three years. This facility will have ball fields, exercise facilities.

#### **C. Barriers and Challenges**

Traffic at peak tourist season is increasing in Damascus. The topography and physiographic features in and around the town make the development of an arterial highway system economically unfeasible, adding urgency to the need for a strong bicycle and pedestrian system within the town limits. The opportunity is present to develop a plan for a bike lanes, walkways, bike facilities and signage prior to any road construction improvements to capture federal funding for the proposed projects.

There is concern regarding the traffic safety problem at the intersections of VA 91 (N) and US 58. The intersection is presently controlled by a stop sign on VA 91, which is unexpected and subsequently often missed by drivers not familiar with the town.

Similarly, the turn where US 58 enters downtown Damascus from the north (towards Abingdon) currently allows high speed turning vehicle movements. The Virginia Creeper Trail parallels, then crosses US 58 at this intersection. There is currently no signage alerting trail users of the upcoming intersection resulting in a potentially dangerous situation for trail users, especially those traveling south on the trail. With the exception of a fluorescent yellow warning sign alerting southbound motorists to the potential presence of bicyclists, there is no other indication to drivers that they are crossing one of the busiest bicycle and pedestrian trails in the region.



The sidewalk along southbound US 58 north of downtown Damascus is narrow in spots and occasionally places users directly adjacent to high speed vehicle traffic. This sidewalk currently provides pedestrian access from downtown to within a short distance of the Damascus Middle School. However, there is a gap in the sidewalk system that prevents users from having a dedicated pedestrian facility providing access to the school grounds.

#### **Sidewalk paralleling US 58 north of Damascus**

According to the recently approved update of the Damascus Comprehensive Plan, the development of a comprehensive bicycle and pedestrian plan to facilitate easy access around town for both tourists and local residents is a high priority. In response, the Town hosted Mark Plotz, of the National Center for Bicycling and Walking, who conducted a Walkable Communities Workshop and walking audit for the town. Those present comprised a cross-section of stakeholders including local citizens, elected officials, trail group members, the Forest Service, the Chamber of Commerce, and local business owners.

#### **Other challenges include:**

- Certain roads are often inhospitable with heavy traffic volumes, high speeds and few facilities
- Certain roads are too wide and others are too narrow for comfortable bicycle travel
- Insufficient bicycle parking in the downtown core
- Inadequate signage to guide trail users to downtown
- Inadequate signage to guide visitors to available parking locations
- Navigational kiosks are in poor state of repair and are missing information
- Narrow sidewalks or sidewalks in poor condition
- “No bicycles on sidewalk” signs convey an unwelcoming message to visitors arriving by bicycle
- Lack of a recreational loop trail for town residents
- Major roads do not provide adequate shoulder space for use by bicyclists or shoulder area has debris and may be in poor condition
- There are particularly uncomfortable intersections in the Town of Damascus where peak demand traffic volume, turning movements, and limited directional information present challenges for pedestrians and bicyclists and motorists

## Chapter 3: Physical Recommendations

This chapter describes the segments of the proposed Damascus Loop Trail as well as numerous recommendations for spot improvements in and around town which will enhance the safety and comfort of bicyclists, pedestrians and motorists. Detailed descriptions of the various improvement recommendations may be found in Appendix A: Facility Descriptions.

Recommendations have been grouped into three general timeframes: short term (0-5 years), mid term (5-10 years) and long term (over 10 years).

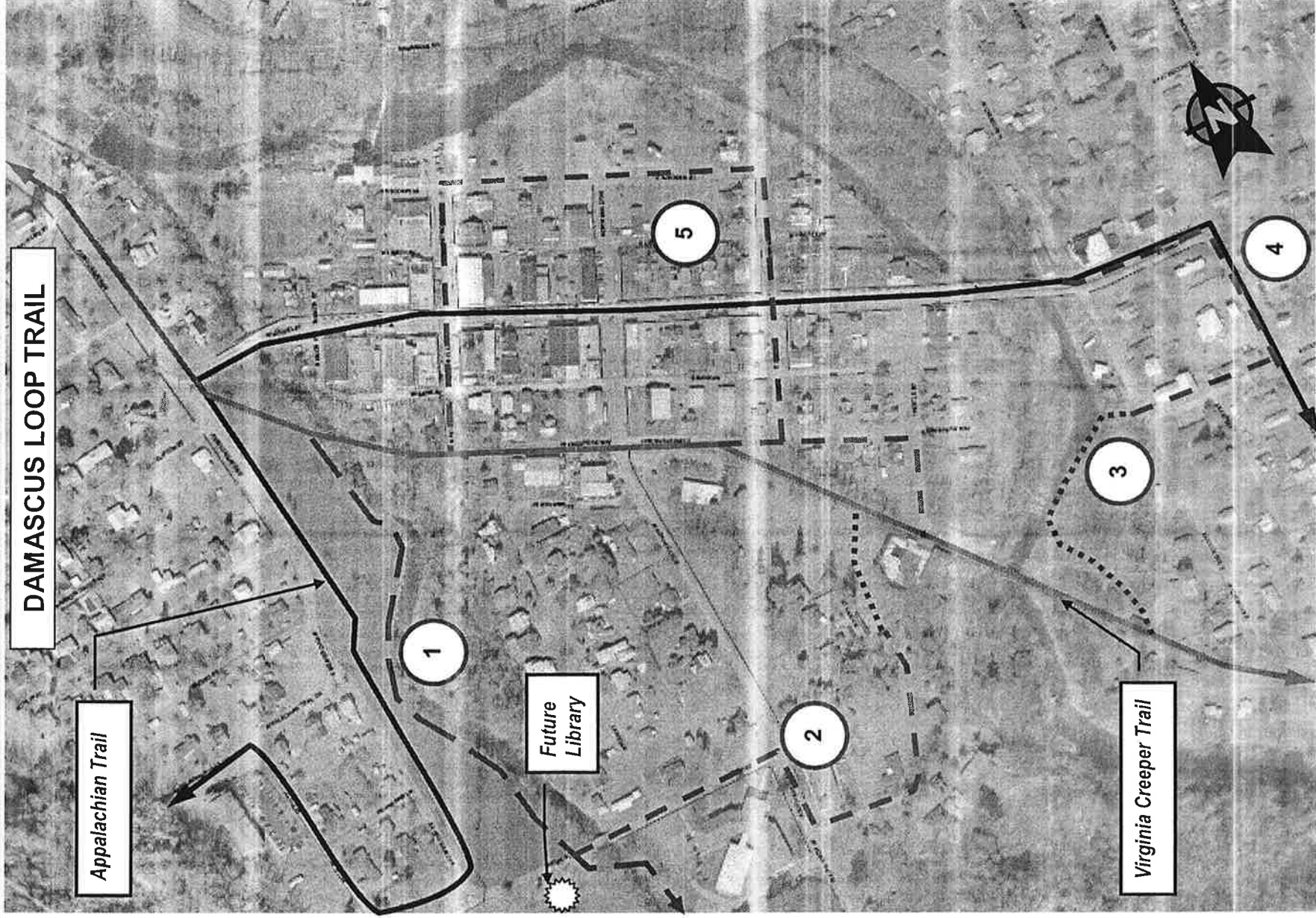
### A. Damascus Loop Trail

Currently, all of the major trail facilities in Damascus go through town and provide radial paths out of downtown. There are no formal trails or pathways that are intended for people to make a circuit within the town. Therefore, a key element of this plan is a loop trail that would provide bicycle and pedestrian circulation opportunities for both residents and visitors to Damascus. Frequently, people walking or bicycling for recreation and health benefits indicate a preference for these loop-type trails rather than merely going out along a linear trail and turning around halfway.

The proposed Damascus Loop Trail builds off of existing trails such as the Virginia Creeper Trail and proposed trails such as the Beaver Dam Creek Trail. Routes are directed so as to provide access to destinations such as downtown, the Beaver Dam Creek waterfront, Veterans Island, Town Park, the future Washington County Library and the future Washington County Sports Complex. Because of the constraints that exist in Damascus, the connections between destinations and the connections through Town are a combination of shared-use and parallel use paths, sidewalks and on-road bicycle facilities such as bicycle lanes and shared lane markings. The recommended facilities on each piece of the loop were selected based on stakeholder input, field analysis and the characteristics of the roadway environment.

Damascus should develop a simple signage system identifying the Damascus Loop Trail route to users since many of the segments will, at least in the short term, run along existing roadways and sidewalks.

A map providing a visual orientation to the proposed recommendations may be found on the next page. Descriptions of each segment of the proposed loop may be found on the pages following the map.





1

### ***The Trail at Beaver Dam Creek***

The Trail at Beaver Dam Creek will be a multi-use, partially paved recreational trail with handicap accessible trail and fishing pier access within Town Park. The trail will link to the Virginia Creeper Trail at Beaver Dam Creek where it heads south and circles the old Smethport Extract Company (Bayer Chemical Corporation) site. The trail will then follow Route 716 to the Jefferson National Forest in Phase I, approximately 1 mile. Phases II and III of this project (if supported) will follow Route 716 into the Cherokee National Forest, Backbone Rock, and Shady Valley, Tennessee (TN Route 133), potentially converting nearly 15 miles of abandoned railbed. At the southern end of the trail, Washington County has planned a sports complex. This is expected to be in place in the next three years.

2

### ***Water Street/Backer Lane Connection***

This connection will be a combination of sidewalks, shared roadways, and off road multi use trail. The section along Water Street will utilize existing sidewalks. A section of new sidewalk is recommended along the western side of South Shady Avenue between Water Street and Backer Lane. Shared roadway facilities would most likely be sufficient along Backer Lane from the intersection with South Shady Avenue to the end of Backer Lane because traffic volumes and speeds are relatively low. An off road paved multi-use path is proposed between the end of Backer Lane and the Virginia Creeper Trail. From inspection of town GIS records, it appears that publicly owned land is available on lots adjoining the swimming pool so land acquisition should be minimal.

This plan also recommends installing on-road bicycle lanes on each side of South Shady Avenue as a mid term recommendation. The bicycle lanes would extend from the Virginia Creeper Trail south to the future Washington County Regional Sports Complex. The town should collaborate with VDOT prior to the next planned improvement to South Shady Avenue to ensure there is adequate pavement width for the bicycle lanes.

3

### ***Laurel Creek/E. 4<sup>th</sup> Street***

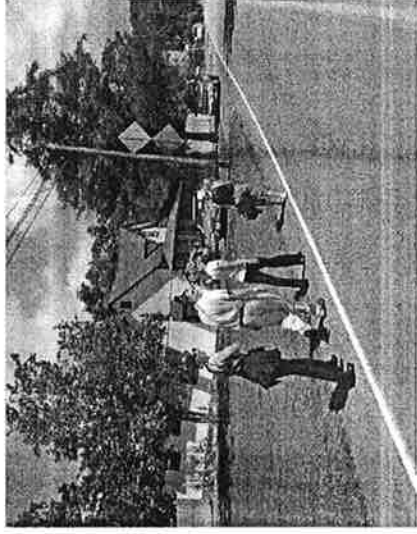
This connection will be a combination of sidewalks, shared roadways, and off road multi use trail. The southern portion of trail section along Laurel Creek is proposed to be an off road multi-use trail. Depending on terrain and environmental factors, this off road trail may be unpaved and have a more natural character. The trail will connect to the roadway at the western end of East 4<sup>th</sup> Street. Because construction of this segment of trail is not an immediate necessity (walkers and bicyclists may use Railroad Avenue), the Laurel Creek segment is proposed as a long term recommendation.

From this end of the off road path, the connection will be made by shared roadway facilities to the intersection with Douglas Drive (US 58/VA 91). In the short term, it is recommended that pedestrians be directed along Railroad Avenue north to Laurel Avenue. Bicyclists can use either Railroad Avenue or they may continue to Douglas Drive (this is also the route to the Iron Mountain Trail).

4

**Douglas Drive/Laurel Avenue Connection**

The segment extends from the Douglas Drive/East 4<sup>th</sup> Street intersection north along Douglas Drive and then west on Laurel Avenue. In the short term, “Share the Road with Bicycles” signage should be installed to increase driver awareness of bicyclists. A longer term recommendation for this length of Douglas Drive is for the construction of paved shoulders a minimum of 6 feet in width on both sides of the roadway. However, on-street parking using the widened shoulders is discouraged because the parked cars would force bicyclists into the roadway. Currently, the roadway has a combination of no shoulder, narrow paved shoulder, and gravel shoulder of varying widths.



Existing shoulder along Douglas Drive

5

**Downtown**

Within the downtown area, the Damascus Loop Trail will be a combination of shared roadways and sidewalks. In the short term, both bicycles and pedestrians will be directed along roadways, except where pedestrians may use existing sidewalks. With the relatively low traffic volumes and speeds found on Damascus’ side streets, use of the existing roadway should be fairly comfortable for cyclists of varying levels of ability and most pedestrians. In the long term, it is recommended that the town construct sidewalks along both sides of all side streets. The town should consider prioritizing construction of sidewalks along Trestle Street as this road leads to the existing pool which is a popular destination. Pool users should be expected to arrive by foot, bicycle and car from all over town and surrounding region.



Looking south along South Legion Street from Laurel Avenue

**B. Recommendations for Spot Improvements**

The recommended pedestrian and bicycle routes in this Plan are meant to provide connections between destinations in the town. Depending on the character of the road, presence of existing sidewalks and trails and other factors, the proposed connections are made through off-road facilities like sidewalks and trails, as well as on-road bicycle facilities such as shared roadways. The recommended facilities will make it more comfortable for walkers and bicyclists to travel along the road; however, for the routes to be truly viable, spot improvements will be needed. The map on the following page provides an orientation to the recommended improvements throughout Damascus.

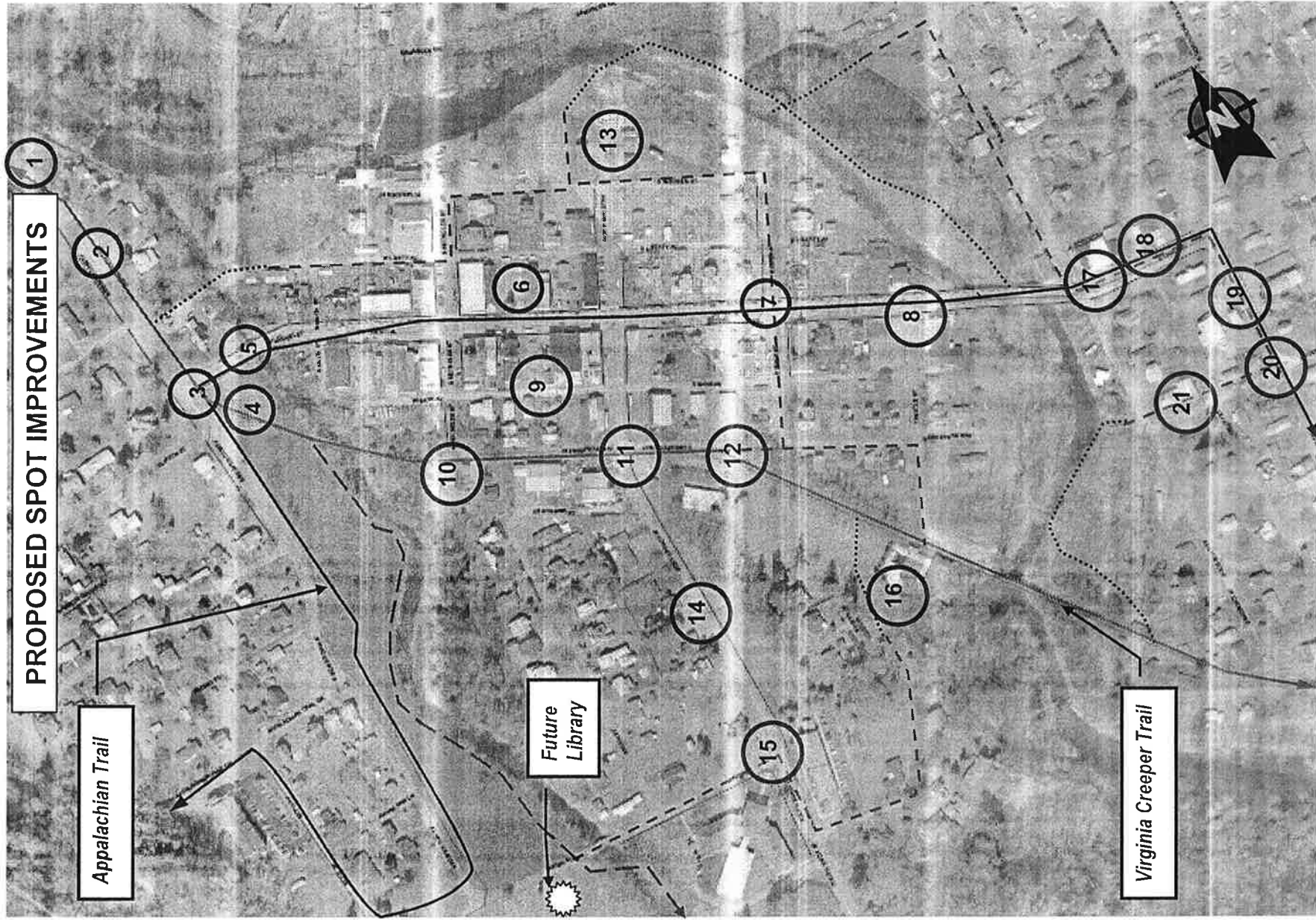
Descriptions of the proposed improvements may be found in Appendix A: Facility Descriptions.



DAMASCUS BICYCLE AND PEDESTRIAN

Master Plan

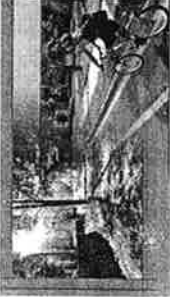
JULY 2009



# DAMASCUS BICYCLE AND PEDESTRIAN

## Master Plan

JULY 2009



Location	Recommended Improvements
1	Widen 6' wide sidewalk. Grade separate from US 58 (min. 6" height of standard VDOT curb)
2	Install "Share the Road" signage to alert Virginia Creeper Trail users to the presence of Daniel Boone Road (parallel to US 58) and to look out for autos.
3	Install bicycle/pedestrian warning signage on southbound US 58 advising drivers of upcoming trail crossing and pedestrians and cyclists in the road Improve intersection approaches to advise cyclists of upcoming road crossing. Recommend installing bollards (possibly use large stones), and advance signage Improve intersection approach with durable surface. Most recommended concrete. Alternatively consider asphalt. When installing the new surface, install pavement markings in the intersection approach. Also consider installing textured pavement to provide trail users with a tactile warning of upcoming intersection.
4	Install gateway treatment marking the VA Creeper Trail. This may traverse the road, or some sort of architectural treatment off the side of the road. Install crosswalk with stamped asphalt surface
5	Acquire right of way to install 'waiting area' on trail just before the road crossing Install signage/schematic map to aid visitors with navigation in and around Damascus Install narrow pavement marking and "Share the Road" signage
6	Install gateway/entry feature to indicate to visitors that they are entering Damascus. Character of US 58 should change from two lane highway to two lane pedestrian priority street Consider installing temporary bicycle parking on busy festival days. Town may partner with local businesses, or businesses may choose to provide parking as a service to revenue generating tourists. Consider having attendants to increase comfort level with parking facility.
7	Install high visibility pedestrian crossing signs to alert drivers to potential pedestrian traffic Install crosswalk with stamped asphalt surface on all four legs of intersection Install curb extensions on all four corners Bike parking concept- consider installing bike parking on one or more curb extensions. Especially consider using increased size curb extension on angled parking street (N and S Reynolds) for more parking or bigger bikes (tandems, bikes w/ trailers, etc.) Bike parking concept- consider installing temporary bike parking one or more parallel parking spaces. Bike parking could be installed during peak use weekends (festivals, etc.) and removed during the week and low demand periods.
8	Install high visibility pedestrian crossing signs to alert drivers to potential pedestrian traffic Install crosswalk with stamped asphalt surface on all four legs of intersection Install curb extensions on all corners
9	Install internal loop trail signage if this course of action is followed Potential festival bike parking alternative. Consider having attended parking sponsored by a business improvement district or consortium of bike shop owners.
10	Install signage to direct trail users to downtown Damascus, bicycle parking, visitors center, etc. Bicycle parking alternative. Install permanent bicycle parking at trail access point. Use temporary pedestrian crossing signs/bollards in roadway to alert drivers to pedestrian traffic on busy tourist days.
11	Install high visibility pedestrian crossing signs to alert drivers to potential pedestrian traffic Install crosswalk with stamped asphalt surface on all four legs of intersection Install "Share the Road" signage Install gateway/entry feature to indicate to visitors that they are entering Damascus. Character should change from two lane rural roadway to two lane pedestrian priority street
12	Install ornamental signage marking the Virginia Creeper Trail. This may traverse the road, or some sort of architectural treatment of the side of the road. Bicycle parking alternative. Install permanent bicycle parking at trail access point.

DAMASCUS BICYCLE AND PEDESTRIAN  
*Master Plan*  
 JULY 2009



Location	Recommended Improvements
13	Potential trailhead. Install signage/schematic map to aid visitors with navigation in and around Damascus. Consider installing permanent bicycle parking
14	Consider installing picnic tables, passive recreational areas Install sidewalks on north sides of Water Street between South Shady Avenue and Town Park Install on-road bicycle lanes in both directions of South Shady Avenue from Virginia Creeper Trail south to Washington County Regional Sports Complex
15	Install crosswalks
16	Install signage alerting travelers to public restrooms/showers at swimming pool
17	Install high visibility crosswalks Install gateway/entry feature to indicate to visitors that they entering Damascus. Character should change from two lane rural highway to two lane pedestrian priority street.
18	Install crosswalks
19	Install pedestrian crossing signage to alert drivers to pedestrians in roadway Install narrow pavement marking and "Share the Road" signage Pave shoulders (they appear to be gravel from photos and aerial) Install sidewalks on both sides of Douglas Drive
20	Install high visibility crosswalks on all legs of intersection
21	Install pedestrian crossing signage to alert drivers to pedestrians in roadway
	Install sidewalks on both sides of East Fourth Street from Douglas Drive to Railroad Avenue



### C. Recommendations for Temporary Improvements

Due to the many festivals and events held in town and its status as a popular weekend vacation spot, Damascus has periods of very high pedestrian, bicycle and vehicular activity that punctuate the otherwise quiet and bucolic character of community. During these events, there are many demands placed on the town's infrastructure and there are increased conflicts between bicyclists, pedestrians and drivers.

This plan recommends a number of temporary treatments to help promote safety and order during peak demand that can be removed during other times when the roads are relatively quiet. The town can also use temporary approaches to test the effectiveness of a particular treatment and determine if a more permanent installation is warranted.

#### In-road Yield to Pedestrian Signage

The town should experiment with the placement of bright yellow "yield to pedestrian" signs in crosswalks along Laurel Avenue in the downtown area and at the Virginia Creeper Trail crossing of South Shady Avenue. According to stakeholders, there are occasional vehicle-pedestrian conflicts during major events. Although there are no recorded cases of pedestrians being hit by vehicles in VDOT records reviewed for this project, it is not unlikely that problems may exist given the number of cars and pedestrians sharing the roadways.

Signs should be located so that they do not impede use of the crosswalk by pedestrians or passing/turning vehicles.

#### Police Control of Intersections

At certain key intersections where high volumes of pedestrian activity are likely (such as the intersection of South Shady Avenue and Laurel Avenue) it may be helpful to have a police officer assist with traffic and pedestrian crossing control.

#### Temporary On-Street Bicycle Parking

The town should identify appropriate locations where on-street bicycle parking may be located in existing parking on-street parking spaces. Care should be exercised to ensure that the bicycle parking is safely accessed from both the roadway and the adjoining sidewalk. Also, the bicycle parking space should be separated from intersections by sufficient distance to minimize potential conflict with turning vehicles and pedestrians crossing the roadway.

Because the on-street bicycle parking is temporary, the town may experiment with different locations along Laurel Avenue or the side streets to provide the best balance of convenience for users and impact on adjoining properties (positive or negative).

#### Temporary Off-Street Bicycle Parking

Damascus should consider installing temporary off street bicycle parking during periods of peak demand. There are several locations where such parking may make sense, including at the intersection of South Reynolds Avenue and the Virginia Creeper Trail, the town parking lot along Imboden Street (near the Old Mill), and the vacant lot on the north side of Laurel Avenue near the Mount Rogers Outfitters. Some of these locations may be on private property which would require landowner coordination.



Potential off-street bicycle parking: Vacant lot on Laurel Avenue across/next to Mount Rogers Outfitters

#### Temporary Street Closures

The 2007 Walkable Communities Workshop provides a recommendation for turning Bank Street and Liberty Avenue into one-way pairs (two one way streets operating in tandem to provide circulation) and stripe bike lanes on each road. According to stakeholders interviewed for this project, the current traffic speeds and volumes on these roads, even during big events, is so small that bicycle travel is relatively easy and comfortable for most cyclists. Therefore, a permanent modification is not recommended at this point. However, the town may consider experimenting with temporary modification of the navigation on these roads or even Laurel Avenue. For example, the town could use traffic cones and signs to restrict traffic on one direction of Laurel Avenue for several blocks, allowing vendors to set up shop on the blocked travel lane which would then be open to foot traffic. A similar approach could be taken on any of the side streets, including Liberty or Bank.

The stakeholders did discuss an effort to redesign Bank Street as a small scale commercial corridor. As plans for this rebranding evolve, the town should consider restricting vehicular traffic on big weekends and during festivals and open the travel lane up to vendors, café tables and foot traffic. In this case, riding bicycle traffic should be discouraged or at the very least slowed to prevent conflicts between bicyclists and pedestrians.



## Chapter 4: Policy and Program Recommendations

This chapter provides recommendations for policy and programmatic changes that will improve conditions for bicycling and walking throughout Damascus. Many of the recommendations will require partnering with VDOT, Washington County, and other entities.

### A. Policy Recommendations

The concept of “complete streets” has gained a tremendous amount of support in recent years through Federal, State, and local policies. Complete streets are those that are designed for all users - people who drive automobiles, people who use public transportation, people who bicycle, people with disabilities, and people who travel on foot. One of the keys to achieving this is for Damascus to ensure that the VDOT Policy for Integrating Bicycle and Pedestrian Accommodations is applied to all projects that involve VDOT right of way or utilize funds that flow through VDOT.

#### A.1: Establish an institutional framework and oversight structure necessary to implement the recommendations of this Plan.

This recommendation addresses the need for continued oversight and coordination to ensure successful implementation of this Plan. This Plan serves as a starting point to provide direction for improving walking and bicycling conditions throughout Damascus. The implementation process that comes after this Plan is complete will require additional planning, coordination, design, and funding.

A variety of agencies, boards, committees and individuals will play a role in the oversight of future bicycle and pedestrian programs and projects. It is important that these entities provide the appropriate level of oversight and minimize overlap in their responsibilities. The responsibilities of each are described below:

#### **Town and Mount Rogers Planning District Commission Staff**

Town and MRPDC staff are responsible for implementing pedestrian and bicycle-related projects within their jurisdiction. They are also responsible for working with VDOT (where appropriate) on state roadway projects in order to accommodate bicycle and pedestrian facilities. Agency staff should work with developers to include bicycle and pedestrian improvements through the rezoning, subdivision, and site planning process. Local building officials also have responsibility under the International Building Code to ensure that accessible routes from site arrival points to accessible building entrances are also included.

Engineering inspection staff is also responsible for quality control of the system. VDOT has this responsibility for public facilities within VDOT-maintained street rights of way. They must ensure that pedestrian and bicycle facilities are constructed and maintained in compliance with National, State, and Town standards. In this respect, they have a responsibility for inspecting pedestrian and bicycle facilities that are built by developers for public use.

*Responsibility for on-street pedestrian and bicycle facilities:* The implementation of the on-street pedestrian and bicycle facilities identified in this plan, such as sidewalks, bike lanes, and shared use paths adjacent to the roadway, is the responsibility of the entity with jurisdiction over the roadway. For state roadways, VDOT is the responsible entity. Damascus and MRPDC staff must work with VDOT to achieve the desired type of pedestrian and bicycle facilities on state roadways and to implement pedestrian and bicycle facilities on roadways under the Town’s control.

*Responsibility for off-street pedestrian and bicycle facilities:* The off-street pedestrian and bicycle network identified in this plan will largely be built by the Town with support from various grants and other funding opportunities (see Chapter 5: Implementation).



### **Pedestrian and Bicycle Program Liaisons**

As indicated above, the responsibility for implementing this Plan will fall on Town and MRPDC staff. Therefore, it is recommended that one staff person from the Town of Damascus and one person from MRPDC staff be assigned to oversee and coordinate the pedestrian and bicycle program in Damascus. With the relationship between Damascus and the MRPDC, it is possible that this would be the same person representing both the town and MRPDC. In addition to the responsibilities outlined above, these staff would be responsible for coordinating their efforts with adjacent jurisdictions and with pursuing grant funding.

### **Planning Commission Pedestrian and Bicycle Advisory Committee (PBAC)**

Because bicycle and pedestrian access and circulation is so important to the local economy and quality of life in Damascus, the Planning Commission should consider forming a new ad hoc Pedestrian and Bicycle Advisory Committee (PBAC) in order to provide support for the implementation of this Plan. This committee would not be a formal standing committee, rather it would develop the recommendations that the Pedestrian and Bicycle Program Liaisons would bring to the MRPDC. Evidence from around the country shows that successful pedestrian and bicycle programs often result from well-organized advocacy and inter-agency support. The purpose of the PBAC will be to stimulate and coordinate the implementation of this Plan. The PBAC should be comprised of individuals from the local business community, Parks and Recreation, Town of Damascus, VDOT, representatives of organizations such as the Damascus Middle School, and citizens from Damascus.

### **Washington County Chamber of Commerce or Business Improvement District**

Eco-tourism, focused on hiking and bicycling, is vital to the local economy in Damascus. Therefore, it is highly recommended that local businesses in Damascus join the Washington County Chamber of Commerce to promote implementation of the recommendations in this plan. Many of the improvements would directly benefit local businesses. In other communities, business organizations have mobilized to help underwrite and facilitate positive changes that benefit the community. In Damascus, temporary bicycle parking and navigational signage are two low cost improvements that would enhance the bicycle and pedestrian system and help businesses that cater to trail users.

### **A.2: Ensure that the non-motorized transportation and recreation facilities identified in this Plan (and other local plans) are constructed during development and improvement projects.**

Town staff should require future developers to construct the pedestrian, and bicycle facilities that are identified in this Plan as a part of their developments. While the pace of development in the Damascus region is slow compared to other parts of the Commonwealth, the Town should work with developers to ensure that bicycle and pedestrian facilities are included in the design of the project and constructed in accordance with this plan

In addition, any time a roadway is being widened, resurfaced, or other improvement, the Town should ensure that any recommendation from this plan is included in the design and construction of the upgraded facility.

### **A.3: Develop a maintenance and management program that ensures that facilities are maintained in good repair, both through routine seasonal maintenance and spot repairs.**

Since the pedestrian and bicycle facilities proposed in this Plan will be owned by various jurisdictions and entities, ensuring good maintenance will require coordination with a variety of parties. This includes the Town of Damascus, VDOT, volunteer groups, and other organizations. VDOT will maintain (e.g., replace and repair) "sidewalks, shared use paths, and bicycle paths built within department right-of-way, built to department standards, and accepted for maintenance" (as per VDOT Policy for Integrating Bicycle and Pedestrian Accommodations, effective March 18, 2004). This does not include



snow and ice removal on sidewalks and shared-use paths and does not preclude previous maintenance agreements.

#### **Maintenance Schedule**

A first step in developing a maintenance program is to identify what tasks need to be undertaken and who is responsible for these tasks. Responsibility is largely determined by facility ownership. Tasks are largely divided between on-street bikeway maintenance tasks, “off-street” sidewalk tasks, and multi-use trail maintenance tasks. Recommended maintenance practices include:

- Sweeping trails, bicycle lanes and paved shoulders regularly to remove debris;
- Repairing trail and roadway surfaces and sidewalks to ensure a continuous facility and smooth surface that is free of cracks, potholes, bumps and other physical problems;
- Repair of utility cuts to prevent rough surfaces for cyclists and sidewalk interruptions for pedestrians;
- Cutting back vegetation to prevent encroachment;
- Maintenance of pedestrian and bicycle signs, striping, and markings, especially replacement of signs that are damaged by vehicle crashes and other incidents;
- Maintenance of drainage facilities including catch basins and drainage grates;
- Sign maintenance; and
- Snow removal (if applicable)



**Example-** This storm drainage grate at the VA Creeper Trail crossing of South Shady Avenue is an older design and is a safety hazard to bicyclists. It should be replaced as soon as possible.

#### **Maintenance Website and Hotline**

Once a regular schedule for pedestrian and bicycle facility maintenance is established, a website and phone hotline can be established to allow residents and trail users to report maintenance problems and request spot repairs. The town should update their websites to include a “Pedestrian and Bicycle Facility Maintenance Action Request Form” and should establish a Pedestrian and Bicycle Maintenance Hotline to give trail users an easy means of reporting maintenance concerns on local trails, sidewalks and bikeways. Damascus should then forward maintenance concerns to the appropriate jurisdiction as appropriate.

#### **Maintenance Manager**

In the future, as there is need, the town should hire a lead staff person as a Maintenance Manager to organize and keep track of both regular and remedial inspection and maintenance of the pedestrian and bicycle network. This staff person would be responsible for coordinating with VDOT, Damascus maintenance crews, and volunteer groups for tasks that they can assist with. The maintenance manager would be responsible for addressing maintenance issues that were raised by residents and visitors through the town Pedestrian and Bicycle Facility Maintenance Website or Hotline.





**A.4: Pursue additional grant sources and capital funding as necessary to implement pedestrian and bicycle facility improvements.**

Given the limited resources of Damascus, it is likely that many (if not most) of the pedestrian and bicycle network will likely not be addressed unless funding is secured for these projects. It will be important to establish a mechanism by which to build these connections, otherwise the network will remain incomplete. There are a wide variety of grant sources available (see Chapter 5: Implementation). Damascus should also establish a yearly capital budget item for new pedestrian and bicycle facilities in order to provide matching funds for future successful grants, and to complete special projects that are not grant-funded.

**B. Program Recommendations**

In addition to the physical facility recommendations presented in Chapter 3 and the policy recommendations in section A of this chapter, a complete approach to improving conditions for pedestrians and bicycles includes recommendations for new education, enforcement, and encouragement programs. Pedestrians and bicyclists of all skill levels should be educated on how to use new pedestrian and bicycle facilities safely. Drivers should also be educated to treat pedestrians and bicyclists as legitimate users of the road and to operate safely around these non-motorized modes. Unsafe behavior by motorists, pedestrians and bicyclists should be targeted through law enforcement. At the same time, promotional efforts, such as Walk and Bike to School Day and developing a public walking and bicycling map can help advertise walking and bicycling fun, healthy forms of recreation and transportation in the Damascus region.

This section presents a number of recommendations that will promote and increase the safety of walking and bicycling.

**B.1: Educate pedestrians and cyclists about safe walking and riding skills and rules of the road**

**Bicycling and Walking Rodeos**

The Parks and Recreation Department should work with town police, local businesses, Washington County parks department, and other local organizations to organize bicycling and walking rodeos. These rodeos are an opportunity for town staff, police, and other leaders to teach safe bicycling and walking behaviors and give children hands-on experience to improve their bicycling skills. The rodeo site can be set up with mock streets, intersections, and houses/stores for the walking course and cones, stop signs, and play vehicles for a bicycle course. These rodeos should be offered several times each year, and could be coordinated with other local events, such as the Iron Mountain Bicycle Race, Fourth of July or Holiday parades, or other seasonal events.

**Educate Visiting Bicyclists about Safe and Courteous Riding in Town and on Trails**

The town, in conjunction with local businesses (especially bicycle outfitters) should develop educational materials to advise trail users about laws and rules applying to use of trails. Drivers transporting bicyclists to trailheads should emphasize safe and courteous riding on local trails. Posters should be installed at navigational kiosks around town to remind bicyclists of good riding etiquette.



**Reward “Riding Bicycles...” Signage in More Positive Terms**

Currently, there are signs along Laurel Avenue warning bicyclists that “riding bicycles on sidewalk is illegal.” This conveys a very negative attitude toward bicyclists. The same message can be delivered in a more positive tone. For example, the sign might say “bicyclists should use roadway.”



**B.2: Conduct programs and events that encourage walking and bicycling for fun, health and fitness, and for transportation.**

**Bicycling and Walking Maps**

Damascus should partner with local businesses to develop maps of walking and bicycling routes. These brochures would show the bicycle route or walking route in significant detail, including written directions (e.g., cue sheet). They would include information about points of interest and historic sites, restaurants, shops, and other attractions around the town and along the major bicycle routes. This type of brochure would be a great resource for residents or visitors looking to do a half-day or full-day of walking or bicycling in the town.

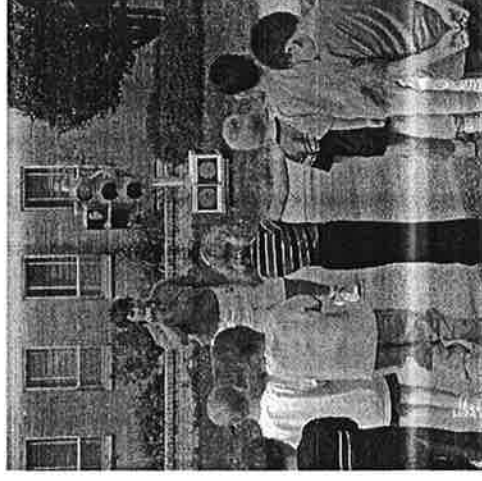
**Walk and Bicycle to School Day**

The Pedestrian and Bicycle Program Liaisons should work with Damascus Middle School to participate in International Walk and Bicycle to School Day (held each year in October). Walk to school days have been instituted at many schools throughout Virginia over the past decade. They increase awareness of bicycling and walking as fun, healthy transportation choices that can reduce automobile congestion and pollution near schools.

**Pedestrian and Bicycle Safety Education Curriculum**

The parks and recreation department should work with Damascus Middle School to implement a pedestrian and bicycle safety education curriculum.

There are a number of existing sources for funding and assistance in integrating pedestrian and bicycle safety education into schools. The Bike Smart, Virginia! initiative is a collaborative project with the Virginia Department of Education, Health, Motor Vehicles, and Transportation and the non-profit organization, BikeWalk Virginia. The program aims to prevent bicycle-related injuries and fatalities in communities throughout Virginia. The initiative has several components to educate citizens about bicycle safety and to make safety equipment (such as bicycle helmets) available.



The Bike Smart, Virginia! Program offers training-the-trainer workshops around the state throughout the year. At these workshops, school health and PE teachers receive 2 days of training in methods of teaching bicycle safety and become "Bike Smart Basics" Certified. These trainers can then offer the BikeSmart, Virginia! six week course as a part of the Health and Physical Education curriculum in elementary and middle schools. The course includes on-bike instruction (including: helmet safety, crash avoidance, bike handling skills, rules of the road, etc.) and other safety tips. Additional information can be found at [www.vahealth.org/civp/bike/schools.asp](http://www.vahealth.org/civp/bike/schools.asp). Damascus should work with the health and P.E. coordinator for the Damascus Middle School to conduct additional research into the program and gain the involvement of local schools.

A viable source for pedestrian and bicycle safety education funding in Virginia is the Department of Motor Vehicle's Safety Grant. The Virginia DMV accepts grant applications each year in March that support Virginia's primary transportation safety goal of "reducing the number of deaths and serious injuries that result from traffic crashes," which includes improving pedestrian and bicycle safety. Guidelines for the current year's application can be found at [www.dmvnow.com/webdoc/pdf/tss10a.pdf](http://www.dmvnow.com/webdoc/pdf/tss10a.pdf).



### ***B.3: Initiate Safe Routes to School programs at Damascus Middle School***

Damascus should work with the Middle School to apply to VDOT for Federal grant funding to establish a SRTS pilot program. This grant source provides 100% (no match required) funding for engineering, education, enforcement and encouragement programs within 2 miles of schools that serve Kindergarten through the 8th grade (see the Chapter 5: Implementation for additional details about the VDOT SRTS program). The pilot program could be based on existing models used in Charlottesville and elsewhere to plan physical improvements (including sidewalk construction and pedestrian crossing improvements) and implement safety education programs at interested schools.

Safe Routes to School programs are beneficial because they provide an impetus to improve walking conditions around schools, help to reduce the financial burden of student busing, provide another way for children to get daily exercise, and reduce traffic volumes during the morning peak hours. State and national estimates suggest that up to thirty percent of morning peak hour vehicle trips are school-bound trips or include dropping students at schools. The environmental, social, health, and safety (not to mention direct costs) of a system that delivers most students to school via school buses and personal automobiles is significant. While increasing the numbers of students that bicycle and walk to school can help mitigate the negative impacts of the current system, safe routes to school must be created before parents and school officials will feel comfortable encouraging students to use them.

It should be mentioned that SRTS programs are generally found in suburban and urban areas. However, health-based SRTS programs have also been successfully implemented in rural areas of Virginia by using walking routes on the school campus.



It is important to note that the Safe Routes to School program does NOT encourage students to walk alone in unsafe locations - it provides a method for improving conditions, and encourages parents to walk with students to school.

### **C. Environmental and Aesthetic Considerations**

A well-designed Bicycle and Pedestrian Master Plan includes plans to preserve and protect natural resources (land, water, animal, and vegetation) as well as cultural, historic, and aesthetic resources throughout the planning and implementation phases.

All projects and program actions taken during the implementation phase of the Damascus Bicycle and Pedestrian Master Plan should minimize any potential negative environmental impact. All actions should also consider rural scenic resources and the aesthetically pleasing character of the town. Strategies for carrying out this requirement are listed below.

#### **Environmental Strategies**

Low Impact Development (LID) is a comprehensive land planning and engineering design approach with a goal of maintaining and enhancing the pre-development hydrologic regime of developing watersheds. Some examples of applicable LID strategies are listed as follows:

- Permeable Pavement: Permeable pavement comes in four forms: permeable concrete, permeable asphalt, permeable interlocking concrete pavers, and grid pavers. All of the permeable pavement systems have an aggregate base in common which provides structural support, runoff storage, and pollutant removal through filtering and adsorption.



- Swales: Swales are vegetated open channels designed to accept sheet flow runoff and convey it in broad shallow flow.
- Bioretention Curb Extensions and Sidewalk Planters: Bioretention is a versatile green street strategy. Bioretention features can be tree boxes taking runoff from the street, indistinguishable from conventional tree boxes. Bioretention features can also be attractive attention grabbing planter boxes or curb extensions.
- Sidewalk Trees and Tree Boxes: By providing adequate soil volume and a good soil mixture, the benefits obtained from a street tree multiply. To obtain a healthy soil volume, trees can simply be provided larger tree boxes, or structural soils, root paths, or “silva cells” can be used under sidewalks or other paved areas to expand root zones. These allow tree roots the space they need to grow to full size without disturbing the sidewalk and trail system.

#### **Cultural Preservation Strategies**

Rural scenic resources are being lost at an alarming rate across the country. Development on the edge of every city, large and small, is turning America’s rural character into parking lots and franchise developments. The resulting “Anywhere USA” creates a homogenized visual image across the landscape everywhere.

Scenic Management provides an additional level of control to preserve and enhance the visual quality of the community when considering the following:

- Landscape planting and design: Landscape development shall be consistent and blend with the adjoining landscape
- Excavation and site grading
- Signage location and design
- Parking location and design
- Woodlands (existing vegetation): Significant existing vegetation within the effected area shall be preserved through careful and innovative site design, if feasible. Trees greater than 8” in diameter (measured 4 feet above the ground) or special specimen trees, as identified by the Town are considered significant vegetation.
- Streams and Rivers
- Commercial, Residential & Industrial Facilities
- Park and Conservancy areas
- Environmental Corridors
- Key Views or Focal Points (positive or negative)
- Visual Features and Landmarks (positive or negative)

## Chapter 5: Implementation

This chapter describes how the recommendations for improving the safety and convenience of pedestrian and bicycle transportation and recreation in Damascus will be achieved over the next 25 years. The first section of this chapter breaks the phasing of recommendations into short-, medium-, and long-term categories. The second part of the chapter describes potential funding sources.

As a general note to the following recommendations, the proposed activities for this plan include a large amount of signage. The Town of Damascus is a community that prides itself on having an attractive small town feel. While each individual improvement listed in this plan may not have excessive signage, the effect of several improvements and their related signage taking place in close proximity may take away from the aesthetics of the Town. When implementing this plan it will be a priority of the Damascus Planning Commission to insure that the related signage is adequate but not detrimental to the Town's appeal.

### A. Project and Program Phasing

The town's pedestrian and bicycle projects and programs will be developed over the next 25 years. Phasing of the plan recommendations is discussed below. Specific short-term recommendations are listed. These are the first actions that should be taken to begin implementing this Plan.

#### Short-Term Recommendations (0 to 5 years)

Several of the project and program recommendations should be implemented soon after this plan is adopted (within 5 years). These short-term projects will improve pedestrian and bicycle conditions in specific areas, creating early successes for decision-makers to highlight. These short-term projects, programs, and policies will build momentum for the other recommendations of the plan.

- **Damascus Loop Trail Segments**  
Generally, it is recommended that the on-road portions of the Damascus Loop Trail that currently provide connectivity be marked over the next few years.
  - *The Trail at Beaver Dam Creek:* This trail is currently in the project permitting and approval phase and is anticipated to be completed within the next three years.
  - *Water Street/Backer Lane Connection:* Improvement of the on-road portions of this segment are relatively inexpensive, requiring only some signage and a short segment of sidewalk along South Shady Avenue. The town should begin planning and explore funding options for the off-road portion of the segment.
  - *Laurel Creek/East 4<sup>th</sup> Street Segment:* Installation of the on road portions (on East 4<sup>th</sup> Street) of this trail segment could begin relatively soon as there is no engineering or construction required.
  - *Douglas Drive/Laurel Avenue Connection:* In the short term, "Share the Road" signage should be installed on each side of Douglas Drive to alert motorists to the presence of bicyclists. Concurrently, Damascus should work with the MRPDC and VDOT to ensure that paved shoulders along Douglas Drive are on the state's Transportation Improvement Plan for the area.
  - *Downtown:* In this area, the bicycle facilities are all on-road shared lanes. Subsequently, "Share the Road" signage would be a relatively inexpensive treatment that would improve the bicyclist's experience.

- **Damascus Loop Trail Signage System:** This Plan identifies a series of routes connecting important destinations throughout the town. The town should field check these routes and then, as the recommended facilities are provided, post signs indicating that they are part of the designated pedestrian and bicycle route system. This destination-based signage system should serve a functional purpose, for example directing bicyclists to a good route through downtown that avoids difficult intersections and connects with on-road bicycle facilities heading out of town. As the loop trail around the town is developed, a signage system with more of a recreational function should be considered.
- **Spot Improvements**

Generally, the recommended short term spot improvements are intended to enhance bicycle and pedestrian safety and the utility of the existing bicycle and pedestrian infrastructure.

  - **Replace Drainage Grate at the Creeper Way/South Shady Avenue Intersection:** The drainage grate currently being used is of an outdated design which may capture the tires of bicycles (especially hybrids or bikes with narrow tires) traveling along the trail. *This should be replaced immediately if it has not already been taken care of.* The town should inspect all other drainage inlets to ensure that they are of an appropriate bicycle safe design.
  - **Extend sidewalk along US 58 to Government Road (Damascus Middle School):** The existing sidewalk system along the stretch of US 58 northwest of downtown Damascus extends from Laurel Avenue to within 300' of Government Road. Closing this gap in the sidewalk network would allow children walking to school to make the trip along the sidewalk without having to walk on the shoulder or roadway (except when crossing the street).
  - **Improve Virginia Creeper Trail approach to Laurel Avenue/US 58:** Currently, there is little signage or other warning advising cyclists that they are approaching a major roadway. Advance warning signage should be installed and the trail should be resurfaced to improve durability and improve trail user safety.
  - **Install Bicycle Racks at the Parking Lot on Imboden Street:** Damascus should conduct a survey to gauge the amount of bicycle parking needed at this lot and purchase or build permanent bicycle parking for visitors (note- this will likely only be used on busy weekends and during festivals).
  - **Install "Share the Road" Signage in Various Locations:** In order to improve bicyclist safety and the awareness of drivers, "Share the Road" signage should be installed at multiple locations around town including: Daniel Boone Road, Laurel Avenue on or near the Beaver Dam Creek bridge, South Shady Avenue at Creepers Way, along Douglas Drive and VA 91/USBR 76 north of Damascus and along US 58/VA 91 southeast of town.
  - **Develop and Install Navigational Maps for Visitors:** Damascus should develop an updated map of the town showing major trailheads, restrooms, lodging, parking and other points of interest. The colorful maps should be located in high visibility areas where they are likely to capture the attention of visitors (such as near the caboose in Town Park, the parking lot along Imboden Street, or the southern entrance into town on the Virginia Creeper Trail).
  - **Install High Visibility Pedestrian Crossing Signs in Downtown:** The town should erect pedestrian crossing signs adjacent to all crosswalks in downtown Damascus.



## DAMASCUS BICYCLE AND PEDESTRIAN Master Plan JULY 2009

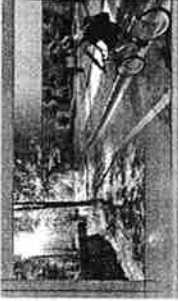
- **Temporary Improvements**

This plan recommends a number of temporary treatments to help promote safety and order during peak demand that can be removed during other times when the roads are relatively quiet. The town can also use temporary approaches to test the effectiveness of a particular treatment and determine if a more permanent installation is warranted.

  - **Implement Temporary Bicycle Parking:** The town should purchase (or build) portable bicycle racks that can be placed on parallel parking spaces on Laurel Avenue or a nearby side street. It is important that the site selection process be well publicized. Additionally, temporary signs, flyers, and other notices should be distributed alerting drivers and nearby property owners of the installation.
  - Alternatively, if an off-road ‘festival’ type bicycle parking is preferred, the town should procure the necessary materials to fence off the area and consider coordinating with local businesses to underwrite the cost of the service and assist with staffing.
  - **In Road Pedestrian Crossing Signage:** The town should purchase high visibility in road “Yield to Pedestrian” signage that can be placed temporarily at key locations around town during peak and times.
  - **Improve Virginia Creeper Trail approach to Laurel Avenue/US 58:** Currently, there is little signage or other warning advising cyclists that they are approaching a major roadway. Advance warning signage should be installed and the trail should be resurfaced to improve durability and improve trail user safety.
- **Programs**
  - **Washington County Chamber of Commerce:** The town should work with local businesses to encourage participation in the Chamber of Commerce that can then assist with plan implementation.
  - **Maps and Brochures:** The town should work with the local businesses to develop maps and brochures to show residents and visitors preferred routes for bicycling and walking. These materials would provide information about the benefits of non-motorized transportation and physical activity, pedestrian and bicycle safety tips, bicycling rules, bicycle parking, and information about local bicycling and walking organizations.
  - **Safe Routes to School (SRTS):** The town should work with Damascus Middle School to start a Safe Routes to School program for encouraging and improving the safety of walking and bicycling to school. The town should also partner with Damascus Middle School to promote a Walk to School Day event.
  - **Bike/Walk Rodeos:** The town should work with local law enforcement and educators to offer walking and bicycling rodeos. The objective of these rodeos is to teach children about pedestrian and bicycle safety through hands-on experience.
  - **Maintenance and Enforcement Hotline:** The County should provide a toll-free number for reporting maintenance and enforcement problems.

### Mid Term Recommendations

There are a number of recommended projects and programs that are very important for improving pedestrian and bicycle conditions in Damascus, but are likely to take longer to implement than the short-term initiatives. These projects and programs are classified as medium-term recommendations. Though these recommendations are designed for a 10-year timeframe, the town should take advantage of opportunities that arise to implement the projects and programs sooner.



## DAMASCUS BICYCLE AND PEDESTRIAN Master Plan JULY 2009

Specific medium-term projects and programs are listed below.

- **Damascus Loop Trail Segments**  
The intent is that the Loop Trail should be completed within 10 years. Funding or design challenges may extend this timeframe.
  - **Water Street/Backer Lane Connection:** The town should build the off-road portion of this trail segment that provides connectivity between the swimming pool, the Virginia Creeper Trail, downtown Damascus and other areas to the Beaver Dam Creek Trail, Washington County Library, the Washington County Sports Complex, and neighborhoods to the south and west of downtown.
  - **Laurel Creek/East 4<sup>th</sup> Street Segment:** The town should conduct a feasibility study and begin preliminary design for the section of off-road trail that would follow the banks of Laurel Creek between the Virginia Creeper Trail and East 4th Street.
  - **Douglas Drive/Laurel Avenue Connection:** Damascus should coordinate with VDOT to install paved shoulders along both sides of Douglas Drive. Ideally, parking should be restricted in these shoulders to provide cyclists adequate space for riding outside of traffic. If possible, sidewalks should also be installed at this time to provide pedestrian connectivity along this commercial and residential corridor.
- To the extent possible, access to Douglas Drive from the parking lots directly abutting the roadway should be controlled to reduce the points of egress. Currently, there are several properties that have long open stretches of pavement and the multiple, unpredictable vehicle turning movements can be dangerous for bicyclists and pedestrians.
- **Spot Improvements**  
Generally, the recommended short term spot improvements are intended to enhance bicycle and pedestrian safety and the utility of the existing bicycle and pedestrian infrastructure.
  - **Improve Virginia Creeper Trail approach to Laurel Avenue/US 58:** Improve the approach to the intersection from the north and south with asphalt or other durable surface. Surface should be textured to provide tactile cues to riders to complement the visual cues. Also consider installing bollards to prevent auto access to the trail and provide additional signals to cyclists that they are approaching the intersection.
  - **Install Gateway Treatment at Western and Eastern Edges of Town:** This could be a significant architectural feature which indicates to visitors that they are entering downtown Damascus. In addition to 'marketing' the downtown, the gateway signifies crossing a threshold into a different environment that elevates the priority of the pedestrian.
  - **Commission a Streetscape Plan for Laurel Avenue:** In order to enhance the small town character of Laurel Avenue, Damascus should consider developing a streetscape plan that identifies design themes for the downtown area.
  - **Improve Visitor Accommodations near Imboden Street Parking Lot:** Damascus should install passive recreational facilities such as benches or other permanent fixtures in the grassy area near the Imboden Street parking lot. Because the land is in the floodplain, it may not be prudent (or legal) to install permanent structures. However, temporary and portable improvements may be made which could significantly enhance this underutilized resource.





- *Install Sidewalks on South Shady Avenue:* The further enhance the proposed Damascus Loop Trail, the town should install sidewalks on both sides of South Shady Avenue to extend from Laurel Street to Water Street. This would provide improved pedestrian connectivity between downtown and the future Washington County Library and Beaver Dam Creek Trail.

#### Long Term Recommendations (Over 10 years)

There is one significant long term recommendation for this bicycle and pedestrian plan. Damascus should look for opportunities to complete this task earlier such as roadway improvement projects.

- *Rebuild Sidewalk on US 58:* The most significant long term project is to improve the existing sidewalk on US 58 leading towards Abingdon. The current sidewalk is functional, but is narrow in places and due to its design it actually functions as a drainage facility for US 58. Improving this stretch of road will require the acquisition of right of way from adjoining property owners and significant engineering and design work to provide adequate space to install a 6' wide highway that is raised a minimum of 6" from the roadway surface.

### B. Potential Funding Sources

Funding is essential for implementing the recommendations of this Plan. New trails, on-road bikeways, and sidewalk projects, programs, and maintenance activities will need to be funded through various sources. Funds from a variety of sources are often required to develop specific projects. Because of this, it will be important Damascus to:

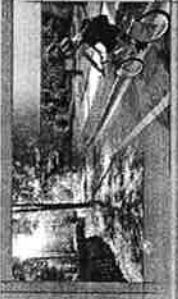
- Establish specific funding sources to use as matching funds for federal, state, and other grants. These funds can be generated through donations from community groups, through the proffer system and through the capital budget if necessary.
- Partner with local governments and adjacent jurisdictions to develop funding sources
- Look for additional funding opportunities from the public and private sectors

The sections below describe available funding sources for pedestrian and bicycle facilities (within roadway rights-of-way) and greenway facilities.

#### *Pedestrian and Bicycle Development Programs*

Two of the most common programs available for developing pedestrian and bicycle facilities in the study area are VDOT's Secondary Six-Year Improvement Program (S-SYIP) and the Rural Regional Long Range Transportation Plan (RLRTP). The S-SYIP is developed by the VDOT District Office. The RRLTP is developed by members of the MRPDC. The VDOT *Policy for Integrating Bicycle and Pedestrian Accommodations* applies to all projects in the S-SYIP and to all projects in the RLRTP that involve VDOT right of way or use funds that flow through VDOT. This policy requires that these projects will be initiated with the presumption that they will accommodate pedestrians and bicyclists. However, it will still be important to continue to make specific requests for pedestrian and bicycle facilities to be included in the S-SYIP and RLRTP project descriptions.

MRPDC staff work with the transportation Rural Technical Committee (RTC) whose members are selected based on their expertise on transportation issues. The committee is comprised of appointed representatives from each of Mount Roger's six counties and two cities in addition to representatives from the Virginia Department of Aviation, the Department of Rail and Public Transit, the Federal Highway Administration and VDOT.



**DAMASCUS BICYCLE AND PEDESTRIAN  
Master Plan  
JULY 2009**

In addition, the County should monitor the planning, design, and construction of these projects to ensure that they accommodate pedestrians and bicyclists adequately. There are several other sources of VDOT funding that can be used to develop pedestrian and bicycle facilities (see table below). Most of the funding sources described below require a local match - up to 20% of the project cost, in some cases (with the exception of the Safe Routes to Schools Program, which is 100% Federal funding). Fortunately, in-kind donations of materials, labor, and land can be used as matching funds. Through a creative strategy of volunteer assistance and land donation, other Virginia counties have been able to generate matching funds with very little capital outlay.

*VDOT Funding Sources*

**Rural Regional Long Range Transportation Planning Program**

<i>Purpose</i>	This program provides funds to planning district commissions to carry out transportation planning for rural areas.
<i>Funding</i>	<ul style="list-style-type: none"> <li>▪ Federal funds finance 80% of program activities and grants</li> <li>▪ A match of at least 20% from a planning district commission or locality is required</li> </ul>
<i>Eligible projects</i>	<ul style="list-style-type: none"> <li>▪ Pedestrian and bicycle planning, greenway planning</li> </ul>
<i>Eligible applicants</i>	<ul style="list-style-type: none"> <li>▪ Planning district commissions</li> </ul>

**Highway Construction Program**

<i>Purpose</i>	This program provides funding for the preliminary engineering, right of way acquisition, and construction of highway projects.
<i>Funding</i>	<p>No local match is needed for projects on primary and secondary system roads.</p> <p>A 2% local match is required for projects on urban system roads</p> <ul style="list-style-type: none"> <li>▪ Pedestrian and bicycle accommodations can be built as part of highway projects</li> <li>▪ Pedestrian and bicycle accommodations can be built as individual projects, separate from the construction of highways, either on highway or independent right of way</li> </ul>

**Pedestrian and Bicycle Safety Program**

<i>Purpose</i>	This program was developed to implement safety projects addressing pedestrian and bicycle crashes or the potential for such crashes, with evaluations based on risk and applications competing with like projects.
<i>Funding</i>	<ul style="list-style-type: none"> <li>▪ Up to 90% of a project can be financed with federal funds</li> <li>▪ A project must have a minimum 10% match</li> </ul>
<i>Eligible projects</i>	<ul style="list-style-type: none"> <li>▪ Construction of on-street facilities and shared use paths</li> <li>▪ Development of treatments for intersections</li> <li>▪ Installation of signs and pavement markings</li> </ul>
<i>Eligible applicants</i>	<ul style="list-style-type: none"> <li>▪ State and local agencies may apply to the program</li> </ul>



### Transportation Enhancement Program

<i>Purpose</i>	This program is an initiative to focus on enhancing the travel experience and fostering the quality of life in American communities
<i>Funding</i>	<ul style="list-style-type: none"> <li>▪ Up to 80% of a project can be financed with federal funds. A local match of at least 20%, from other public or private sources, is required.</li> <li>▪ Local matches may be in-kind contributions including tangible property, professional services and volunteer labor</li> <li>▪ This is a reimbursable program</li> </ul>
<i>Eligible projects</i>	<ul style="list-style-type: none"> <li>▪ Pedestrian and bicycle facilities such as sidewalks, bicycle lanes and shared use paths</li> <li>▪ Pedestrian and bicycle safety and educational activities such as classroom projects, safety handouts and directional signage for trails</li> <li>▪ Preservation of abandoned railway corridors such as the development of a rails-to-trails facility</li> </ul>
<i>Eligible applicants</i>	<ul style="list-style-type: none"> <li>▪ Any local government, state agency, group or individual may apply to the program. All projects need to be formally endorsed by a local jurisdiction or public agency.</li> </ul>

### Safe Routes to Schools Program

<i>Purpose</i>	This program provides funding for engineering, education, enforcement, encouragement, and evaluation activities that are aimed at making it safer and more appealing for children to walk and bicycle to school.
<i>Funding</i>	<ul style="list-style-type: none"> <li>▪ 100% of the cost of the program can be financed with Federal funds</li> <li>▪ No match is required.</li> <li>▪ This is a reimbursable program</li> </ul>
<i>Eligible projects</i>	<ul style="list-style-type: none"> <li>▪ Engineering projects such as traffic calming, sidewalk installation, intersection improvements, warning signage and crosswalks markings, among others</li> <li>▪ Education programs such as pedestrian and bicycle safety classes, bicycle rodeos, and motorist education programs</li> <li>▪ Encouragement programs such as Walking School Buses, Bike Trains, Walk to School Day, and other incentives to encourage children and their parents to walk and bicycle to school.</li> </ul>
<i>Eligible applicants</i>	<ul style="list-style-type: none"> <li>▪ Any local government, state agency, or non-profit may apply to the program.</li> </ul>

### Recreation Access Program

<i>Purpose</i>	This program provides bicycle access to public recreational facilities or historic sites operated by a state agency, a locality, or a local authority, either with an access road or on a separate bicycle facility.
<i>Funding</i>	<ul style="list-style-type: none"> <li>▪ This program uses state funds only.</li> <li>▪ Up to \$75,000 may be awarded for bicycle access to a facility operated by a state agency.</li> <li>▪ UP to \$60,000 may be awarded for bicycle access to a facility operated by a locality or local authority, with a \$15,000 match.</li> </ul>
<i>Eligible projects</i>	Construction, reconstruction, maintenance, or improvement of bikeways.
<i>Eligible applicants</i>	A governing body of a county, city or town may make an application to this program



### National Scenic Byways Program

<i>Purpose</i>	This program supports projects to improve the quality and continuity of the traveler's experience on highways designated as National Scenic Byways, All American Roads, or a state scenic byway.
<i>Funding</i>	<ul style="list-style-type: none"><li>▪ Up to 80% of a project can be financed with federal funds</li><li>▪ A project must have a minimum 20% match</li><li>▪ This is a reimbursable program</li></ul>
<i>Eligible projects</i>	<ul style="list-style-type: none"><li>▪ Construction of a facility for pedestrian and bicyclists along a scenic byway</li><li>▪ Safety improvements to reduce or eliminate the incidence or likelihood of crashes or conflicts with bicyclists and pedestrian</li></ul>
<i>Eligible applicants</i>	Any local government, state agency, group or individual may apply to the program.

Source: Information in the tables above was derived from a VDOT brochure entitled: *VDOT Funding for Bicycling and Walking Accommodations*.

### Other Funding Sources

To be as successful as possible the Town of Damascus should dedicate a portion of its budget for funding for trails development and bicycle and pedestrian improvements. Funds will be needed to continue planning activities, leverage funding from other sources, acquire properties and easements, administer the implementation process, and maintain completed facilities.

In addition to a dedicated town funding source, Damascus should also seek funds through a variety of other sources, including:

#### Federal Sources

- Surface Transportation Program
- Recreational Trails Program
- Office of Bicycle and Pedestrian Transportation Program
- National Scenic Byways Program
- Land and Water Conservation Fund (LWCF)
- Wetlands Reserve Program

#### State Sources

- Virginia Land Conservation Foundation (VLCF)
- Virginia Outdoors Fund (VOF)
- Virginia Recreational Trails Fund (VRTF)

In addition, there are several resources provided by the Commonwealth that provide useful information about greenway funding, acquisition, development, and maintenance. These are the Virginia Outdoors Plan (2002) (<http://www.dcr.virginia.gov/prt/vopfiles.htm>) and The Virginia Greenways and Trails Toolbox (<http://www.dcr.virginia.gov/prt/docs/toolbox.pdf>). These resources also suggest working with the following organizations:

- The Conservation Fund (national)
- Land Trust Alliance (national)



DAMASCUS BICYCLE AND PEDESTRIAN  
*Master Plan*  
JULY 2009

- Rails-To-Trails Conservancy (national)
  - Trails and Greenways Clearinghouse (national)
  - Trust for Public Land (national)
  - James River Association (state)
  - Land Trust of Virginia (state)
  - Williamsburg Land Conservancy (state)
- Local Sources
- Taxes (property taxes and excise taxes)
  - Fees (stormwater utility fees, impact fees, in-lieu-of fees)
  - Bonds and Loans (revenue bonds, general obligation bonds, special assessment bonds)
  - Other Local Sources (Capital Improvements Program, local trail sponsors, volunteer work, private foundations and organizations)

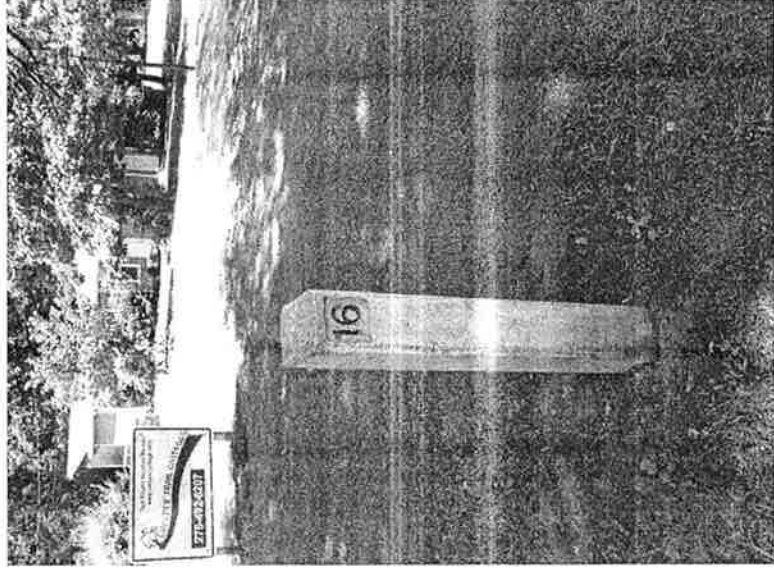


## Chapter 6: Conclusion

The Damascus Bicycle and Pedestrian Master Plan builds off the success of the 2007 Walkable Communities Workshop and other local planning efforts. It provides recommendations for on and off-road bicycle and pedestrian routes to connect important destinations throughout the community. It uses the excellent existing trail infrastructure as a centerpiece for this effort. The highest priority is to improve the safety and comfort of bicyclists and pedestrians and provide strategies for managing the intermittent, but significant demands placed on local infrastructure.

The 2007 Walkable Communities Workshop provided general guidance for a walkable and bikeable community; this Plan provides specific recommendations for improving access to destinations. It builds on existing trail and sidewalk systems and utilizes the full range of options available from off-road shared-use trails to on-road bicycle lanes and sidewalks. This strategy ensures connected bicycle and pedestrian routes, while accounting for opportunities and constraints such as the existing road width and cost of providing different types of pedestrian and bicycle facilities.

By presenting practical near-term recommendations and a long-term vision, this Plan seeks to increase access to destinations, making walking and bicycling realistic and comfortable transportation choices and improving quality of life for all residents.



Historic milestone along the Virginia Creeper Trail

## Appendix A: Facility Descriptions

### A. Overview

This appendix describes various new and improved pedestrian and bicycle accommodations in Damascus. The facilities are intended to create an interconnected network of sidewalks, trails, and safe roadway crossings so that people have the safe and convenient option of bicycling and walking in town. Chapter 3 identifies the locations around Damascus where different facilities are recommended.

### B. Facility Descriptions

All non-motorized transportation and recreation facilities in the study area should be designed according to national standards, as defined by the American Association of State Highway Transportation Officials (AASHTO), the Americans with Disabilities Act, Designing Sidewalks and Trails for Access: Part 2 and the *Manual on Uniform Traffic Control Devices* (MUTCD) and requirements of Virginia Department of Transportation (VDOT). For more in-depth information and design development standards, the publications listed below should be consulted:

- *Guide to the Development of Bicycle Facilities*. Updated in 1999 by the American Association of State Highway Transportation Officials (AASHTO). Available from FHWA or AASHTO. [www.aashto.org/bookstore/abs.html](http://www.aashto.org/bookstore/abs.html)
- *Manual on Uniform Traffic Control Devices* (MUTCD). Published by the U. S. Department of Transportation, Washington, DC, 2001
- *Americans with Disabilities Act Accessibility Guidelines*. U.S. Department of Justice, United States Access Board. Guidelines are available at <http://www.access-board.gov/adaag/html/adaag.htm>
- *Designing Sidewalks and Trails for Access: Part Two - Best Practices Design Guide*. Published by U.S. Department of Transportation, Washington, DC, 2001
- *Greenways: A Guide to Planning, Design and Development*. Published by Island Press, 1993. Authors: Charles A. Flink and Robert Searns. [www.greenways.com](http://www.greenways.com)
- *Trails for the Twenty-First Century*. Published by Island Press, 2001. Authors: Charles A. Flink, Robert Searns, and Kristine Olka. [www.greenways.com](http://www.greenways.com)

A description of the different pedestrian and bicycle accommodations recommended in this Plan is included below. Additional detail such as cross sections and typical designs for certain treatments are included in the appendix to this plan.

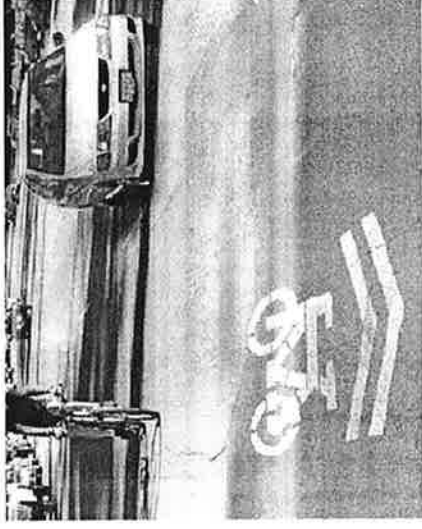
### Shared Roadway

Shared roadways are streets and roads where bicyclists can be served by sharing the travel lanes with motor vehicles. Usually, these are streets with low traffic volumes and/or low motor vehicle speeds, which do not need special bicycle accommodations in order to be bicycle-friendly. Shared roadways can also include streets with wide outside lanes (13 to 14 feet). Increasing the outside lane width increases comfort for bicyclists, but can also encourage increased vehicular speeds. Example of roads that can be shared between bicycles and motor-vehicles without additional improvements include the secondary roads in Damascus such as Liberty Avenue, Bank Avenue, and Beaver Dam Avenue.



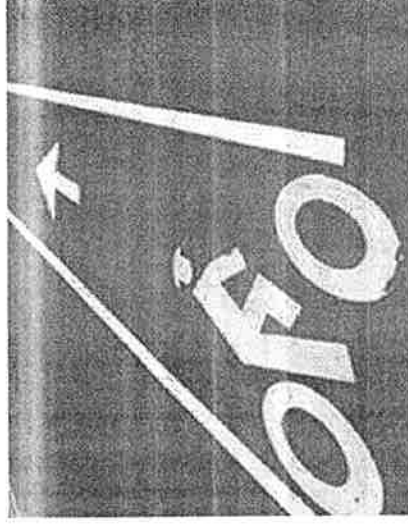
#### Shared Lane Marking or “Sharrow”

Motor vehicle/bicycle sharing of the travel space can be emphasized by using special shared roadway pavement markings or *sharrows*. Shared lane markings can be helpful on shared lane streets where there is insufficient space to add bicycle lanes and traffic volumes and/or motor vehicle speeds are at medium levels. In some cases they may be used on two-lane roadways as well. The shared lane marking also assists with wayfinding and can be used in conjunction with signs to delineate specific bicycle routes. Examples of roads that would be appropriate for shared lane markings include Laurel Avenue and South Shady Avenue (between Creepers Way and Imboden Street).



#### Bicycle Lane

A bicycle lane is a portion of the roadway that has been designated by striping, signing and pavement markings for the preferential or exclusive use of bicyclists. Bicycle lanes should always be located on both sides of the road (except one way streets), and carry bicyclists in the same direction as adjacent motor vehicle traffic. The standard width for a bicycle lane is 5 feet. Example of roads that could be improved by adding bicycle lanes include US 58/VA 91 between Railroad Avenue and the town limits and along South Shady Avenue towards the planned Washington County Recreational Complex.



#### Shared-Use Paths

Shared-use paths provide a high quality walking and bicycling experience in an environment that provides separation from traffic. Shared-use paths should be a minimum of ten-feet wide and should be paved. Their width may be reduced to eight feet if there are physical or right-of-way constraints. These types of paths can be constructed within a roadway corridor, in their own corridor (such as a greenway trail or rail-trail), or be a combination of both. On high speed roadways, there may be a need for shared-use paths in addition to bicycle lanes. Shared-use paths should not be used to preclude on-road bicycling but rather to supplement a system of on-road bicycle facilities for less experienced bicyclists. The planned Beaver Dam Creek Trail is a candidate for a shared use path for most of its length.

#### Improving Trail and Road Intersections

A common issue with trail design is ensuring comfortable and safe conditions for intersections between trails and roads. When trails and roads intersect, two different user types interact; drivers and non-motorized travelers. The two user types need advanced warning of the intersection. Both also need adequate sightlines and a clear indication of the appropriate traffic pattern for the intersection. Suggestions for spot improvements for these types of intersections are provided below.



In Damascus, some trail segments are flanked by trees on either side for nearly the entire length of the trail. To provide users with an opportunity to see and react to the unexpected, a shared use path should be designed with adequate stopping sight distances. The distance required to bring a path user to a full controlled stop is a function of the user's perception and braking reaction time, the initial speed, the coefficient of friction between the wheels and the pavement, the braking ability of the user's equipment and grade.

Bollards may be used to remind bicyclists that they need to slow down for the intersection and are also used to keep out unauthorized vehicles. If the bicyclists cannot see the bollards in time to react and slow down because they are too thin or are not painted a bright color, they risk running into an intersection unprepared. Also if bicyclists cannot see the bollards, they may run into them causing injuries.

Another concern with the existing trail/road intersections is the lack of visual separation between the trail end and the roadway. In some cases there is no curb or apron to show that the trail is entering vehicle territory; instead the trail forms a seam with the road. This can be addressed with a change in texture, material or color that visually separates the two paths. A wider apron at the end of the trail would also help accommodate any congestion on the end of the trail.

Changes in trail surface provide tactile and visual cues to trail users that they are approaching an intersection. Another potential benefit if asphalt or other hard surface treatment is used is enhanced durability of the trail in the intersection approach area. These areas often wear more quickly than others because users are applying breaks, mounting and dismounting, or simply congregating in the approach area to an intersection. All of these activities can add significant wear and tear to a trail.

Additional recommended treatments that could significantly improve trail and road intersections in the study area are noted below.

- A 15-foot (4.5 m) minimum sight triangle should be provided at the intersection of shared use paths with adjoining sidewalks or other pedestrian access points. The clear sight line will enable pedestrians approaching the pathway to see and react to oncoming bicyclists to avoid potential conflicts.
- High visibility signage (conforming to VDOT and MUTCD requirements) should be installed along roadways to alert drivers.
- If bollards are installed, they should be painted a bright color (yellow is recommended) and be reflective on all sides. Striping an envelope around the post is recommended.
  - Recommended bollard placement:
    - Use of one bollard in center of trail is preferred
    - Where more than one bollard is necessary, place one in center of path, and one on either side of trail placed a minimum of 6 feet (1.5 m) apart.

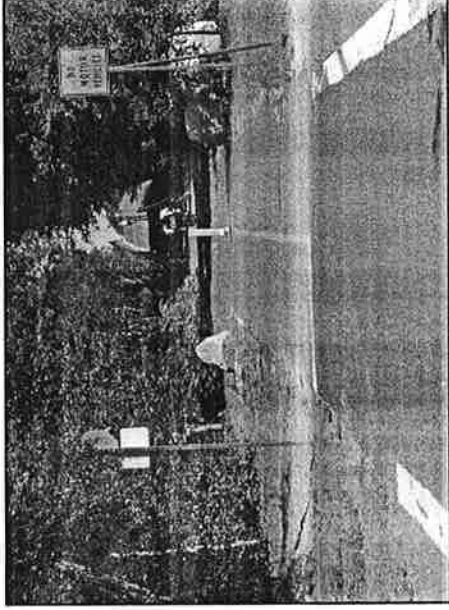


Sign combines visual diagram with text alerting motorists to trail users



## DAMASCUS BICYCLE AND PEDESTRIAN Master Plan JULY 2009

- Set bollards back from roadway edge a minimum of 30 feet (10 m). Path users need to focus on intersection conditions independently from trying avoiding bollards on or near the path.



Contrasting color pavement, signs and other design features highlight the transition from the trail to the road

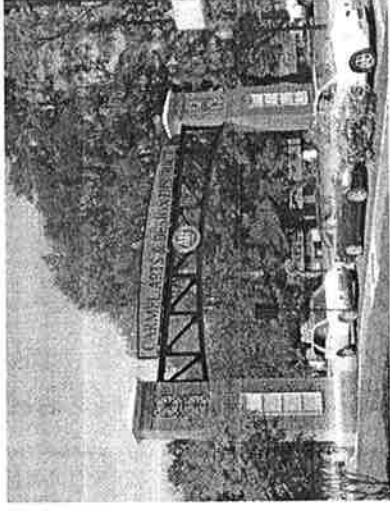
- Contrasting color can be used to create a visual distinction between shared use paths and roadways at locations where the roadway and shared use path are constructed with the same material (typically asphalt). Right of way assignment should be based upon the standard MUTCD practice of using the least control that is effective. Assigning incorrect priority or being overly restrictive in an attempt to protect path users can lead to confusion and unsafe practices by both path users and motorists, increasing the potential for a collision.
- For locations where queuing at an intersection results in crowding at the roadway edge, consideration should be given to widening the trail approach. This can increase the crossing capacity and help reduce conflicts at the path entrance
- Signs and markings at crossings should provide clear messages to motorists and path users, and direct path users to cross at a clearly defined location when the crossing location is not intuitively apparent.

Gateway treatments such as arches, signage and other elements signify a transition between character areas. In Damascus, gateway treatments could be used to signify the transition between the higher speed, auto-oriented stretches of US 58 and VA 91 outside of downtown to the slower speed, pedestrian-oriented section of US 58 (Laurel Avenue) within town.

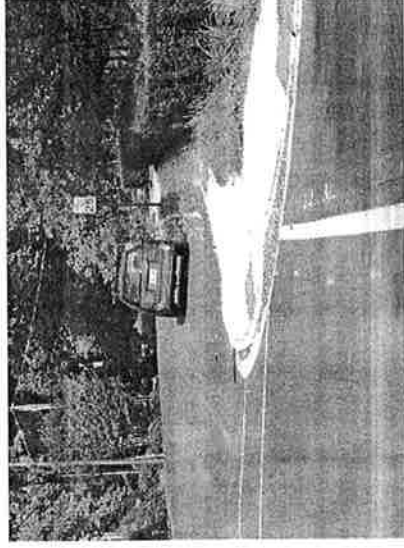
### Road Crossing Improvements

- Curb extensions shorten pedestrian crossing distance and increase the visibility of pedestrians at roadway crossings. By narrowing the curb-to-curb width of a

Arches identify entry and convey a feeling of moving into a different, exciting area



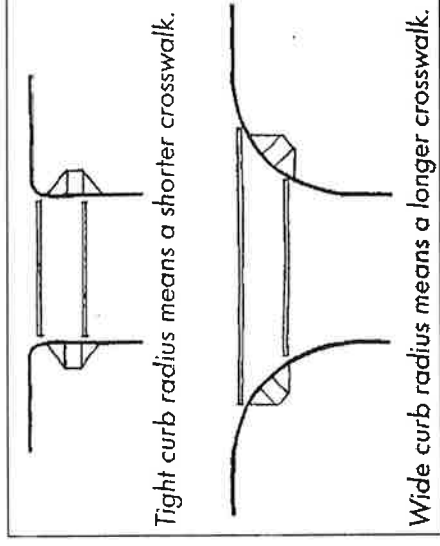
Arches identify entry and convey a feeling of moving into a different, exciting area



Curb extensions can shorten pedestrian crossing distances and slow vehicle speeds

roadway, curb extensions may also help reduce motor vehicle speeds and improve pedestrian safety. Curb extensions are appropriate for locations that have on-street parking. They may be complemented by in-roadway pedestrian crossing signs, high-visibility pedestrian warning signs, and improved lighting. Space for bicycle parking, street furniture (benches, planters, etc.) or tree planting areas can be created on these curb extensions (provided ample pedestrian travel space remains). Curb extensions can be installed at intersections along Laurel Avenue in downtown Damascus.

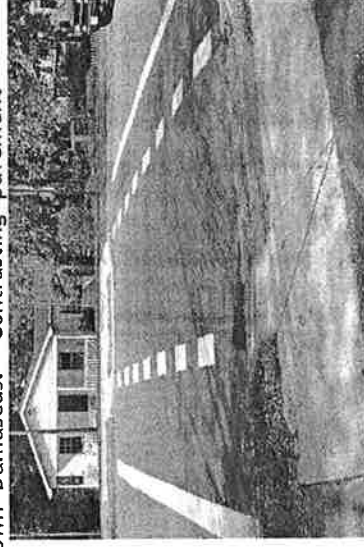
- **Curb radius reduction:** Wide curb radii allow motorists to make high-speed turning movements. Reducing the curb radii at the corners of an intersection helps slow turning vehicles, improves sight distance between pedestrians and motorists, and shortens the crossing distance for pedestrians. Surrounding land uses and the traffic composition on the roadway are important to evaluate when considering this treatment. If a curb radius is too small, trucks and buses may drive over the curb and endanger pedestrians. The town should also look for opportunities to reduce curb radii as a part of all roadway projects that involve geometric improvements at intersections.



- **NOTE: Stormwater drainage and vehicle turning radius are key considerations for both curb extensions and curb radius reductions. A detailed engineering analysis must be conducted to evaluate the feasibility of installing either treatment in a particular location.**

- **Contrasting Pavement Treatments:** Stamped or patterned pavement can be a very effective tool to draw a motorist's attention to pedestrian crosswalks. Similarly, the contrasting color pavement can provide strong visual guidance to pedestrians regarding appropriate places to cross a street. Contrasting pavements are recommended at locations along Laurel Avenue within downtown Damascus. Contrasting pavement should be installed to align with existing sidewalks and curb ramps to provide a straight path of travel for pedestrians. A thick white dashed stripe should be placed on each side of the pavement marking to highlight the crossing and improve visibility to motorists.

In addition to being more visible, contrasting pavement treatments can provide a message to drivers that they are entering or passing through an area where pedestrians are given priority over the automobile by providing visual continuity of the pedestrian system across roadways.



**Pavement treatments can make crosswalks more visible to pedestrians and drivers**

- **Raised crosswalks or speed tables:** Raised crosswalks provide a continuous route for pedestrians at the same level as the sidewalk. Approaching vehicles must slow down to go over raised crosswalks comfortably. This encourages motorists to yield and makes crossing the street safer for pedestrians. Pedestrians are also positioned slightly higher than the road surface, which makes them (especially children) more visible to approaching motorists. Pavement markings on the slope of the raised crosswalk can improve the visibility of the raised crosswalk to motorists. Raised crosswalks should be used only on low-speed streets or at crosswalks in parking lots.



Raised crosswalks can slow vehicles and make pedestrians more visible to drivers

### Sidewalks

Sidewalks are the central element of the pedestrian transportation system. It is important to ensure that sidewalks and other pedestrian pathways have appropriate width, surface, and separation from motor vehicle traffic, lighting and signs. Elements of good sidewalk design are described below.

- **Width:** Sidewalks should be wide enough to accommodate expected levels of pedestrian traffic. Narrow sidewalks that cannot accommodate the volume of foot traffic may encourage pedestrians to walk in the roadway increasing the potential for conflict with motor vehicles. At a minimum, it is desirable to provide a sidewalk clear width (i.e., lateral space available for pedestrian travel for the length of a corridor) at least wide enough to accommodate two people walking side-by-side (5 feet). In addition, ADA guidelines specify a minimum passing area width of 5 feet at least every 200 feet. In areas with high pedestrian volumes such as areas near bus stops and/or where street furniture, pay phones, trash cans, utilities and street trees may function as obstacles, additional sidewalk width will be necessary to provide this minimum clear width.
- **Surface:** The full clear width of a sidewalk should be paved with a smooth, stable and slip-resistant material to accommodate wheelchairs, bicycles, and strollers. Additionally, grade changes and conflicts with vehicles should be kept to a minimum, including curb cuts for driveways. More details can be found in the ADAAG.
- **Curb Ramps:** Curb ramps should be smooth and provide an uninterrupted transition to the sidewalk at the top of the ramp and the roadway at the bottom of the ramp. Generally, ramps should be aligned with the crosswalk, rather than pointing into the center of the intersection.
- **Buffer:** For the safety and comfort of pedestrians, it is desirable to provide a buffer area between the sidewalk and roadway (i.e., sidewalks should not be located against the curb, directly adjacent to the lanes of moving traffic). Where practical, some form of buffer should be included to protect pedestrians from noise, pollution, wind and



errant vehicles. Landscaping, such as a simple grass strip, shrubs, and/or trees can be used. A tree-lined buffer has the added benefits of improving roadway aesthetics, providing shade, and improving pedestrians' perceptions of safety with respect to motor vehicle traffic. On-street parking can also serve as a buffer between moving vehicles and pedestrians while simultaneously slowing vehicular traffic. It should be noted that the buffer should not be as tall as to obscure pedestrians from view of drivers, especially near intersections.

### Usage and Navigation

In addition to installing the trail, sidewalk or other facility, it is important to think about the end user. There are modest, but significant efforts that a community can take to enhance the utility of the bicycle and pedestrian infrastructure.

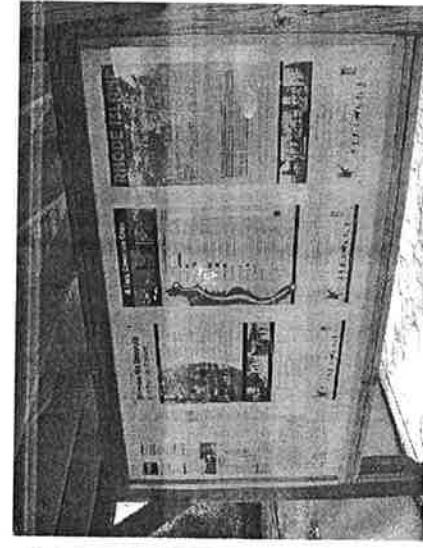
- **Maintenance:** Vegetation growing over a trail or sidewalk can impede users. Trimming tree branches, shrubs and removing overgrowth are relatively modest cost but can improve accessibility. Similarly, the trail or sidewalk surface should be smooth and in good conditions. Cracks and heaves in paved trails and concrete sidewalks should be repaired so that they do not become tripping hazards or worse. Storm drainage grates should be designed so that they do not trap bicycle wheels or pose a hazard for users. Regular inspection and maintenance programs are important to keeping facilities in good condition.



Sign identifying Virginia Creeper Trail is located in the middle of the travel path-potential hazard for cyclists

- **Obstructions:** There are locations in Damascus where immovable objects block the sidewalk. Examples of these obstructions include trees, utility poles, light poles, hydrants, mailboxes and signs. To the extent possible, these obstacles should be relocated or removed.

- **Wayfinding:** Signage and wayfinding should be installed around major pedestrian attractors (e.g. heavily-used trails, parking facilities, parks, tourist destinations, downtown and the library) to direct pedestrians to local points of interest. This signage should be sized and oriented appropriately for pedestrians and bicyclists.



Effective wayfinding can orient trail users to the amenities available in Damascus



- **Bicycle Parking:** Bicyclists need secure and convenient locations to store their bicycles and ancillary equipment. Many visitors arrive by bicycle and therefore have saddlebags and even trailers to carry their supplies. Additionally, many of these bicycles are outfitted with expensive navigational equipment such as trip computers and global positioning systems. Because of the cost of the equipment and the bicycles themselves, many cyclists are likely to find ways to secure their bicycles in places that they perceive to be secure and within eyesight such as in front of stores along Laurel, in spite of the fact that it is currently discouraged by the town and creates obstacles for pedestrians walking along the sidewalk. There are many different approaches to bicycle parking which would involve different levels of effort to the town.

#### Reverse Angle Parking

Reverse angle parking is designed so that the driver backs into an angled parking space, as opposed to the conventional front-in angled parking. The driver experiences several benefits, including increased convenience for vehicle loading and unloading, easier parking lot exit due to improved site distances, and the potential for additional parking spaces if replacing parallel parking.

The safety benefits to passing bicyclists and pedestrians are perhaps more significant. When a driver is facing outward, towards the street, they are more likely to see bicyclists passing on the roadway. Furthermore, operators of both vehicles are able to make eye contact with each other. Both of these can reduce the potential for vehicle/cyclist collisions in confined areas with multiple movements happening simultaneously.

#### Temporary Facilities

Many of the issues confronting Damascus are the result of intermittent demands placed on the town by visitors taking advantage of the many recreational opportunities available. These challenges are most significant on weekends during the late spring, summer and fall and during major festivals (Trail Days, Iron Mountain Bicycle Race, etc.) which swell the town's population by thousands of people. Other times of year, the existing bicycle and pedestrian infrastructure functions reasonably well and there are no recorded instances of pedestrian crashes in recent history according to VDOT<sup>2</sup>. Therefore, the goal of these temporary measures is to match the remedy to the problem.

Visitors arrive in Damascus by one of three conveyances- motor vehicle, foot or bicycle. Each mode would benefit from improved accommodations during times of peak activity. The different approaches mentioned below may be implemented with modest investment and would not create unnecessary burden on year round residents or businesses.

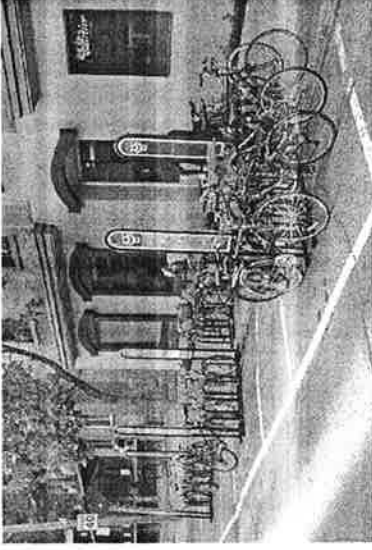


**Reverse angle parking, Kelowna BC.**

Photo source: Back In Angle Parking in the Central Business District, by: John A. Nawn, P.E., PTOE

<sup>2</sup> A summary of 2005 - 2007 Crash data may be found in Appendix C.

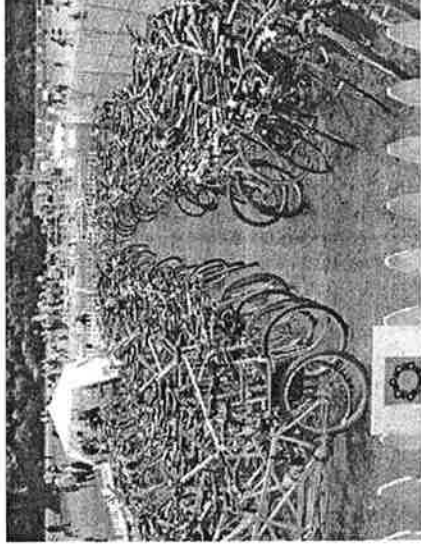
- **Temporary bicycle parking in vehicle parking spaces:** The town could reserve two or three parallel parking spaces for bicycle parking. Portable bike racks could be installed in parking spaces along Laurel Avenue or perpendicular side streets that may be transported to the site by truck and removed after the demand subsides. It is important that cyclists feel that their bikes and equipment are reasonably secure and that the location is not hidden or difficult to find. Because the racks are portable, they can be moved to different locations along the street, minimizing the perceived burden on any business owner concerned about not having car parking in front of their business. On the contrary, businesses may actually benefit by having the bicycle parking in front of their store which would allow more potential customers to park near their entrance.



Temporary bicycle parking in parallel parking spaces

Traffic cones, sawhorses or other highly visible indicators should be installed to identify the boundaries of the bicycle parking area in order to provide some protection to bicycles and keep cars out.

- **Festival or event bicycle parking:** Many communities are providing manned bicycle parking during times of peak demand. This 'valet' bicycle parking provides customers with the peace of mind that someone is watching their equipment. Often, the cost of valet bicycle parking is underwritten by the local government or by local businesses. When valet bicycle parking is provided, location is somewhat more flexible. However there should be a clear perimeter around the operation to prevent a would be bicycle thief from simply taking a bike and walking or riding off. It is important to clearly identify the bicycle parking with signage or banners. Additionally, if the facility is not located in a readily apparent location, navigational signage must be provided so that users can find the parking.



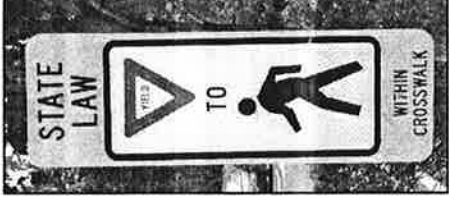
Temporary valet bicycle parking

- **Temporary traffic controls:** Portable signage can be used in many different places and is relatively inexpensive compared to permanent signs, traffic signals and other control devices. Rather than go through the lengthy and potentially costly VDOT approval process for installing permanent traffic control devices or markings in the roadway, Damascus could very easily place temporary bollards, barricades, signage and other traffic controls at key locations throughout town. The goal of these different treatments is to slow vehicle traffic during periods of peak pedestrian activity and raise awareness of the presence of walkers and bikers. Signage, bollards and other control devices must be installed in conformance with local and VDOT requirements governing the placement of temporary control facilities.



## DAMASCUS BICYCLE AND PEDESTRIAN Master Plan JULY 2009

The high visibility pedestrian warning sign shown at right can increase driver awareness of pedestrians, especially in areas where pedestrians may not be expected. A fluorescent yellow/green color is approved in the MUTCD and can be used on these signs (the W11-2 Pedestrian Crossing Sign). This may be mounted to a heavy base that allows easy transport and storage. Many communities are experimenting with using signs such as these in temporary in-roadway situations to draw attention to pedestrians and bicyclists and alert drivers to state laws regarding pedestrians.

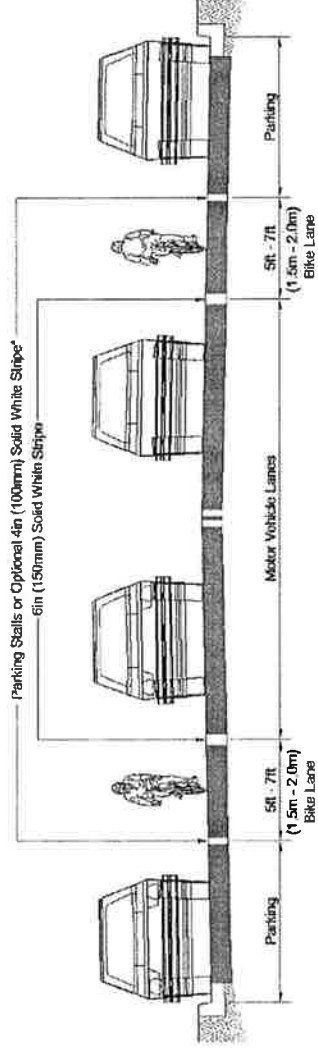






## Appendix B: Typical Cross Sections

### Bicycle Lanes



\* This optional solid white stripe may be advisable when stalls are unnecessary (because parking is light) but there is a concern that motorists may misconstruct the bike lane to be a traffic lane.



### Shared Lane Markings

**SYMBOL PLACEMENT - NO PARKING:**

**SYMBOL PLACEMENT - PARKING:**

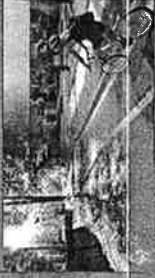
**SUITABLE LOCATIONS FOR SHARED LANE MARKING:**

- Symbols may be used on roadways that are too narrow for bicycle lanes.
- Symbols may be used on narrow roadways to connect disconnected bicycle facilities such as bicycle lanes, designated routes, and shared use paths.
- Symbols should only be used on roadways with posted speeds less than 40 mph.

**DESIGN OF SHARED LANE MARKINGS:**

- Symbols shall be placed after each intersection.
- If used on roadways with on-street parking, symbols shall be placed so that their centers are a minimum of 11' from the adjacent curb face.
- Symbols placed in a shared lane without parking shall be placed so that their centers are a minimum of 4' from the adjacent curbface.
- Do not place symbols on lane lines.

Figure 4.4 - Example Shared Lane Marking Placement



Shared Use Path

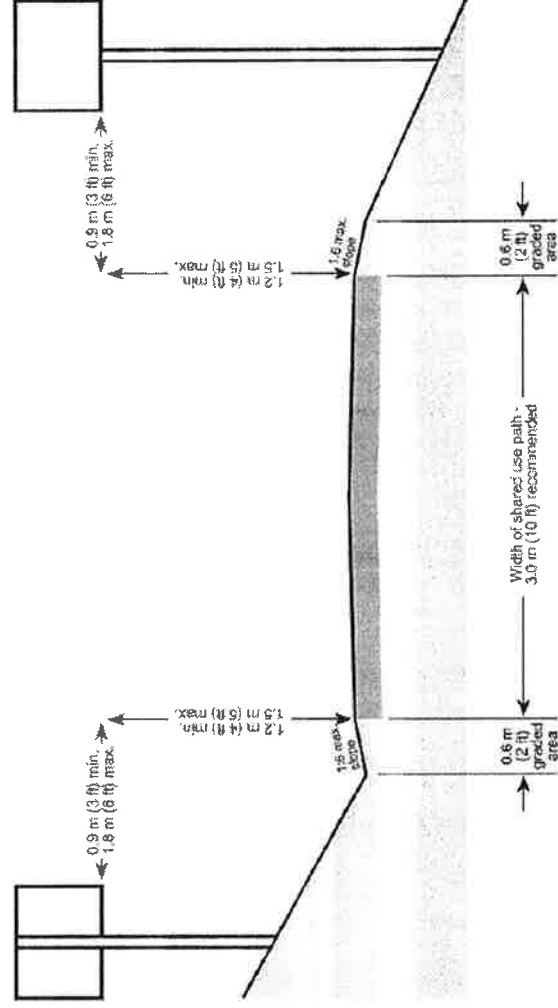
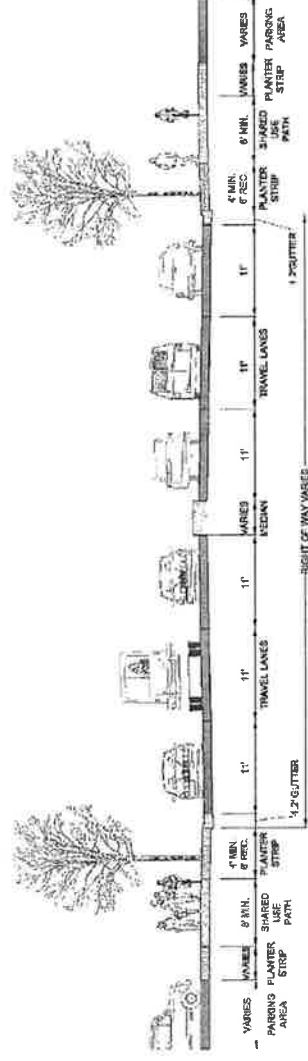


Figure 17. Cross Section of Two-Way Shared Use Path on Separated Right-of-Way

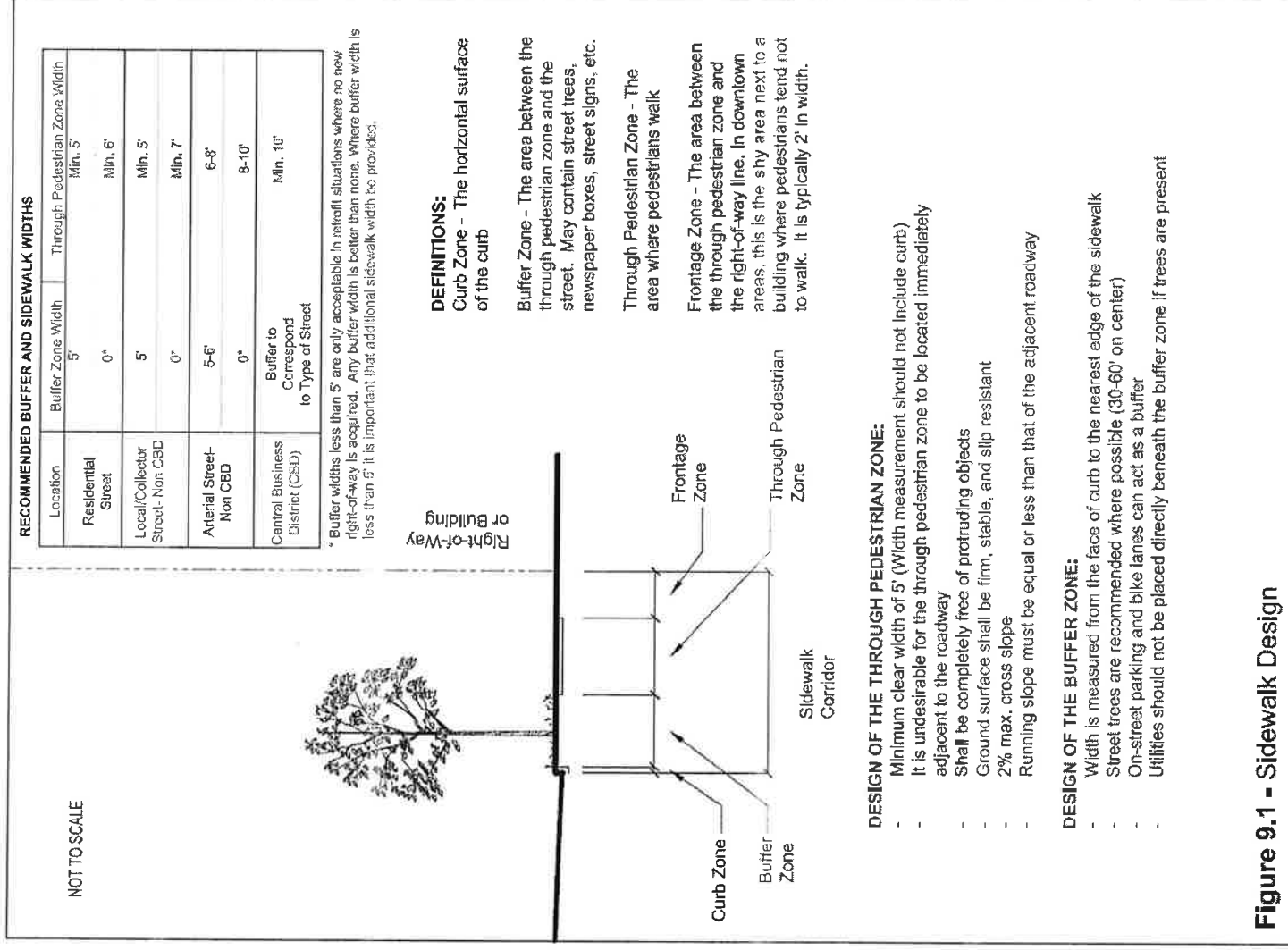
Sources: American Association of State Highway and Transportation Officials (AASHTO) Guide for the Development of Bicycle Facilities, 1999.

Parallel Use Paths

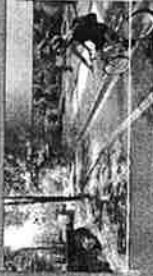




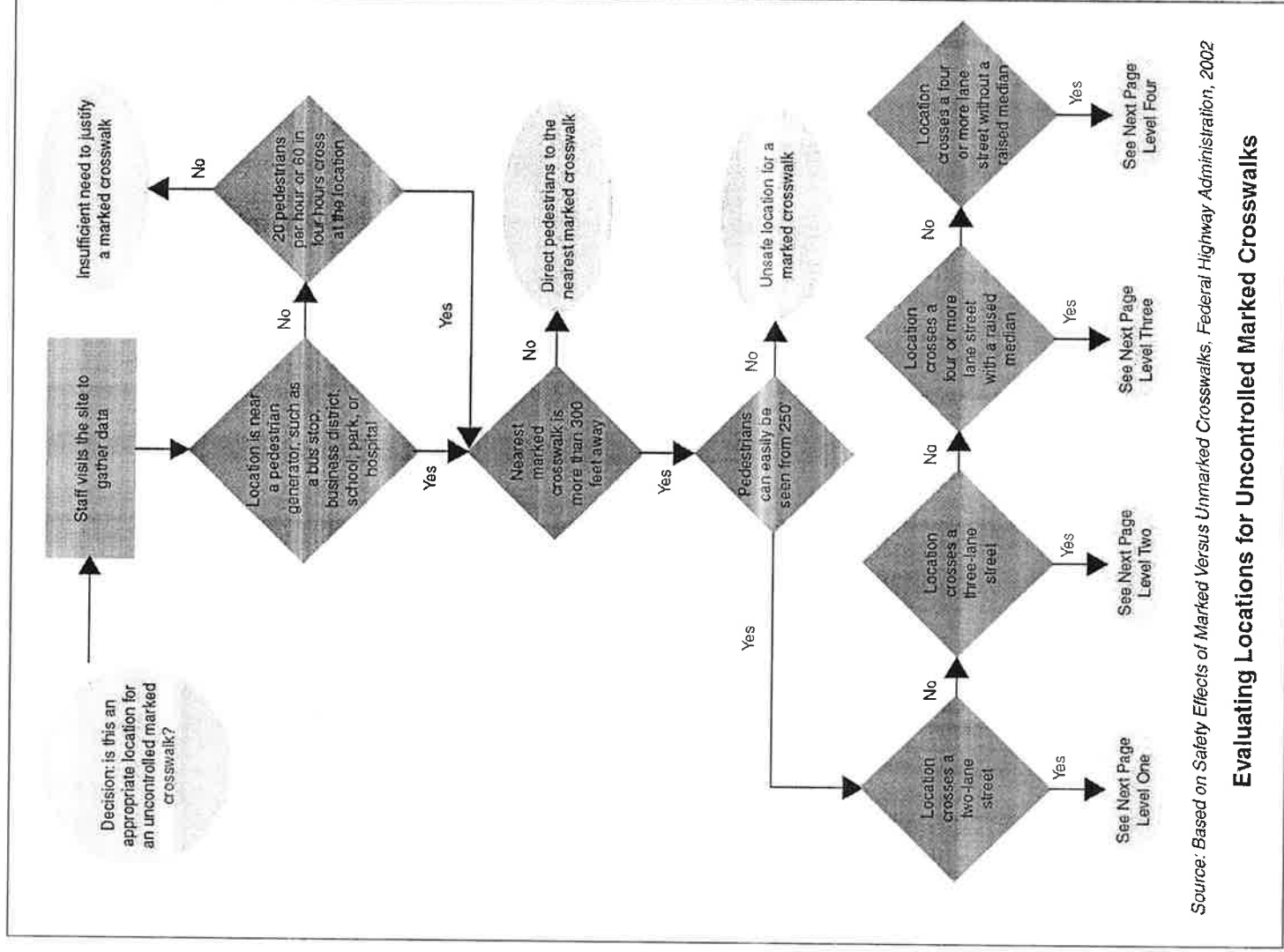
**Sidewalk Design**



**Figure 9.1 - Sidewalk Design**



## Appendix C: Evaluating Locations for Uncontrolled Marked Crosswalks



Source: Based on Safety Effects of Marked Versus Unmarked Crosswalks, Federal Highway Administration, 2002

### Evaluating Locations for Uncontrolled Marked Crosswalks



# DAMASCUS BICYCLE AND PEDESTRIAN Master Plan JULY 2009

## Engineering Treatments for Uncontrolled Marked Crosswalks

Level 1: 2 Lane Street			
NUMBER OF CARS (ADT)	POSTED SPEED 30 mph or less	35 mph	40 mph or more
Up to 12,000 cars per day	High visibility crosswalk markings	High visibility crosswalk markings	High visibility crosswalk markings plus an engineering treatment (see below)
12,000-15,000	High visibility crosswalk markings	High visibility crosswalk markings	Pedestrian signal or grade separated crossing
15,000 cars or more per day	High visibility crosswalk markings	High visibility crosswalk markings plus an engineering treatment (see below)	Pedestrian signal or grade separated crossing

Level 2: 3 Lane Street			
NUMBER OF CARS (ADT)	POSTED SPEED 30 mph or less	35 mph	40 mph or more
9,000 cars or fewer per day	High visibility crosswalk markings	High visibility crosswalk markings	High visibility crosswalk markings plus an engineering treatment (see below)
9,000-12,000	High visibility crosswalk markings	High visibility crosswalk markings plus an engineering treatment (see below)	High visibility crosswalk markings plus an engineering treatment (see below)
12,000-15,000	High visibility crosswalk markings plus an engineering treatment (see below)	High visibility crosswalk markings plus an engineering treatment (see below)	Pedestrian signal or grade separated crossing
15,000 or more	High visibility crosswalk markings plus an engineering treatment (see below)	High visibility crosswalk markings plus an engineering treatment (see below)	Pedestrian signal or grade separated crossing

Level 3: 4 or more Lanes with a Raised Median			
NUMBER OF CARS (ADT)	POSTED SPEED 30 mph or less	35 mph	40 mph or more
9,000 cars or fewer per day	High visibility crosswalk markings	High visibility crosswalk markings	High visibility crosswalk markings plus an engineering treatment (see below)
9,000-12,000	High visibility crosswalk markings	High visibility crosswalk markings plus an engineering treatment (see below)	Pedestrian signal or grade separated crossing
12,000-15,000	High visibility crosswalk markings plus an engineering treatment (see below)	High visibility crosswalk markings plus an engineering treatment (see below)	Pedestrian signal or grade separated crossing
15,000 or more	Pedestrian signal or grade separated crossing	Pedestrian signal or grade separated crossing	Pedestrian signal or grade separated crossing

Level 4: 4 or more Lanes without a Raised Median			
NUMBER OF CARS (ADT)	POSTED SPEED 30 mph or less	35 mph	40 mph or more
9,000 cars or fewer per day	High visibility crosswalk markings	High visibility crosswalk markings plus an engineering treatment (see below)	High visibility crosswalk markings plus an engineering treatment (see below)
9,000-12,000	High visibility crosswalk markings plus an engineering treatment (see below)	High visibility crosswalk markings plus an engineering treatment (see below)	High visibility crosswalk markings plus an engineering treatment (see below)
12,000-15,000	Pedestrian signal or grade separated crossing	Pedestrian signal or grade separated crossing	Pedestrian signal or grade separated crossing
15,000 or more	Pedestrian signal or grade separated crossing	Pedestrian signal or grade separated crossing	Pedestrian signal or grade separated crossing

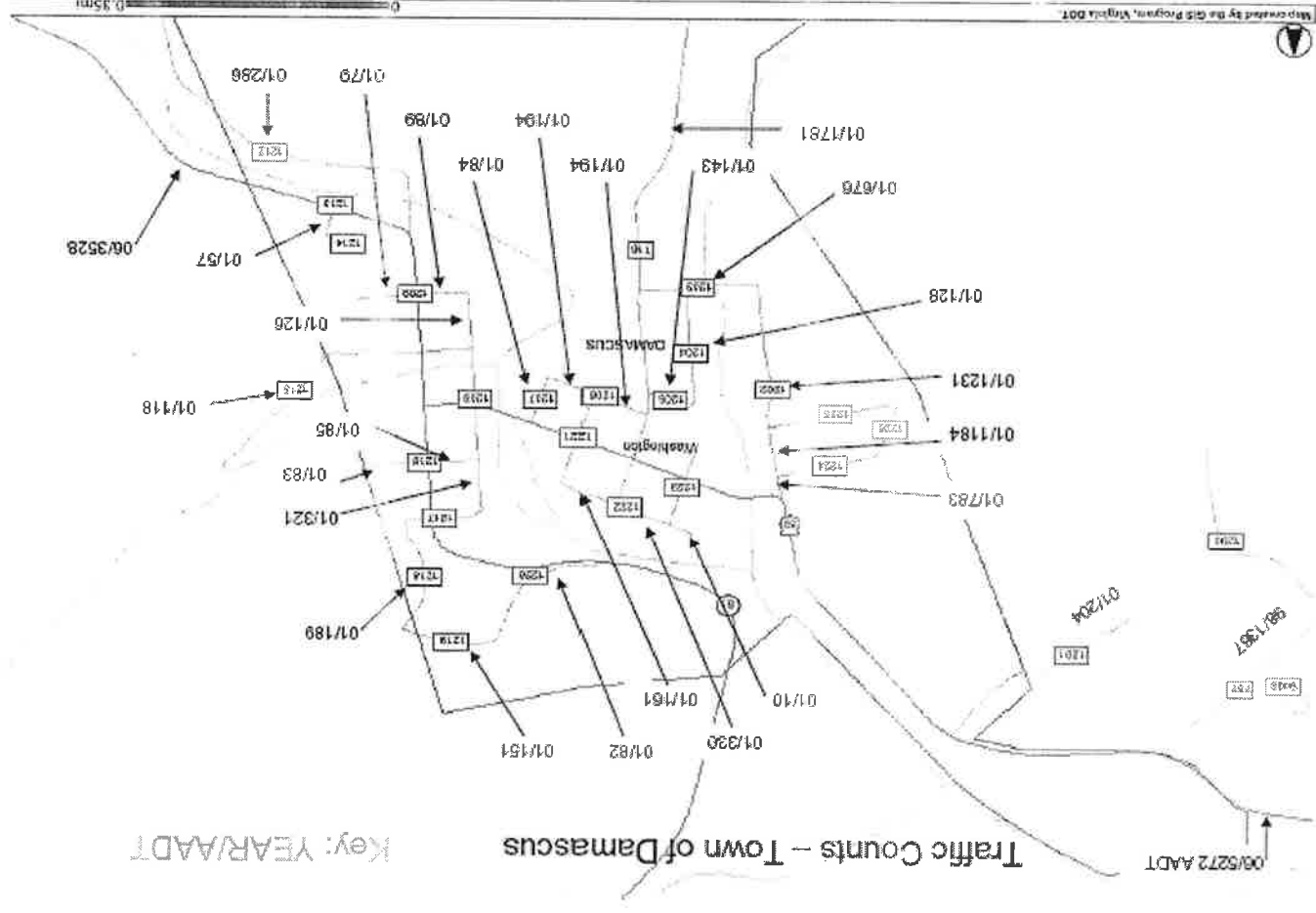
  

**Engineering Treatments**  
 Road Diet (removal of one or more motor vehicle travel lanes)  
 Median Crossing Islands  
 Curb Extensions  
 Advance Stop Lines  
 In-Roadway Warning Lights  
 Pedestrian Signals  
 Grade Separated Crossing (should not be used in conjunction with high visibility crosswalk markings)

## Engineering Treatments for Uncontrolled Marked Crosswalks



## Appendix D: VDOT Vehicle Counts and Crash History





Crash History – Town of Damascus 1/1/05 – 12/31/07

