Bicycle & Pedestrian Plan 2010

Department of Public Works
Department of Planning & Community Development

Acknowledgments

The City of Harrisonburg's Bicycle & Pedestrian Plan was prepared by an Advisory Committee with the support of the Bicycle & Pedestrian Committee, citizens and City staff.

Advisory Committee Members

Charles Chenault, Planning Commission
Thanh Dang, Department of Public Works
Betsy Dunnenberger, Harrisonburg City Public Schools
Lee Eshelman, James Madison University
Adam Fletcher, Department of Planning & Community Development
Paul Johnston, Shenandoah Valley Bicycle Coalition
Sgt. William Keller, Harrisonburg Police Department
Ted Pelikan, Department of Parks & Recreation
Cindy Reeves, RMH Community Health/ Safe Kids of the Central Shenandoah Valley
Andrew Williams, Department of Public Works
Len Van Wyk, Transportation Safety Commission
Ben Wyse, Department of Public Transportation

City Planning Commission

William L. Jones, Jr., Chairman
Charles Chenault, Vice-Chairman
Richard Baugh, Councilmember
MuAwia A. Da'Mes
Alan P. Finks
Deb Fitzgerald
Joseph M. Snell, II "J.M"

City Council

Kai Degner, Mayor
Richard Baugh, Vice Mayor
Ted Byrd
Carolyn Frank
David Wiens

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I. Purpose

The purpose of the Bicycle and Pedestrian Plan is to provide a framework for developing and implementing bicycle and pedestrian transportation in the City of Harrisonburg ("The City"). All new developments and redevelopments are encouraged to follow the recommendations of the Plan, in addition to requirements set forth by other federal, state, and local regulations. This is an update of the 2005 Bicycle and Pedestrian Plans in an effort to maintain plans which are meaningful to the City.

II. Introduction

Bicycling and walking are integral components of an efficient transportation network. Appropriate bicycle and pedestrian accommodations provide the public, including the disabled community, with access to the transportation network, connectivity with other modes of transportation and independent mobility regardless of age, physical constraint, or income. Building effective "complete streets" with bicycle and pedestrian accommodations enhances quality of life and health, strengthens communities, increases safety for all modes of transportation, reduces congestion, offers recreational opportunities, and benefits the environment.

Figure 1. International Walk to School Day celebrated at Waterman Elementary School, 2009.

As automobile use has increased over the last half century, other modes of transportation (walking, bicycling, and mass transit) have often taken a backseat to the needs of motorists. Like many other communities, Harrisonburg shares this history.

As most commercial and residential growth occurs along heavily traveled streets, it is increasingly important to provide bicycle and pedestrian facilities to minimize car trips. Traffic volumes have steadily increased as a result of growth in the Harrisonburg area, but many motorists could easily become bicyclists and pedestrians for nearby trips if the infrastructure was developed to support them.

The City adopted its first Bicycle Plan in 1994, followed by updates in 1999 and 2005. The first Pedestrian Plan was adopted in 2005. However, it was not until Fiscal Year 2005-2006 that the City Council began appropriating public funding, annually, to support bicycle and pedestrian capital improvement projects. Often times, significant project costs require multiple budget years to finance.

In 2007, the Department of Public Works began facilitating quarterly meetings between City staff and citizens, who together make up the City's Bicycle & Pedestrian Committee. The committee has been a valuable vehicle for bringing pedestrian and bicycle needs and concerns to the attention of City staff. In May 2009, an *ad hoc* committee, called the Bicycle & Pedestrian Plan Advisory Committee ("Advisory Committee") was formed. The Advisory Committee is made up of staff and citizen representatives and was tasked to update the Bicycle and Pedestrian Plan.

In June 2010, in response to citizen requests to establish a Council appointed body to advise City Council and staff on bicycle and pedestrian matters, City Council amended Chapter 4 of Title 13 of the City Code (Traffic Safety Commission), renaming the Commission "Harrisonburg Transportation Safety and Advisory Commission" and adding bicycle and pedestrian matters as additional areas of responsibility.

In September 2009, a Public Input Meeting was held at Thomas Harrison Middle School to solicit public comments on the first draft of the Bicycle & Pedestrian Plan. The comment period remained open through mid-October. A second draft of the plan was made available and a comment period was opened again in January through March 2010. This comment period was extended to receive additional comments resulting from a trip a group of Harrisonburg citizens, the City's Mayor, a City Planning Commissioner, and a City staff member took in early March to Davis, California to learn more about bicycle infrastructure.

III. Facilities

The City strives to design and operate "complete streets" to enable safe access for all users. Pedestrians, bicyclists, motorists, and transit riders of all ages and abilities must be able to safely move along and across a complete street. Each complete street is unique, but some common facilities in addition to the roadway may include:

- sidewalks,
- bike lanes,
- shared lane markings,
- wide paved shoulders,
- special bus lanes,
- comfortable and accessible transit stops,
- frequent crossing opportunities,
- median islands,
- accessible pedestrian signals, and
- curb extensions.

A complete street must also balance safety and convenience for everyone using the road.[1] Complete streets provide a variety of transportation opportunities for citizens to travel between many locations such as their home, neighborhoods, city parks, city schools, work places, and shopping destinations.

Facilities must also be designed and constructed to meet different physical and site characteristics and must consider multiple user types and comfort levels. Much information and guidelines on the design specifications for bicycle and pedestrian facilities to components of a complete street system are available. Specific bicycle and pedestrian facility design is determined by federal, state and local standards, most of which are based on design and construction standards set by the American

[1] National Complete Streets Coalition, http://www.completestreets.org/complete-streets-fundamentals/complete-streets-faq/.

Association of State Highway and Transportation Officials (AASHTO) and the Manual on Uniform Traffic Control Devices (MUTCD). A list of references can be found in Section XI. References of this plan.

This Plan recommends considering bicyclists and pedestrians as a factor in planning, design, construction, and maintenance of all roadway projects and when reconstructing or reconfiguring a roadway or right-of-way, to strive to maintain or improve existing bicycle and pedestrian non-motorized facilities.

A. Bicycle Facilities

By generating awareness of bicycling issues, the City's 2005 Bicycle Plan has prompted the City to include bicycle facilities in the design and construction of new streets, including Neff Avenue, Port Republic Road, Linda Lane, and the forthcoming Erickson Avenue-Stone Spring Road Project.

As described in the AAHSTO Guide for the Development of Bicycle Facilities ("AASHTO Bicycle Guide"), selection of bicycle facility type is dependent on many factors, including the ability of users, specific corridor conditions, and facility cost. Bicycles are legally classified as vehicles and can be ridden on all roads in the City except Interstate 81. Currently, in the City, there are an estimated 4-miles of bicycle lanes, 3-lane miles of "Share the Road/Bicycle Route" signed routes, and 2-miles of shared use paths.

Bicycle facility designs in the City follow guidelines as described in the AASHTO Bicycle Guide and MUTCD. Additionally, bicycle parking facilities (i.e. bike racks) required by City ordinance, plans or design standards, or racks installed on any City owned properties follow the "Bicycle Parking Guidelines: A set of recommendations from the Association of Pedestrian and Bicycle Professionals." [2]

Following are descriptions of different types of bicycle facilities:

- *Shared Roadways (No Bikeway Designation).* These are streets in which no bicycle facility markings or signs will be installed. In some instances, an existing street may be fully adequate for efficient bicycle travel; signing and striping may be unnecessary (e.g. local residential streets and some collectors that have low volumes and speeds). In other cases, some streets and highways may be unsuitable for bicycle travel at present, and it would be inappropriate to encourage bicycle travel by designating the routes as bikeways. Finally, some routes may not be considered high bicycle demand corridors, and it would be inappropriate to designate them as bikeways, regardless of roadway conditions.[3]

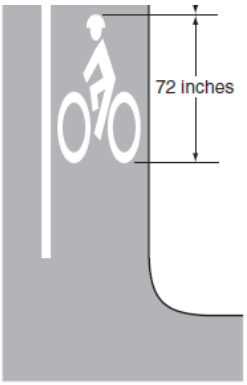
- *Bike Lanes.* Bike lanes are intended to delineate the right-of-way assigned to bicyclists and motorists and to provide for more predictable movements by each. Bike lanes in the City are

[2] Association of Pedestrian and Bicycle Professionals, "Bicycle Parking Guidelines: A set of recommendations from the association of Pedestrian and Bicycle Professionals", 2002, http://www.bicyclinginfo.org/library/details.cfm?id=6.

[3] American Association of State Highways and Transportation Officials, "Guide for the Development of Bicycle Facilities", 1999.

established following the AASHTO Bicycle Guide's recommendation of minimum 5-ft. wide lanes including the gutter pan, if one exists. Bike lanes also have appropriate pavement markings and signage along streets. Bike lanes help to increase the total capacities of highways carrying mixed bicycle and motor vehicle traffic.[4] Where there is adequate street width, bike lanes greater than 5-ft wide is encouraged.

As shown Appendix XII.A Bicycle Plan Map, bike lanes are to be planned for all principal arterial and minor arterial streets in the City, with the exception of East Market Street between Country Club Road and Vine Street. Use of bike lanes on collector and local streets must be designated in this Plan or approved by the Director of Public Works or their designee.



Bicyclist Symbol as shown in the MUTCD.

When a street is scheduled for repaving (every 10 to 15 years) opportunities to widen the shoulders or to modify line painting to reduce vehicular lane width to accommodate bicycle lanes may be possible. Although these opportunities exist for some roadways, other roadways will have significant challenges with drainage swales along the roadway that may prevent relatively low cost shoulder widening. Some streets may also face challenges at intersections as pavement width must be utilized for left and/or right vehicular turn lanes thus resulting in abrupt discontinuation of bike lanes forcing bicyclists and motorists to share the same space.

Bike lanes in the City shall be marked with the Helmeted Bicyclist Symbol as shown in the MUTCD, Figure 2.

- *Shared Lane Markings ("Sharrows").* In 2009, shared lane markings were approved for national use by the MUTCD. As with bike lanes, marking a street with shared lane markings indicates to bicyclists that particular advantages exist to using these routes compared with alternative routes. This means these routes are suitable bike routes and will be maintained in a manner consistent with the needs of bicyclists.

Figure 3. Example Shared Lane Marking used in another Virginia locality.

Although shared lane markings may be used on any classification of street, their preferred use is on collector streets that have lower motor vehicle volumes. Use of shared lane markings on local streets is prohibited except for those streets specifically designated in this Plan.

[4] American Association of State Highways and Transportation Officials, "Guide for the Development of Bicycle Facilities", 1999.

Locations for shared lane markings are shown listed in Section VII. Recommended Priorities and shown in Appendix XII.A Bicycle Plan Map. Unlike bike lanes, shared lane markings do not impact on-street parking.

In some cases where traffic volumes and speeds are low, shared lane markings may be used as a temporary measure on a street designated on the Plan for bike lanes until bike lanes can be constructed and/or marked on that street in the future.

- *Bicycle Route Signage.* The 2005 Bicycle Plan adopted signage for specific routes between multiple destinations, including a proposed bicycle by-way. The Advisory Committee re-evaluated the placement of existing signs and determined it would be best to follow AASHTO's Bicycle Guide for route signage, which does not suggest numbered routes, but encourages the use of directional signage with a description of frequented destinations. The AASHTO Bicycle Guide signs offer more flexibility as multiple routes may converge on one street and provide more helpful information to bicyclists while riding.

Figure 4. AASHTO Bicycle Guide Bike Route Signage

Bicycle destination signage should be coordinated with the City's Wayfinding signage to avoid duplication and street sign clutter. Key destinations in Harrisonburg suggested by the Advisory Committee are listed in Table 1. Suggested Destinations.

Table 1. Suggested Destinations

• Hillandale Park • Kiwanis Park • Westover Park • Purcell Park • Morrison Park • Ralph Sampson Park • Liberty Park • Smithland Park • Downtown • Keister Elementary School	• Spotswood Elementary School • Smithland Elementary/Skyline Middle Schools • Waterman Elementary School • Stone Spring Elementary School • Thomas Harrison Middle School • Harrisonburg High School • James Madison University • Eastern Mennonite University

- *Share the Road Signage.* The 2005 Bicycle Plan adopted Share the Road signage to be utilized with Bicycle Route signage for routes identified in the Plan. With the adoption of this plan, share the road signage will be replaced by either bike lanes or shared lane markings.

1. Guidelines for Bicycles on Sidewalks

Although bicycles are allowed to ride on sidewalks unless otherwise posted, bicyclists should use additional caution when riding on a sidewalk. Generally, designing sidewalks for bicycle travel is not recommended, even if the sidewalks are wider, for the following reasons:

- Motorists do not expect to see bicyclists traveling on sidewalks and may pull out of intersections or driveways and collide with a bicycle unexpectedly.
- The potential for conflicts between bicyclists and pedestrians greatly increases with shared use.
- Pedestrian movements are often unpredictable for an approaching bicyclist from behind, and pedestrians cannot always predict the direction an oncoming bicyclist will take.
- Sidewalks are usually two-way facilities and bicyclists are encouraged to travel one way, with the flow of traffic.
- Sight distances are more limited at driveway crossings.
- There may be limited sight distance and clearances due to signs, utilities, landscaping, fencing, or other obstacles beside or protruding into the sidewalk.[5]

2. Railroad Crossings

Harrisonburg has many railroad/street crossings. In 2009, the City and Norfolk Southern Railroad worked together to improve two of the most dangerous railroad crossings in the City. These sites are located on South Main Street (near Rocco Drive) and Country Club Road (under I-81). These improvements have drastically improved safety for bicyclists crossing these railroad tracks.

Figure 5. Country Club Road Railroad crossing improvements made in 2009, provide safer crossing opportunities for bicyclist .

Improvements such as the ones made at South Main Street and Country Club Road are not necessary or appropriate for all railroad crossings within the City. It is recommended that the City provide literature and education to citizens about how to safely cross railroad tracks on a bicycle. Bicyclists should:

1. Cross with caution.
2. Cross as close to a right angle (90 degrees) with the tracks as possible.

[5] "Pedestrian Facilities Guidebook: Incorporating Pedestrians into Washington's Transportation System", 1997, ftp://ftp.wsdot.wa.gov/dotshare/LocalPrograms/Walk/PedFacilityGB.pdf

3. If a bicyclist cannot cross safely, the bicyclist should dismount and walk the bike across the railroad tracks.

3. Bicycle Parking Facilities ("Bike Racks")

In 2009, the City began requiring bike racks to be installed at new developments with 15 or greater car parking spaces at a rate of one bicycle space per 25 car parking spaces, with a minimum of 4 bicycle spaces. This requirement can be found in the City's Design & Construction Standards Manual (DCSM). Rack design and layout shall be as recommended in the "Bicycle Parking Guidelines: A set of recommendations from the Association of Pedestrian and Bicycle Professionals." Existing developments are encouraged to provide bicycle parking and under cover when possible.

Figure 6. Good bicycle rack design example on Court Square in Downtown Harrisonburg.

B. Pedestrian Facilities

Though the Department of Public Works presently maintains approximately 61 miles of sidewalk, opportunities for pedestrian traffic throughout the City still remains limited. Construction of new sidewalks enhances the pedestrian environment and makes walking a viable form of transportation. Additionally, a completed pedestrian network promotes use of public transportation as bus stops are connected and as accessibility to bus stops is improved from residential to commercial areas.

Components of good pedestrian facilities include:

- *Sidewalks and Walkways.* Sidewalks and walkways serve as the skeleton by which all other pedestrian components are accessed. Sidewalks are the actual space that pedestrians use to move from one location to another. Sidewalks should be constructed according to widths designated in of this Plan, and City DCSM, AASHTO guides, and ADA guidelines. These guidelines and standards should also be followed when constructing all sidewalk elements, including curb ramps and street crossings. Beginning in 2009, the City's DCSM requires that sidewalks be constructed on both sides of all new public streets and along the street frontage of all developing and redeveloped properties.

Table 2. Dimensions for Sidewalks and Walkways

Road Type	Major Arterial	Minor Arterial	Collector	Local
Right-of-Way^	80 ft.	60 ft.	60 ft.	50 ft.
Width of Roadway ^	4-5 lanes	3-4 lanes	2-3 lanes	30 ft ±
Sidewalk Widths (minimum)*				
With planting strip/buffer	5 ft.	5 ft.	5 ft.	5 ft.
No buffer – requires approval +	5 ft.	5 ft.	5 ft.	5 ft.
Urban Center/ Business District (e.g. downtown)	10-15 ft.	10-15 ft.	Varies	-
Location	Both sides	Both sides	Both sides	Both sides
Buffer/Utility Strip Width				
Grassed, planting strip+	2-5 ft.	2-5 ft.	2-5 ft.	2-5 ft.

^ Right-of-way and roadway widths are as shown in "Typical Street Cross Sections" from City of Harrisonburg Design & Construction Standards Manual (DCSM). Final pavement widths, bike lane provisions, sidewalk location, and right-of-way for new streets and street improvements are determined during project development or site plan review. Some older city streets may also have varying right-of-way.

** Minimum sidewalk widths outside of urban centers and business districts are 5-feet. However, the City encourages developers to consider wider sidewalks in areas when high volumes pedestrian traffic is expected in the future.*

+ Buffers and Utility Strips between the sidewalk and roadway provides separation between the pedestrian and vehicular traffic making walking more comfortable. Also, in situations where mailboxes or other obstructions are present along the roadway, a buffer strip provides a space outside of the sidewalk. Exceptions to this requirement may be made in cases where existing utilities or topography challenges exist and must be approved by the Director of Public Works or their designee.

Ideally, all streets should have sidewalks on both sides. However, Section 0.

Pedestrian Priorities List illustrates the priority of constructing sidewalks on one side of all existing city streets in developed areas to expand the network of sidewalks to serve more people and destinations. Construction of sidewalks in already developed neighborhoods and streets have greater challenges, including right-of-way, utilities, and structures that may limit the possibility of maintaining the desired/recommended sidewalk widths and designs described above.

- *Pedestrian Crossings.* At both signalized and unsignalized intersections, there is an implied and legal crosswalk for pedestrians at each leg of the intersection from one corner to the other, regardless to whether the crosswalk is painted. The only time this is not true is when there is a clear sign prohibiting pedestrians from crossing one corner to another.

  Crosswalk markings in the City shall be the "continental-style" crosswalk, shown in Figure 7.

  Figure 7. A "continental-style" crosswalk at Port Republic Road and Neff Avenue.

  Painted mid-block crosswalks are discouraged from use in the City. The traditional consensus among traffic engineers is that at-grade mid-block crosswalks are undesirable.[6] Providing markings at mid-block crossing locations gives pedestrians a false sense of security. There is no guarantee that drivers are aware of the potential pedestrian crossing or if they will exercise any caution regarding the potential crossing. However, conditions such as traffic volumes, speed, pedestrian volume, location, distance to nearest crosswalk, on-street parking, street lighting, and others may justify the use of mid-block crossings.

- *Pedestrian Signals.* Electronic signals are primarily utilized for the purpose of warning or permitting safe crossing for pedestrians. These electronic devices, controlled through a number of manual or timed formats, are employed primarily at longer crossing distances or higher volume roads. At multiple lane crossings, pedestrian signals can also be combined with pedestrian refuge islands or right-turn slip-lanes.

  1. *Actuated Pedestrian Signals.* Pedestrian signals in the City are all actuated, meaning that a pedestrian must press a push button to activate a pedestrian signal sequence. Pedestrian signals in the City are typically concurrent, meaning motorists may turn left or right across pedestrians' paths after yielding to pedestrians. In this scenario, pedestrians usually have more crossing opportunities and have less time to wait for a

[6] Transportation Research Board, Research Needs Statements: Effectiveness of Various Mid-block Crossing Treatments, http://rns.trb.org/dproject.asp?n=13454.

signal.[7] In high pedestrian volume locations, such as downtown, fixed-time pedestrian signals, that do not require pedestrians to push a button, may be more appropriate.

2. *Leading Pedestrian Intervals.* Pedestrian signals that have leading pedestrian intervals are started a few seconds before the adjacent vehicular through movement phase. This allows pedestrians to establish presence in the crosswalk before vehicles are given the green light; making pedestrians more visible to motorists, thereby reducing conflicts between pedestrians and turning vehicles. At the time of this writing, leading pedestrian signals have not been utilized in the City due to limitations in traffic signal hardware and software. However, City staff are exploring opportunities with equipment vendors to utilize this technology.

3. *Exclusive Pedestrian Phases.* Exclusive pedestrian phases are discouraged from use in the City. However, use of exclusive pedestrian phasing may be appropriate at locations with high pedestrian volumes (especially if pedestrian volumes are higher than motor vehicle volumes), high turning movement conflicts, or high speed locations. Exclusive pedestrian phases may cause longer, undesirable travel times for both motorists and pedestrians. Pedestrians will often have to wait a long time for an exclusive signal. This is not pedestrian-friendly, and results in many pedestrians choosing to ignore the signal and cross, if and when, there is a gap in traffic, negating the potential safety benefits of the exclusive signal.[8]

- *Right-Turn-On-Red Restrictions.* While the law requires motorists to come to a full stop and yield to cross-street traffic and pedestrians prior to turning right on red, many motorists do not fully comply with the regulations, especially at intersections with wide turning radii. Motorists are often so intent on looking for traffic approaching on their left that they may not be alert to pedestrians approaching on their right. Additionally, motorists usually pull up into the crosswalk to wait for a gap in traffic, blocking pedestrian crossing movements. Prohibiting turning right on red may be considered when there are high pedestrian volumes or when there is a proven problem with motorists conflicting with pedestrians. At some intersections, restrictions may only be needed during certain times of the day. A sign indicating these times may be used.[9]

- *Curb Extensions.* Curb extensions are physical extensions of a sidewalk or island that increase visibility of pedestrians for motorists and it shortens the pedestrian crossing distance. Curb extensions, through their visual nature, also serve to slow motorist speeds thus

[7] Pedestrian and Bicycle Information Center, Signals and Signs, http://www.walkinginfo signals.cfm
[8] Pedestrian and Bicycle Information Center, Signals and Signs, http://www.walkinginfo signals.cfm.
[9] Pedestrian and Bicycle Information Center, Signals and Signs, http://www.walkinginfo signals.cfm.

presenting an additional safety feature for pedestrians. Curb extensions are appropriate at crossing locations along areas with on-street parking. They can also include visual and physical amenities such as trees or small plants.

- *Pedestrian Refuge Islands.* Also known as crossing islands, center islands, or pedestrian islands are raised islands placed in the center of the street at intersections or midblock to help protect crossing pedestrians from motor vehicles. Pedestrian refuge islands allow pedestrians an opportunity to deal with only one direction of traffic at a time. They also enable pedestrians to stop partway across the street and to wait for an adequate gap in traffic before crossing the second half of the street.[10]

Figure 8. Pedestrian Refuge Island on East Market Street.

- *Right-Turn Slip-Lane.* At many arterial street intersections, pedestrians have difficulty crossing due to right-turn vehicular movements and wide crossing distances. Well-designed right-turn slip lanes provide pedestrian crossing islands within the intersection and a right-turn lane that is designed to optimize the right-turning motorist's view of the pedestrian and vehicles to his or her left. The triangular corner island should have a "tail" pointing to approaching traffic. Pedestrians are able to cross the right-turn lane and wait on the crossing island for their walk signal. An additional advantage to the right-turn slip-lane is the crosswalk is located in an area where the driver is still looking ahead.[11]

Figure 9. Right-Turn Slip Lane at South Main Street & Port Republic Road.

1. On-Street Parking

On-street parking near pedestrian crossing points can interfere with visibility. When cars are parked too close to crossing points, they may block the line of sight between the driver and the pedestrian stepping off the curb to cross. City Code prohibits parking within 20 feet of any corner and 30 feet of a stop sign, regardless of whether the corner is signed or the curb is painted.

C. Shared Use Path Facilities

Shared use paths, generally, are off-road corridors separated from the road system by an open space or barrier. Some exist

Figure 10. Rockingham Drive Shared Use Path provides a connection between Chicago Avenue and North Dogwood Drive.

[10] Pedestrian and Bicycle Information Center, Crossing Enhancements, http://www.walkinginfo.org/engineering/crossings-enhancements.cfm#

[11] Pedestrian and Bicycle Information Center, Improved Right-Turn Slip-L http://www.walkinginfo.org/engineering/crossings-design.cfm.

on utility easements or former railroad right-of-ways, allowing such facilities to be constructed away from the influence of parallel streets. Shared use paths should offer opportunities not provided by the road system. They can provide a recreational opportunity, or in some instances, can serve as direct commute routes if cross flow by motor vehicles and pedestrians is minimized.[12]

The City's DCSM states that "where a shared use path bisects a property as indicated in any City-adopted plans, the applicant-owner shall create a public access easement maintaining connectivity with adjoining properties in order to facilitate planning for and construction of shared use path facilities."

Shared use path designs should follow guidelines provided in Table 3 and the AASHTO Bicycle Facilities Guide.

Table 3. Dimensions for Shared Use Paths[13]

Shared Use Path Element	Dimensions	Comments
Shared Use Path Width	10-12 ft.	-
Roadway Separation	5 ft.	Minimum separation for parallel, adjacent path; a physical barrier should be installed where minimum separation cannot be met.[14]
Cleared Area Adjacent to Path	2-4 ft.	Shoulders provide pull-off/resting and passing space; should be graded to the same slope as the path. Less than 2 ft shoulder width should only be used in constrained areas. Shoulder may be grassed.
Vertical Clearance	8-10 ft.	Necessary for good visibility and clearance for bikes on paths.
Shared Use Unpaved Path Width	6-10 ft.	Only suggested as an interim solution and not appropriate for high use shared use paths; best in rural or semi-primitive areas.
Pedestrian Mall/ Corridor (Urban) Width	10-15 ft.	Paths in urban areas or those that receive heavy use should be wide enough to accommodate several people walking side-by-side or groups of people walking in opposite directions.

There are challenges with providing off road facilities adjacent to streets that serve adjacent land uses because they can create confusion for motorists, bicyclists, and pedestrians alike. The City has determined that, on a limited access roadway – one which restricts or prohibits private drive entrance connections – a shared use path is ideal. This creates a safe environment for bicyclists where motorized

[12] American Association of State Highways and Transportation Officials, "Guide for the Development of Bicycle Facilities", 1999.
[13] Pedestrian Facilities Guidebook: Incorporating Pedestrians into Washington's Transportation System", 1997, ftp://ftp.wsdot.wa.gov/dotshare/LocalPrograms/Walk/PedFacilityGB.pdf.
[14] American Association of State Highways and Transportation Officials, "Guide for the Development of Bicycle Facilities", 1999.

traffic is generally traveling at higher speeds. Where adjacent land use access conditions are prevalent, the on-street bicycle lane is preferred.

The key components to successful off-street paths are illustrated in Table 4.

Table 4. Key Components of successful shared use paths

Key Components	Comments
Continuous separation from traffic to reduce conflicts and maintain safety	Street or driveway crossings should be limited.
Frequent connections to land-uses	Shared use paths should be connected to residential areas, shopping, schools, and other destinations.
Shorter trip lengths than the road network	Shared use paths can provide connections between dead-end streets or cul-de-sacs, or as short cuts through open space
Security	Proximity to housing and businesses increases visibility; illumination helps provide a sense of security at night.
Scenic qualities	Shared use paths should keep the contour of the land for aesthetic and environmental reasons, and for practical reasons, should not be unnecessarily curved. This aesthetic experience also attracts bicyclists and pedestrians to use the facility.
Good design	Design should provide adequate width and grades, and avoid problems such as poor drainage, blind corners, and steep slopes.
Well-designed street crossings	Measures such as signals or median refuge islands may be used.
Proper maintenance	Shared use paths should be swept as needed and repair made so that they not fall into disrepair. Paths that fall into disrepair are not used to their full potential and can be a liability.

1. Restricting Motor Vehicles

Bollards, or other restrictive devices, should be used at entry ways onto a shared use path to restrict motor vehicles. Bollards placed in the shared use path should have reflective material on them and also be surrounded by a 6-inch solid yellow line to gain the attention of approaching bicyclists, as described in the MUTCD. Bollards should also be removable, with a locking mechanism in the event that maintenance or emergency access is required.

D. Public Transit Facilities

Public Transit routes and facilities must also be integrated with the bicycle and pedestrian network. The Harrisonburg Department of Public Transportation (HDPT) operates all public transportation operations that the City offers to its residents and visitors. Transportation services provided by HDPT include fixed-route mass transit buses, school buses, and paratransit operations to serve persons with disabilities. It is an integral service to James Madison University's students and staff.

In 2001, HDPT began installing bicycle racks on the front of transit buses so that riders may take their bicycles with them to their next destination. All transit buses are now equipped with bicycle racks. HDPT and the Department of Public Works have coordinated the installation of bus shelters, benches and other amenities with new road and sidewalk improvement projects.

Figure 11. Bicycle racks on city buses provide opportunities for bicyclists to take their bikes on the bus.

HDPT has been working to identify suitable locations in or around the downtown Harrisonburg area on which to construct a dedicated transfer location that can accommodate a sufficient number of buses to provide service to the area. This transfer location could contain bicycle and pedestrian accommodations, a taxi cab stand, and a location for the launching of intercity bus operations that may locate in Harrisonburg at a future date. In effect, it could serve as a hub for multi-modal transportation operations.

E. Signage

Signs are a key component to a well designed and safe alternative transportation system. In general, signage within the bicycling and pedestrian transportation network is used to alert motorists of bicycling or pedestrian activity or to direct bicyclist and pedestrian movement towards designated areas, such as crosswalks or marked on-road corridors. While signage is vital to ensuring safety to bicyclists, pedestrians, and motorists, it is important not to overuse signage to a point that it is ignored by motorists so that it provides a false sense of safety or awareness.

IV. Project Accomplishments since 2005

New facilities constructed since the adoption of the 2005 Bicycle and Pedestrian Plans are shown in Table 5.

Table 5. New Bicycle and Pedestrian Facilities, 2005-2010.

Location(s)	Facility Type	Approximate Distance	Date(s) Completed	Funding Source
City Schools, City Parks, Downtown Area (32 installed total)	New bicycle racks	NA	2008, 2009	CDBG, Downtown Streetscape Ph 1
South Main Street. (Rt. 11) to Miller Circle	Wide curb lane (14-ft) and "Share the Road" signage	0.5 miles	Started in 2006	City
North Dogwood Drive, South Dogwood Drive, Hidden Creek Lane, Greystone Street, and College Avenue.	"Share the Road"/ "Bike Route"	1.5 miles	2007	City
Port Republic Road from Devon Lane to Neff Avenue	Bicycle Lane	0.25 miles	2005	City
Various locations	Drainage Grates	NA	2010	City
From Neff Avenue to JMU Arboretum ("Arboretum Trail")	Shared Use Path	0.1 miles (0.5 mile connection)	2007	City
Chicago Avenue to North Dogwood Drive ("Rockingham Drive Trail")	Shared Use Path	0.4 miles	2007	CDBG
Elmwood Drive to Westover Park	Shared Use Path	0.25 miles	2008	City
Linda Lane from Country Club Road to Smithland Road	Shared Use Path	0.75 miles	2008	City
Port Republic Road from Devon Lane to Neff Avenue	Sidewalk	0.5 miles	2005	City
Devon Lane	Sidewalk	0.5 miles	2008	CDBG
East Washington Street, Vine Street, East Wolfe Street	Sidewalk	0.75 miles	2009	CDBG
East Market Street between Burgess Road and University Boulevard	Sidewalk	0.35	2009	VDOT HSIP
Port Republic Road from Neff Avenue to east city limits	Shared Use Path	0.5 miles	2009	VDOT TE
East Gay Street from Broad Street to Sterling Street	Sidewalk	0.4 miles	2009	CDBG
Rocktown Trails at Hillandale Park*	Recreational mountain bike/walk/run trail	3.5 miles	2008	City, Volunteers

CDBG = Community Development Block Grant, VDOT HSIP = Virginia Department of Transportation's Highway Safety Improvement Program, VDOT TE = Virginia Department of Transportation's Transportation Enhancement Program

Lengths of sidewalks, shared use paths, and bicycle lanes given are length of street centerline. Sidewalks vary, some were constructed on one or both sides of the street.

** Rocktown Trails was constructed with funding and volunteers from the City of Harrisonburg, Shenandoah Valley Bicycle Coalition, International Mountain Bike Association and is maintained by the City Parks & Recreation Department.*

V. Common Challenges

Some common challenges of constructing new infrastructure include:

- Many older streets lack sufficient right-of-way to construct new bicycle and pedestrian facilities.
- Crossing Interstate 81 poses safety threats and greatly restricts access from one side of the City to the other. Minimal crossing opportunities at Interstate 81 limit accessibility from east to west.
- Interstate 81 separates most JMU off-campus housing from the Main Campus.
- Right-of-way costs and utility relocation hinders the feasibility of bicycle and pedestrian facility construction.
- At-grade railroad crossings can be difficult for bicyclists and pedestrians to negotiate.
- Topography in the City is characterized as rolling with varying slopes, which can present use and construction challenges for connectivity of transportation facilities.
- Like road projects, cost of bicycle and pedestrian facility projects are high and projects must be prioritized based on safety, history, motor vehicle, bicycle, and pedestrian traffic volumes, location, etc.

VI. City and Regional Plans

- City of Harrisonburg Comprehensive Plan – This plan presents a vision of what kind of community the City would like to be in the future and identifies the steps required to move toward that vision. It addresses a wide range of issues, including land use, housing, transportation, infrastructure, the preservation of historic and natural resources, and economic development. It also references the Bicycle and Pedestrian Plan. The Comprehensive Plan is assessed every five years. http://www.harrisonburgva.gov/compplan
- City of Harrisonburg Master Transportation Plan – A part of the Comprehensive Plan, the Master Comprehensive Plan establishes the City's long-range plan for transportation improvements. This plan states that bicycle and pedestrian accommodations should be considered with all new road improvement projects. http://www.harrisonburgva.gov/compplan
- Harrisonburg-Rockingham Metropolitan Planning Organization's Constrained Long Range Plan (CLRP) – Developed every three to five years, this Plan defines the long-range (at least 20 years) transportation needs and outlines a fiscally-constrained list of projects that will be eligible for inclusion in the Transportation Improvement Program (TIP), which identifies transportation projects to be funded in the Harrisonburg and Rockingham areas within the next six years. http://www.hrvampo.org

- Central Shenandoah Regional Bicycle Plan – Provides a coordinated and strategic approach to the development of a regional transportation system that accommodates and encourages bicycling. http://www.cspdc.org

VII. Recommended Priorities

This section provides the list of priority bicycle and pedestrian projects with estimated costs. Bicycle Facility and Pedestrian Maps showing existing and proposed facilities are also included in the Appendices.

A. Estimate Baseline Costs

Cost information is provided for reference only. Although these values include estimated materials, equipment and labor costs, these values do not include right-of-way, environmental clearances, utility relocation or unusual topographical conditions, all of which could change estimated project costs. Estimated baseline costs for new facilities are found in Table 6.

Table 6. Estimate Baseline Costs for New Facilities.

Facility		
Bike Lanes +	$416,000.00	Base cost per mile for 4 ft. pavement on both sides of street.
Bike Lanes +	$3.00	Base cost per linear ft. for 6-inch white paint on both sides of street plus bike symbols and signage.
Bike Lanes +	$300.00	Sign with post. Signs placed approximately every 350 ft.
Shared Lane Markings *	$300.00	Markings placed approximately every 250 ft. on both sides of street.
Bicycle Route Signage +	$300.00	Sign with post.
Shared Use Path +	$687,500.00	Base cost per mile of 10 ft. shared use path.
Sidewalks #	$80.00	Cost per linear ft.
Pedestrian Signals ^	$30,000.00	Assumes full signal upgrade.

+ Bike lanes, shared use path, and bicycle route signage cost estimates are based on VDOT's "Example Planning-level cost Estimates for Bicycle Accommodations," 2006, and costs incurred by the City of Harrisonburg Department of Public Works for past projects. Field conditions, such as required road widening, repaving of road surface or stormwater drainage, etc. will vary the costs.

**Shared lane marking estimated base on actual material costs and consultation with other localities on labor costs. Field conditions, such as location of intersections, sight distance, etc. will vary the costs. Signage is not required for shared lane markings.*

 # Estimates for sidewalks include averages for number of American with Disabilities Act (ADA) ramps needed on a project and mobilization. Estimates developed from actual bided costs for East Washington Street, East Gay Street sidewalks, and for engineering cost estimates for Virginia Avenue and Third Street sidewalks.

^ Estimates from "Cost of Typical Traffic and Pedestrian Signal Upgrades" (http://safety.transportation.org/htmlguides/peds/assets/App08.pdf) and staff estimates.

B. Bicycle & Pedestrian Facility Goals for the next 2 and 5 years

Goals to complete within 2 years:	Facility Type	Approximate distance (miles)	Estimate Cost
• **North Main Street from Market Street to Wolfe Street**	Shared Lane Markings	0.15	$950
• **North Main Street from Wolfe Street to Noll Drive/Kratzer Avenue – paint bicycle lanes on existing pavement.**	Bike Lanes	0.20	$5,280
• **South Main Street from Campbell Street to Market Street**	Shared Lane Markings	0.30	$1,900
• **Noll Drive from Kratzer Avenue to Rock Street – to paint bicycle lanes, removal of two on street parking spaces required on west side. Coordination with Downtown Parking Services required.**	Bike Lanes	0.25	$6,600
• **Liberty Street from Rock Street to South Main Street**	Shared Lane Markings	0.70	$4,440
• **Vine Street from North Main Street to Country Club Road – paint bicycle lanes on existing pavement.**	Bike Lanes	1.50	$39,600
• **Central Avenue from Maryland Avenue to South Avenue – widen the pavement on Central Avenue about three (3) feet to accommodate painting of bicycle lanes. Located within ¼ -mile of Keister Elementary School. Schedule is dependent upon street paving program.**	Bike Lanes	0.40	$10,560 plus cost of widening
• **South Avenue from railroad tracks west of South Main Street to South High Street – remove on street parking from one side of street and paint bicycle lanes. Located within ¼ - mile of Keister Elementary School.**	Bike Lanes	0.50	$13,200
• **South Main Street from Cantrell Avenue to Pleasant Hill Road – modify vehicular lane widths by line painting where needed and paint bicycle lanes. Schedule is dependent upon street paving program.**	Bike Lanes	1.50	$39,600
• **Cantrell Avenue from South Main Street to Reservoir Street – paint bicycle lanes on existing pavement.**	Bike Lanes	1.00	$26,400
• **Park Road from Mount Clinton Pike to Dogwood Drive – remove on street parking and paint bicycle lanes. Support from EMU for removal of on street**	Bike Lakes	0.40	$10,560

parking has been received.			
• **South Dogwood Drive from Hidden Creek Lane to West Market Street**	Shared Lane Markings	1.75	$11,090
• **Hidden Creek Lane from South Dogwood Drive to South High Street**	Shared Lane Markings	0.20	$1,270
• **South Avenue between South Main Street to South Dogwood Drive – construct sidewalks on both sides of South Avenue between South Main Street and South High Street, and on one side between South High Street to South Dogwood Drive. This project will be funded by VDOT's Safe Routes to School Grant.**	Sidewalks	1.00	$422,400
• **South Avenue and South High Street – install pedestrian signal and crosswalks at intersection. This project will be funded by VDOT's Safe Routes to School Grant.**	Pedestrian Signal	NA	$30,000
• **Maryland Avenue from South High Street to Chestnut Drive – construct sidewalks on one side of Maryland Avenue. This project will be funded by VDOT's Safe Routes to School Grant.**	Sidewalks	0.20	$84,480
• **East Market Street from Linda Lane to University Boulevard – construct 10 ft. sidewalks on north side of the street. This project will be funded by VDOT's Highway Safety Improvement Program.**	Sidewalks	0.35	$147,840

Replace City wide drainage grates identified as Priority 2 and to be replaced within the next two years:

- South Main Street & East Market Street (SE corner)
- North Liberty Street and West Elizabeth Street (NE corner)
- South Liberty Street and West Water Street (SW corner)
- Newman Avenue and South Main Street (SE and NE Corner)
- South Main Street and Water Street (NW and SE corner)
- 28 South Main Street
- South Main Street and Gay Street (SW corner)
- Ashtree Lane and Federal Street (two grates)

Goals to complete within 5 years:	Facility Type	Approximate distance (miles)	Estimate Cost
• **South Main Street from Cantrell Avenue to Campbell Street - bicycle lanes would require support of adjacent property owners and Downtown Parking Services for removal of on street parking on one side. Shared lane markings may be substituted in the interim.**	Bike Lanes/ Shared Lane Markings	0.30	$7,920 / $1,900
• **South Main Street from Pleasant Hill Road to Mosby Road – modify vehicular lane widths by line painting and paint bicycle lanes. Schedule is dependent upon street paving program.**	Bike Lanes	0.50	$13,200
• **Erickson Avenue Stone Spring Road (Phase II) from South Main Street to east city limits – construct bicycle lanes as part of the road improvement project. This project is expected to begin construction in Fall 2010.**	Bike Lanes & Sidewalk	1.15	$494,600 & $485,800
• **East and West Market Streets between High Street and Mason Street**	Shared Lane Markings	0.40	$1,270
• **Devon Lane and Lois Lane from Port Republic Road to Peach Grove Avenue – remove on street parking where needed and paint bicycle lanes. Support of adjacent neighbors required. Schedule is dependent upon street paving program.**	Bike Lanes/ Shared Lane Markings	0.80	$21,120 / $5,070
• **Evelyn Byrd Avenue from Reservoir Street to East Market Street – consider restriping vehicular travel lanes from four 11-ft. lanes and changing to two 11-ft. lanes, one 11-ft. center turn lane, and two 5.5-ft. bicycle lanes.**	Bike Lanes	1.30	$34,320
• **Bluestone Trail (Phase I) from Port Republic Road to Stone Spring Road – construct shared use path to provide access for residents and university students between James Madison University, Purcell Park, RMH Wellness Center, bicycle lanes on Stone Spring Road, and future Bluestone Trail Phase II to the south.**	Shared Use Path	1.00	$687,500
• **Devon Lane to Stone Spring Road – construct a shared use path connection between neighborhoods.**	Shared Use Path	Unknown	Unknown
• **Wyndham Drive to West Market Street – construct a shared use path connection between (a) the neighborhoods to West Market Street and (b) from the path to Thomas Harrison Middle School**	Shared Use Path	0.25 + 0.20	$171,875 + $137,500
• **Circle Drive to Hillandale Park – construct a shared use path connection between the neighborhoods to Hillandale Park.**	Shared Use Path	Unknown	Unknown
• **Chicago Avenue from West Gay Street to Rockingham Drive Trail – widen pavement where needed and paint bicycle lanes. This project will be funded by**	Bike Lanes	0.50	$93,760

VDOT's Safe Routes to School Grant.			
• **Virginia Avenue from 2nd Street to 5th Street – construct sidewalks on both sides of Virginia Avenue. This project will be funded by VDOT's Safe Routes to School Grant.**	Sidewalks	0.50	$211,200
• **West Wolfe Street from North Main Street to North Dogwood Drive – paint shared lane markings**	Shared Lane Markings	0.35	$2,220
• **North Dogwood Drive from West Market Street to Rockingham Drive Trail – replace "share the road" signage with shared lane markings.**	Shared Lane Markings	0.60	$3,810
• **East Wolfe Street from North Main Street to Old Furnace Road, Old Furnace Road from East Wolfe Street to Vine Street**	Shared Lane Markings	1.00	$6,340
• **Blue Ridge Drive from Old Furnace Road to Country Club Road**	Shared Lane Markings	0.80	$5,070
• **East Washington Street from North Main Street to Vine Street – maintain on street parking on north side and paint bicycle lanes.**	Bike Lanes	0.70	$18,480
• **North and South Carlton Street from Country Club Road to Mountain View Drive**	Shared Lane Markings	0.60	$3,810
• **Maryland Avenue from South High Street to South Dogwood Drive**	Shared Lane Markings	0.25	$1,590
• **South Avenue from South High Street to South Dogwood Drive**	Shared Lane Markings	0.25	$1,590
• **Central Avenue from South Avenue to Pleasant Hill Road**	Shared Lane Markings	0.70	$4,440
• **Maryland Avenue from South Main Street to South High Street**	Bike Lanes	0.45	$11,880
• **Third Street from Collicello Street to Stuart Street, Stuart Street from Third Street to Chicago Avenue – construct sidewalks on one side of the street. Provides connection between neighborhoods and Waterman Elementary School and Morrison Park. This project will be funded by VDOT's Safe Routes to School Grant.**	Sidewalks	0.30	$126,720
• **Virginia Avenue and Third Street – install pedestrian signal and crosswalks. This project will be funded by VDOT's Safe Routes to School Grant.**	Pedestrian Signal	NA	$30,000
• **Chicago Avenue from 2nd Street to Rockingham Drive Trail – construct sidewalks on west side of Chicago Avenue. This project will be funded by VDOT's Safe Routes to School Grant.**	Sidewalks	0.30	$126,720

• **East Market Street & University Boulevard Intersection**	Pedestrian Signal & Crosswalk	NA	$32,500
• **East Market Street from University Boulevard to Evelyn Byrd Avenue – construct sidewalks on south side. This project will be funded by VDOT Highway Safety Improvement Program Grant**	Sidewalks	0.90	$237,500 (engineer's estimate)
• **Northend Greenway – construct a shared use path approximately following Blacks Run from North Main Street near Johnson Street to Mt. Clinton Pike and on Mt. Clinton Pike towards Park Road.**	Shared Use Path	1.6	$1,023,277

C. Bicycle Priorities List

The following are bicycle facilities, which are not listed as a 2 or 5 year goal, but rather should be considered during any street improvement project, or if significant development or redevelopment occurs. Some of these projects are also included on the Street Improvement Plan of the Master Transportation Plan.

Northwest	Facility Type	Approximate distance (miles)	Estimate Cost	Priority
• **Mount Clinton Pike from Virginia Avenue to west city limits – reconstruct Mount Clinton Pike.**	Bike Lanes	0.70	$305,984	High
• **Mount Clinton Pike from Virginia Avenue to North Main Street – either reconstruct and widen Mount Clinton Pike or reduce number of vehicular travel lanes to accommodate bicycle lanes.**	Bike Lanes	1.30	$568,000 (reconstruction)	High
• **Chicago Avenue from Rockingham Drive Trail to Mount Clinton Pike – reconstruct Chicago Avenue and include bicycle lanes**	Bike Lanes	0.55	$240,420	High
• **North Main Street from Kratzer Avenue to north city limits – shoulder widening and/or road reconstruction would be required to paint bicycle lanes**	Bike Lanes	1.20	$524,545	High
• **North Liberty Street from West Market Street to Gay Street and Noll Drive from Gay Street to Kratzer Avenue**	Bike Lanes	0.70	$7,395	High
• **Harmony Drive from Park Road to Virginia Avenue – paint bicycle lanes**	Bike Lanes	0.25	$5,280	Medium
• **Virginia Avenue from West Market Street to north city limits - reconstruct Virginia Avenue to accommodate bicycle lanes.**	Bike Lanes	2.10	$917,955	Medium
• **West Washington Street from North Main Street to North Liberty Street – bicycle lanes would be preferred and would require significant widening and reconstruction of West Washington Street. As an alternative solution, shared lane markings are recommended.**	Bike Lanes/ Shared Lane Markings	0.25	$109,280/ $1,585	Medium
• **West Market Street from High Street to west city limits – would require significant road reconstruction or modification.**	Bike Lanes	1.75	$764,960	Medium
• **Park Road from Dogwood Drive to Harmony Drive – remove on street parking and paint bicycle lanes. Support of adjacent neighbors would be required. Shared lane markings may be an appropriate alternative.**	Bike Lanes	0.5	$10,560	Medium

• **Waterman Drive from West Market Street to Chicago Avenue – widen Waterman Drive to accommodate bicycle lanes.**	Bike Lanes	0.85	$371,555	Low
• **Switchboard Road from West Market Street to north city limits**	Bike Lanes	0.20	$87,425	Low

Northeast	Facility Type	Approximate distance (miles)	Estimate Cost	Priority
• **Country Club Road from Vine Street to East Market Street – reconstruct Country Club Road as shown in Street Improvement Plan and include bicycle lanes.**	Bike Lanes	1.60	$699,395	High
• **East Market Street from Main Street to Vine Street – reconstruct East Market Street to add bicycle lanes.**	Bike Lanes	1.00	$437,120	Low
• **Keezletown Road – reconstruct and widen Keezletown Road as shown in the Street Improvement Plan and include bicycle lanes**	Bike Lanes	0.75	$327,480	Low
• **East Market Street from Country Club Road to east city limits**	Bike Lanes	0.75	$327,480	Low
• **Linda Lane from Country Club Road to East Market Street – require significant road widening and improvements**	Bike Lanes	0.25	$109,280	Low

Southwest	Facility Type	Approximate distance (miles)	Estimate Cost	Priority
• **Garbers Church Road from West Market Street to southwest city limits (near Erickson Avenue) – bicycle lanes are preferred, but would require additional road widening or reduction of vehicular lanes to accommodate bicycle lanes. Shared lane markings may be a possible temporary measure.**	Bike Lanes/ Shared Lane Markings	1.60	$669,395/ $10,140	High
• **South High Street from West Market Street to south city limits – road widening would be required.**	Bike Lanes	2.35	$1,027,235	Medium
• **Pleasant Hill Road from South Main Street to Pear Street – significant road widening and improvements would be required.**	Bike Lanes	0.80	$349,700	Low
• **Pear Street from Pleasant Hill Road to Erickson Avenue– to provide a**	Bike Lanes	0.25	$109,280	Low

connection to Pleasant Hill Road and Erickson Avenue.				
• **Grace Street from South Main Street to South High Street – paint bicycle lanes. Provides connectivity between Main Campus of JMU and Memorial Hall.**	Bike Lanes	0.30	$131,140	High
• **Erickson Avenue – Stone Spring Road from west city limits to South Main Street**	Bike Lanes	1.65	$721,250	High

Southeast	Facility Type	Approximate distance (miles)	Estimate Cost	Priority
• **Reservoir Street from Neff Avenue to southeast city limits – include bicycle lane in roadway reconstruction and widening for which design is currently underway.**	Bike Lanes	1.0	$437,120	High
• **Reservoir Street from East Market Street to University Boulevard/ Neff Avenue – requires significant road widening and reconstruction.**	Bike Lanes	1.45	$633,825	Medium
• **Burgess Road from East Market Street to Evelyn Byrd Avenue – requires significant road widening and reconstruction.**	Bike Lanes	0.35	$152,995	Low
• **University Boulevard from East Market Street to Forest Hills Road, and Forest Hills Road from University Boulevard to Port Republic Road – requires significant road widening and reconstruction. Part of the roadway is owned and maintained by JMU and VDOT.**	Bike Lanes	2.10	$917,955	Low
• **Ramblewood Road from Stone Spring Road to Greendale Road – to include bicycle lanes or shared lane markings as Ramblewood Road is reconstructed or improved.**	Bike Lanes/ Shared Lane Markings	1.20	$524,545	Low
• **Greendale Road extended and Greendale Road between Early Road and east city limits – construct bicycle lanes as Greendale Road is constructed/ reconstructed.**	Bike Lanes	0.65	$284,130	Low
• **Pleasant Valley Road from South Main Street to south city limits – construct bicycle lanes with improvements made to Pleasant Valley Road. Would require widening of bridge over Interstate 81.**	Bike Lanes	1.40	$611,970	Low

Citywide drainage grates that have been identified for replacement with regular maintenance activities:

- South Main Street in front of 34 South Main Street
- Mason Street adjacent to 1905 East Market Street property
- Mason Street and East Market Street (NE corner)
- Water Street and South Main Street (NE corner)
- South Mason Street and Ashtree Lane (SW and NW corners)
- East Elizabeth Street and Broad Street (SE and NE corners).

D. Pedestrian Priorities List

The following are pedestrian facilities, which are not listed as a 2 or 5 year goal, but rather should be considered during any street improvement project, or if significant development or redevelopment occurs. Some of these projects are also included on the Street Improvement Plan of the Master Transportation Plan.

Citizens would prefer that sidewalks are made available on both sides of the street, which is now required for all new street construction. However, for sidewalk retrofits along existing streets, the priority is to construct new sidewalks on at least one side of all streets, unless otherwise indicated below.

Northwest	Facility Type	Approximate distance (miles)	Estimate Cost	Priority
• **Chicago Avenue from Rockingham Drive Trail to Mt. Clinton Pike – this project must be coordinated with roadway improvement plans to Chicago Avenue.**	Sidewalk	0.50	$211,200	High
• **Chicago Avenue, Park Road, and Mount Clinton Pike Intersection**	Intersection Improvement	NA	Unknown	High
• **Waterman Drive & Chicago Avenue Intersection**	Intersection Improvement	NA	Unknown	High
• **North Main Street from Holly Hill Drive to north city limits – include Public Transit stop in front of Community Services Board at 1241 North Main Street**	Sidewalk	0.35	$147,840	Medium
• **North Willow Street from 2nd Street to West Gay Street**	Sidewalk	0.15	$63,360	Low
• **West Gay Street from North Dogwood Drive to North Willow Street**	Sidewalk	0.25	$105,600	Low

Northeast	Facility Type	Approximate distance (miles)	Estimate Cost	Priority
• **Sterling Street from East Market Street to Effinger Street**	Sidewalk	0.30	$126,720	High
• **East Gay Street from Myrtle Street to Summit Street – construct sidewalks on both sides**	Sidewalk	0.60	$253,440	High
• **Country Club Road from Spotswood Trailer Park to Linda Lane**	Sidewalk	0.20	$84,480	High

• **Country Club Road from Country Club Court to Linda Lane**	Sidewalk	0.60	$253,440	High
• **Myrtle Street from East Washington Street to Kelly Street**	Sidewalk	0.20	$84,480	Medium
• **Vine Street from East Market Street to Old Furnace Road**	Sidewalk	0.75	$316,800	Medium
• **Kelly Street from Simms Avenue to Hill Street**	Sidewalk	0.20	$84,480	Low
• **Ott Street from East Market Street to Franklin Street**	Sidewalk	0.60	$253,440	Low
• **Blue Ridge Drive from Country Club Road to Old Furnace Road**	Sidewalk	0.75	$316,800	Low

Southwest	Facility Type	Approximate distance (miles)	Estimate Cost	Priority
• **Erickson Avenue from Stone Spring Road from west city limits to South Main Street. Project began June 2010.**	Sidewalks	1.70	$718,080	High
• **Port Republic Road & South Main Street Intersection – construct slip lane at northeast corner to improve pedestrian safety.**	Intersection Improvement	NA	Unknown	High
• **South Main Street just south of Mosby Road to south city limits – construct sidewalks on both sides of South Main Street**	Sidewalk	3.90	$1,647,360	High
• **Pear Street from new sidewalk construction to north end of Pear Street. Would provide sidewalks to transit bus stops for visitors of the Summit House.**	Sidewalk	0.20	$84,480	Medium
• **Central Avenue from Pleasant Hill Road to Southampton Avenue**	Sidewalk	0.60	$253,440	Medium
• **Pleasant Hill Road from South Main Street to Pear Street**	Sidewalk	0.75	$316,800	Medium
• **Peach Grove Avenue from Stone Spring Elementary to Stone Spring Road**	Sidewalk	0.40	$168,960	Low
• **South Dogwood Drive from Hidden Creek Lane to West Market Street**	Sidewalk	1.75	$739,200	Low
• **Maryland Avenue from Chestnut Drive to South Dogwood Drive**	Sidewalk	0.10	$42,240	Low

Southeast	Facility Type	Approximate distance (miles)	Estimate Cost	Priority
• **Erickson Avenue from Stone Spring Road from west city limits to South Main Street.**	Sidewalks	1.50	$633,600	High
• **Reservoir Street from Neff Avenue to east city limits. Project included**	Sidewalks	1.6 (includes	$675,840	High

	in new Reservoir Street corridor road improvement project.		both sides)		
•	**University Boulevard from Reservoir Street to East Market Street**	Sidewalks	0.70		High
•	**Reservoir Street & Neff Avenue Intersection**	Pedestrian Signal & Crosswalks	NA	$30,000	High
•	**Neff Avenue from Reservoir Street to Evelyn Byrd Avenue**	Sidewalk	0.50	$211,200	Medium
•	**Evelyn Byrd Avenue from University Boulevard to East Market Street**	Sidewalk	0.60	$253,440	Low
•	**East Market Street from Carlton Street to sidewalk to the north**	Sidewalk	0.25	$105,600	Low

Other	**Facility Type**	**Approximate distance (miles)**	**Estimate Cost**	**Priority**
• **Signalized Pedestrian Crosswalks – at 8 downtown intersections: South Main Street & Bruce Street, South Main Street & Water Street, South Main Street & South Court Square, North Main Street & Elizabeth Street, North Main Street & Wolfe Street, Liberty Street & West Market Street, Liberty Street & West Water Street, South Liberty Street & West Bruce Street**	Pedestrian Signals and Crosswalks	NA	$100,000	High

E. Shared Use Path Priorities List

	Approximate distance (miles)	Estimate Cost	Priority
• **Along Smithland Road from Linda Lane to Old Furnace Road – construct a shared use path along Smithland Road to provide a connection with Linda Lane shared use path, Smithland Elementary and Skyline Middle Schools and Smithland Road Park.**	0.55	$378,125	High
• **From South Dogwood Drive to southeast corner of Westover Park – provide shared use path connection to existing shared use path in Westover Park.**	0.10	$68,750	High
• **From proposed path between Wyndham Drive and West Market Street to upper parking lot at Thomas Harrison Middle School**	0.70	$481,250	High
• **From Hillandale Park to Garbers Church Road – to provide connection between neighborhood, park, and Harrisonburg High School.**	0.90	$618,750	High
• **From University Boulevard to JMU's Athletic Complex – this property is owned by JMU.**	0.50	$343,750	Medium
• **Bluestone Trail (Phase II) from Stone Spring Road to south (at or near Pleasant Valley Road)**	1.60	$1,100,00	Medium
• **From Bluestone Trail to South Main Street via Boxwood Court**	0.35	$240,625	Medium
• **From Bluestone Trail to west end of West Kaylor Park Drive**	0.05	$34,375	Medium
• **From Westmoreland Drive to A Dream Come True Playground**	0.20	$137,500	Low
• **Connections between neighborhoods on east side of Interstate 81, Linda Lane, and Keezletown Road – construct shared use path(s) to connect neighborhoods with Smithland Elementary and Skyline Middle Schools and Linda Lane shared use path. Concept includes a bicycle and pedestrian overpass over Interstate 81.**	1.85	$1,271,875	Low

VIII. Funding

In addition to Council appropriated funding to support bicycle and pedestrian capital improvement projects, funding sources can also come from City Council appropriation of funds towards a specific capital improvement project, and a variety of state, federal, and foundation grants. Citizens and community organizations are encouraged to partner with the City to apply for grants for new bicycle and pedestrian infrastructure.

One example of a successful partnership is the application for sidewalk and bicycle improvements around Keister and Waterman Elementary Schools through VDOT's Safe Routes to Schools program. School staff, parents, students, RMH Community Health, the Shenandoah Valley Bicycle Coalition and the City were the primary SRTS grant partners for both grant applications.

Implementation and construction of new bicycle and pedestrian facilities is both a public and private responsibility. In cases where insufficient right-of-way exists for sidewalk construction, the City's Subdivision Ordinance requires that the property owner dedicate the appropriate right-of-way for sidewalk construction and the City's DCSM requires sidewalks to be constructed on both sides of all new public streets, and for sidewalks to be constructed along the street frontage of all developing and redeveloping properties. Additionally, any property being developed, which fronts on a public street and abuts a designated bicycle route as designed by this Plan, is required to dedicate additional right-of-way to satisfy the appropriate width for bicycle lanes and the developer may be responsible for bicycle facility construction.

Public funding can also be better utilized for the actual construction of facilities if property owners along the frontage of a corridor with planned sidewalks, donate the right-of-way or temporary construction easements necessary to construct the sidewalks.

As new facilities are constructed and added to the City's transportation system, the need for repair and replacement of facilities, snow removal, litter pickup, vegetation maintenance, and additional maintenance activities are required. It is recognized that additional funding is needed for the long-term maintenance of bicycle and pedestrian facilities within the City.

IX. Education & Outreach

The Harrisonburg community has many organizations and programs who contribute and collaborate on education, advocacy and outreach for bicyclists and pedestrian needs. There are opportunities for citizens to become members and participate with each of these organizations. Below is a sampling of groups and organizations in our community:

Figure 12. City staff, citizens and local organizations collaborate to display "Walk Smart, Bike Smart" at the Harrisonburg International Festival, 2008.

- City Bicycle & Pedestrian Information, www.harrisonburgva.gov/bikeped
- City Transportation Safety & Advisory Commission, www.harrisonburgva.gov/tsc
- Harrisonburg Fire Department, www.harrisonburgva.gov/fire
- Harrisonburg Police Department, www.harrisonburgva.gov/police
- Harrisonburg Public Works Department, www.harrisonburgva.gov/publicworks
- Harrisonburg-Rockingham Metropolitan Planning Organization (HRMPO)'s Bicycle & Pedestrian Subcommittee, www.hrvampo.org
- Central Shenandoah Planning District Commission (CSPDC)'s Bicycle & Pedestrian Committee, www.cspdc.org, www.bikethevalley.org
- Safe Kids of the Central Shenandoah Valley, www.uwhr.org/safekids/index.html
- Shenandoah Valley Bicycle Coalition (SVBC), www.svbcoalition.org
- New Community Project, www.newcommunityproject.org

X. Goals, Objectives & Strategies

Goal 1. To develop and maintain "complete streets" which includes a safe and convenient pedestrian and bicycle network that operates safely within the overall transportation system.

Objective 1.1 Develop and improve the City's bicycle and pedestrian transportation system.

Strategy 1.1.1. Adopt, implement, and maintain the City's Bicycle & Pedestrian Plan for bicycle and pedestrian improvements.

Strategy 1.1.2. Complete the 2 and 5 year infrastructure project goals identified in the bicycle and pedestrian priorities list within the next 2 and 5 years, respectively.

Strategy 1.1.3. Coordinate bicycle and pedestrian facility improvements with the City's Comprehensive Plan, Master Transportation Plan, Design & Construction Standards Manual (DCSM), and other City planning and design guidelines.

Strategy 1.1.4. Secure sidewalk and shared use path improvements, easements, and on-site bicycle parking and storage consistent with the Bicycle and Pedestrian Plan through the development review process.

Strategy 1.1.5. Coordinate bicycle and pedestrian facility improvements with Rockingham County, the Virginia Department of Transportation (VDOT), the Harrisonburg-Rockingham Metropolitan Planning Organization (HRMPO), JMU, EMU, and others appropriate organizations.

Strategy 1.1.6. Collaborate with City departments, agencies, and citizen organizations to identify grant opportunities and submit applications to fund improvement projects.

Objective 1.2. Develop a bicycle and pedestrian network that is convenient and comfortable to encourage citizens to bike and walk more frequently.

Strategy 1.2.1. Develop bicycle and pedestrian linkages between neighborhoods, shopping centers, recreation facilities, and education centers.

Strategy 1.2.2. Appropriate public funding annually to support bicycle and pedestrian capital improvement projects and long-term maintenance activities.

Strategy 1.2.3. Install way-finding and route signs and provide maps and internet-based information to guide users through the City's pedestrian and bicycle systems.

Strategy 1.2.4. Provide sufficient arterial street right-of-way width to permit landscaping, and to accommodate pedestrian and bicycle facilities while considering neighborhood character and context.

Strategy 1.2.5. Ensure that sidewalks, walkways, and shared use paths are furnished, where needed and appropriate, with lighting, seating, landscaping, street trees, trash receptacles, bike racks, handicap access, etc.

Objective 1.3. Implement operational safety measures for all modes of travel.

Strategy 1.3.1 Minimize the number of driveways on arterial streets to reduce the potential for bicycle, pedestrian, and vehicle collisions.

Strategy 1.3.2. Promote the City's Neighborhood Traffic Calming Program and traffic calming measures to reduce speeds on City streets.

Strategy 1.3.3. Enforce traffic laws, for all modes of travel, such as speeding, failing to make a full stop at red lights and stop signs, failing to yield to pedestrians in crosswalks, failing to use bike lights at night, etc.

Goal 2. To provide education and encouragement to citizens to promote safe walking and bicycling as a regular or primary form of transportation.

Objective 2.1. Promote and encourage bicycling and walking as a healthy, safe and sustainable forms of transportation.

Strategy 2.1.2. Collaborate with local organizations and agencies to promote International Walk to School Week/Day, Cyclist & Pedestrian Awareness Week, and National Bike to Work Month/Week/Day.

Objective 2.2. Educate citizens on bicycle and pedestrian laws, etiquette, and safe practices.

Strategy 2.2.1. Continue promoting transportation safety campaigns created by federal, state, and/or local agencies.

Strategy 2.2.2. Provide literature and education to citizens about how to safely cross railroad tracks on a bicycle.

Strategy 2.2.3. Encourage bicyclists and pedestrians to follow safety guidelines as recommended by transportation and enforcement agencies, and biking and walking advocacy groups.

Objective 2.3. To recognize the efforts of the City, local businesses and local organizations for their efforts to promote bicycling and walking in the City.

Strategy 2.3.1. The City should apply for and receive at least a Bicycle Friendly Community Bronze designation from the League of American Bicyclists by 2012.

Strategy 2.3.2. Encourage local businesses and universities to also apply for a Bicycle Friendly Community award from the League of American Bicyclists.

XI. References

A. Design Guidelines

- City of Harrisonburg's "Design & Construction Standards Manual (DCSM)," http://www.harrisonburgva.gov/dcsm
- American Association of State Highways and Transportation Officials, "Guide for the Development of Bicycle Facilities", http://www.aashto.org
- US DOT Federal Highway Administration, "Manual on Uniform Traffic Control Devices (MUTCD) for Streets and Highways," most recent edition, http://mutcd.fhwa.dot.gov/.
- Association of Pedestrian and Bicycle Professionals, "Bicycle Parking Guidelines: A set of recommendations from the association of Pedestrian and Bicycle Professionals," http://www.bicyclinginfo.org/library/details.cfm?id=6

B. Recommended Facility & Design References

- Harrisonburg Bicycle & Pedestrian Facilities Resources (includes this Plan, maps, meeting minutes, etc), http://www.harrisonburgva.gov/bikeped
- VDOT's Policy for Integrating Bicycle & Pedestrian Accommodations, http://www.virginiadot.org/programs/resources/bike_ped_policy.pdf
- VDOT Bicycle Facility Design Guidelines from the VDOT Road Design Manual, http://www.extranet.vdot.state.va.us/locdes/Electronic%20Pubs/2005%20RDM/appenda.pdf (See Section A-5)
- FHWA Design Guidance, Accommodating Bicycle and Pedestrian Travel: A Recommended Approach. A US DOT Policy Statement Integrating Bicycling and Walking into Transportation Infrastructure, http://www.fhwa.dot.gov/environment/bikeped/design.htm
- VDOT – Bicycle & Walking in Virginia (webpage of resources) http://www.virginiadot.org/programs/bk-default.asp
- US DOT, Federal Highway Administration, Pedestrian & Bicycle Information Center, http://www.pedbikeinfo.org/, http://www.bicyclinginfo.org/, http://www.walkinginfo.org/
- US DOT, Federal Highway Administration, BIKESAFE: Bicycle Countermeasure Section System, http://www.bicyclinginfo.org/bikesafe/
- US DOT, Federal Highway Administration, PEDSAFE: Pedestrian Safety Guide and Countermeasure Selection System. http://www.walkinginfo.org/pedsafe/
- Pedestrian Facilities Guidebook: Incorporating Pedestrians into Washington's Transportation System", ftp://ftp.wsdot.wa.gov/dotshare/LocalPrograms/Walk/PedFacilityGB.pdf
- Pedestrian and Bicycle Information Center & City of Chicago, "Bike Lane Design Guide", http://www.cityofchicago.org/webportal/COCWebPortal/COC_EDITORIAL/bike_lane.pdf

C. Other References

- Harrisonburg City Code on Bicycles, (see City Code 13-2), http://www.municode.com/Resources/gateway.asp?pid=10893&sid=46

- Harrisonburg Neighborhood Traffic Calming Program, http://www.harrisonburgva.gov/trafficcalming
- VDOT Bicycle Laws & Safety Tips, http://www.vdot.virginia.gov/programs/bk-laws.asp (lists, pictures, and references to state code)
- Walk Bike Virginia, http://www.bikewalkvirginia.org/
- Sharing the Road in Virginia, http://www.sharingtheroadinvirginia.org/
- League of American Bicyclists' Resources, http://www.bikeleague.org/resources/index.php

XII. Appendices

A. Bicycle Plan Map

B. Pedestrian Plan Map