Harrisonburg

Bicycle & Pedestrian Plan | 2017

Department of Public Works
Department of Planning & Community Development

DRAFT | February 23, 2017

BIKE WALK HARRISONBURG

Acknowledgements

This Bicycle and Pedestrian Plan for the City of Harrisonburg has been prepared by staff of the Department of Public Works, staff of the Department of Planning and Community Development, and the Bicycle and Pedestrian Subcommittee. This plan would not have been possible without the dedicated efforts of these participants, as well as the many citizens and community advocates who participated in public workshops and offered their insight and opinions.

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I. Introduction

Purpose

As the City of Harrisonburg strives to be inclusive of all transportation modes, the purpose of this plan is to provide a vision and framework for developing an interconnected bicycle and pedestrian network throughout the community. This plan builds upon the work of the 2010 Bicycle and Pedestrian Plan and prior plans.

Background

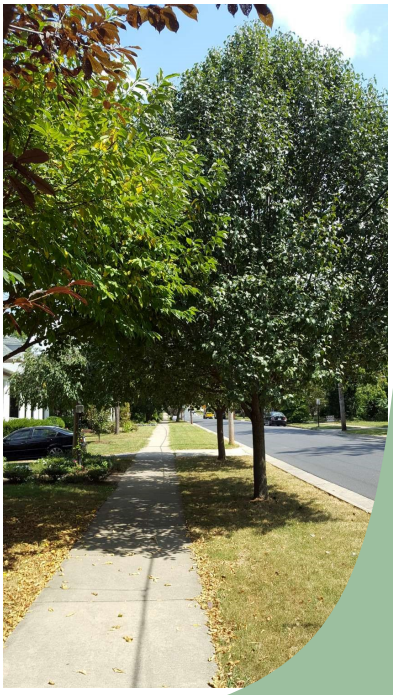
As a response to continued growth in Harrisonburg, the City's Bicycle and Pedestrian Plan is meant to encourage a balanced and interconnected transportation system for all modes. Do facilities have logical termini that are safe and accessible? Are we serving the greatest needs with the infrastructure choices we make? How do we phase projects over time and still ensure safety and community goals are met? Who should be investing in the transportation network – public agencies or private development? Whether new construction, retrofitting existing infrastructure, or maintenance, it is important to approach planning for these facilities in a wholistic manner; a concept sometimes referred to as "Complete Streets".

Complete Streets

Complete streets serve communities so that all residents regardless of age, race, culture, ability, and socioeconomic status have access to safe and pleasant means of transportation to residences, places of work, and places of leisure. Complete streets improve street design so that pedestrians, bicyclists, buses, automobiles, and other modes can be adequately accommodated. *(adapted from Smart Growth America)*

The guiding principles of Complete Streets are:

1. *Equitable Access*
2. *Economic Prosperity*
3. *Safety*
4. *Incorporating Best Practices*



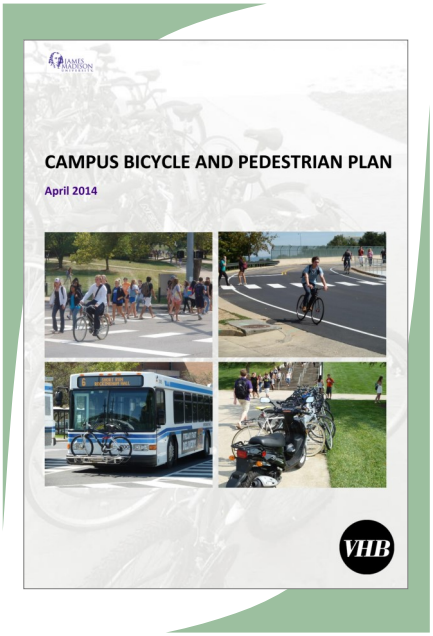
Bicycle and pedestrian facilities were overlooked, for a period of time, as an integral part of the overall transportation network. Many of the oldest neighborhoods in the City provide excellent examples of pedestrian oriented development, since walking was a common mode of transportation before car ownership became the norm. Around mid-century, the approach to neighborhood development shifted to accommodate the motor vehicle, and as a result, neighborhoods throughout the city have wide streets, many of which lack or have substandard sidewalks and minimal bicycle facilities. The rejuvenation of the preference to bike and walk for transportation purposes led the City to begin planning for the integration of bicycle and pedestrian facilities into the transportation network. Efforts began in the early-1990s to consider integration and planning for bicycle facilities. The City's first Bicycle Plan was adopted in 1994, with updates in 1999 and 2005. In the early 2000s, city staff recognized the need to plan for pedestrian facilities in a similar fashion, which led to the adoption of the first Pedestrian Plan in 2005. These planning documents were initially separate tools and focused not only on community need, but implementation. In Fiscal Year 2006, City Council made a commitment to begin translating the plans into reality by appropriating general fund dollars towards bicycle and pedestrian capital infrastructure improvements.

City Council was interested in understanding how the plan was being implemented and as such, Public Works staff began facilitating meetings starting in 2007 with stakeholders and citizens which became the Bicycle and Pedestrian Advisory Group. As the interest in maintaining a closer dialog between city staff, citizen groups, and City Council, the Transportation Safety Commission was charged with advising Council on bicycle and pedestrian matters. The Commission was renamed the Transportation Safety and Advisory Commission and a Bicycle and Pedestrian Subcommittee was formed and tasked with reviewing policies, projects, and recommendations from staff on implementing components of the 2010 Bicycle and Pedestrian Plan.

Relationship to Other Plans

The Bicycle and Pedestrian Plan is referenced as part of the City's Master Transportation Plan – itself a component of the Comprehensive Plan. Annually, the City develops a five-year Capital Improvement Program (CIP), which fiscally constrains the capital needs identified in planning documents. There are many other planning documents that overlap with this particular effort and this plan has attempted to integrate those as best as possible. These include:

- *Harrisonburg Downtown Streetscape Plan*: identifies how sidewalks and streets should be redeveloped in the downtown area to better serve the needs of all users as well as defining hardscape appearance for aesthetic continuity.



- *James Madison University Bicycle and Pedestrian Master Plan*: a campus-wide planning initiative was completed in 2014 to provide tactical planning and to develop a strategic blueprint for the development of an interconnected network on campus but also throughout the greater community.

- *Rockingham County and Harrisonburg-Rockingham Metropolitan Planning Organization (HRMPO) Bicycle Plans*: the City of Harrisonburg is surrounded by Rockingham County and is part of the HRMPO, covering a region including Harrisonburg, Rockingham County and the Towns of Bridgewater, Dayton, and Mount Crawford. The County has adopted a county-wide bicycle and pedestrian plan and the HRMPO is developing a bicycle and pedestrian plan within its urbanized area. Ensuring continuity in bicycle facilities across jurisdictional boundaries better serves the community at-large and provides alternative transportation options to the entire region.

As the community's needs continue to change and evolve, it is recommended that this Plan be reviewed every 5 years to ensure it is achieving the vision, and to make adjustments if necessary.

Accomplishments Since 2010

Since adoption of the 2010 Bicycle and Pedestrian Plan, 22 pedestrian projects, 17 bicycle projects, and 3 shared use path or trail projects have been completed. The City has leveraged $1.5 million dollars to receive over $14.5 million dollars in non-locality funding, which includes grants and private developer contributions. Many vital connections were incorporated with larger transportation projects, including the completion of Phase II and Phase III of Erickson Avenue-Stone Spring Road – the City's major east to west connector bypassing the urban core of the city – and the reconstruction of Port Republic Road Phase III, which includes a multiuse path on one side from Peach Grove Avenue eastward into Rockingham County. Safe Routes to Schools grants have been utilized to provide greater connectivity at two elementary schools – Waterman Elementary and Stone Spring Elementary. During this time period, Phase I-A and I-B of the Bluestone Trail were completed, which is the first off-road multi-use path in the city that is intended for both transportation and recreation, serving not only recreational users at Purcell Park, which it passes through, but also providing an alternative to vehicular traffic connecting Stone Spring Road with the James Madison University campus. Additional bicycle and pedestrian projects are included in the City's Capital Improvement Program or other planning documents for future construction. A complete list of accomplishments since 2010 can be found in the Appendix.

II: Vision, Goals, & Objectives

The City of Harrisonburg has made great strides to become a renowned bicycle and pedestrian community thanks to the efforts of City government, advocacy organizations, individual citizens, and others. These efforts to expand transportation choice in the city come with a variety of benefits:

- Bicycle tourism is an economic generator responsible for $13.6 million dollars in annual revenue and 184 jobs within the Central Shenandoah Valley. *(Central Shenandoah PDC, 2015)*
- Greater mobility can enhance workforce development by allowing low income and other households without cars access to employment, and can contribute to the City's competitiveness in attracting a younger workforce that increasingly seeks alternative modes of transportation.
- Bicycling and walking can give greater independence to children, teenagers, older adults, and people with disabilities who cannot drive, helping them get to school and other activities without help from a parent or caregiver.
- Walking and bicycling are active methods of transportation that can have a variety of health benefits.
- When used for transportation, bicycling and walking can remove some automobile trips from City streets, resulting in reduced traffic congestion.

To support being a more bicycling and pedestrian friendly community, the City, working together with citizens and the Bicycle and Pedestrian Subcommittee, proposes the following vision, goals, and objectives to guide future decision making. While many of the following goals and objectives apply to various city departments, these goals are shared by a host of city citizens and groups, who can also work to advance the cause of pedestrian and bicycle safety and convenience in Harrisonburg.

Vision Statement:

The City of Harrisonburg will be a place where pedestrians and cyclists can access a connected network of bicycle and pedestrian infrastructure to safely and conveniently reach all areas of the city for school, work, play, and other daily needs.

Goal 1 **To develop and maintain a network of streets and paths that are designed and operated to enable safe access for all users, including pedestrians, bicyclists, motorists, and transit riders of all ages and abilities.**

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

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

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

Goal 2 **To use education and encouragement to promote safe walking and bicycling as a form of transportation and recreation.**

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

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

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

Objective 2.4. Continually evaluate the state of the city's bicycle and pedestrian infrastructure and programs, and plan for ongoing improvement.

III: Plan Process

Existing Facilities

The City of Harrisonburg's existing bicycle and pedestrian networks are shown on the following maps. The bicycle network consists of on-road bicycle lanes, shared use paths, streets marked with sharrows, and neighborhood streets with low vehicle speeds and volumes. The pedestrian network consists of sidewalks and shared use paths, enhanced with crosswalks and pedestrian signals in many cases.

Existing System Observations:

- Recent road projects near the fringe of the City have incorporated bicycle and pedestrian improvements, while some segments are still missing from the traditional urban core where it is more difficult to integrate and develop dedicated bicycle and pedestrian infrastructure.
- Interstate 81 presents a barrier running through the middle of the city, with minimal opportunities to cross.
- At-grade rail crossings can pose a challenge for bicyclists, particularly those who are less experienced.
- Some neighborhoods lack sidewalks on one or both sides of the street.
- Wider streets/highways that have greater distances between traffic signals pose challenges for pedestrians that may desire to cross.

Existing Pedestrian Facilities

Facility Type

- Sidewalk
- Shared Use Path
- Traffic Signal with Crosswalk Signal
- Traffic Signal without Crosswalk Signal
- School
- Transit Bus Stop

N

0 0.25 0.5 Miles

1 in = 1 miles

CITY OF HARRISONBURG VIRGINIA

BIKE WALK HARRISONBURG

Existing Bicycle Facilities

Facility Type

- Bicycle Lanes
- Shared Lane Markings
- Shared Use Path
- Transit Bus Stop

N

Miles

0 0.25 0.5

1 in = 1 miles

BIKE WALK HARRISONBURG

Public Involvement

The process of updating Harrisonburg's Bicycle and Pedestrian Plan has relied on a host of participants whose opinions and expertise inform this plan to continue to promote and plan for walking and bicycling in the city. While the primary responsibility for creating and updating the Bicycle and Pedestrian Plan resides with the City's Department of Public Works, the development of this update has been steered by an appointed group of citizens, the Bicycle and Pedestrian Subcommittee, to represent the needs, desires, and opinions of Harrisonburg residents. The Subcommittee acts as an advisory panel to the Transportation Safety and Advisory Commission, which is a City Council appointed body.

While the input of citizens is reflected in the goals and projects found in this plan, the public can also play a role in bringing the plan to reality by working individually, or with community groups, to implement the plan's goals, strategies, and programs.

Stakeholders

The Harrisonburg community has been wonderfully active in its advocacy and outreach for cyclists and pedestrians. City agencies, along with community organizations and citizens, collaborate on bicycle and pedestrian education, promotion, and planning efforts. A sample of the many departments and organizations who participated in the forums and focus groups leading up to this plan are listed below. Many of these groups offer ways for citizens to become more involved in bicycle and pedestrian issues and advocacy in the city.

Participating Agencies and Organizations:

Central Shenandoah Planning District Commission
Church World Service Harrisonburg
Eastern Mennonite University
Funkhouser Realty
Harrisonburg City Public Schools
Harrisonburg Department of Economic Development
Harrisonburg Department of Public Transportation
Harrisonburg Fire Department
Harrisonburg Parks & Recreation Department
Harrisonburg Planning & Community Development Department
Harrisonburg Police Department
Harrisonburg Public Works Department
Harrisonburg-Rockingham Community Services Board
Harrisonburg-Rockingham Chamber of Commerce
The Hills of Harrisonburg Management
James Madison University
Matchbox Realty
Pheasant Run Townhomes Management
Sentara RMH Community Health
Shenandoah Bicycle Company
Shenandoah Valley Partnership
Valley Associates for Independent Living
Valley Mall Management
Virginia Mennonite Retirement Community
Valley Program for Aging Services

Public Input

The City of Harrisonburg has made great strides to become a top bicycle and pedestrian community thanks to the efforts of City government, advocacy organizations, students, citizens, and others. For this reason, the city has incorporated steps to be sure that a variety of voices had the opportunity to shape this plan.

- **2013:** The Harrisonburg Rockingham Metropolitan Planning Organization conducted an online mapping exercise (Wikimap), allowing residents to pinpoint areas of opportunity and concern for pedestrians and cyclists. This mapping exercise received 361 unique entries for Harrisonburg and Rockingham County.
- **December 2014 – April 2015:** James Madison University students conducted a series of 10 forums with community organizations, gathering community input on walking and bicycling routes, safety issues, and desirable walking and bicycling destinations.
- **May 19th, 2015:** The Department of Public Works hosted a bicycle and pedestrian forum at Thomas Harrison Middle School. The forum was attended by community members, city staff, and members of the Bicycle and Pedestrian Subcommittee, and focused on participants' vision for biking and walking in general, and for specific areas of the city.
- **Fall 2015:** The Department of Public Works held a series of focus group work sessions, organized around individual topics and sets of knowledgeable citizens, to discuss the future of Harrisonburg's bicycle and pedestrian network in greater detail. Focus groups included:
  - ◊ Safe Routes to School, Youth and Families
  - ◊ Transportation Disadvantaged and Traditionally Underrepresented
  - ◊ Institutions: Higher Education and Retirement Communities
  - ◊ Business and Economic Vitality
  - ◊ Housing Providers: Real Estate Development and Property Management

Crosswalk and Pedestrian Signal.

Workshop Notes and Ideas.

- A Pedestrian Checklist survey was circulated to allow pedestrians to rate individual walking trips, as well as to offer feedback on safety, crossings, facilities, and connections to transit. This feedback was delivered directly to the Department of Public Works.
- Other public comments were received throughout the input period, and were cataloged for inclusion in this plan and other city efforts.


Pedestrian Checklist

How accessible is your community for walking/ rolling/ strolling?

Take a stroll with your family and friends, and decide for yourselves.

Everyone benefits from taking a stroll outside. These benefits include: improved fitness, cleaner air, reduced risks of certain health problems, and a greater sense of community. But walking and rolling needs to be safe and easy. Take a walk/roll/stroll and use this checklist to decide if your neighborhood is a friendly place to walk.

Getting started:

First, you'll need to pick place to walk/ roll/ stroll, like the route to school, to work, to a bus stop, a friend's house or just somewhere fun to go.

The second step involves the checklist. Read over the checklist before you go, and as you travel, note the locations of things you would like to change.

When you are done:

At the end of your trip, **return the check list to the person you received it from** or send to City of Harrisonburg, c/o Thanh Dang, 320 East Mosby Road, Harrisonburg, VA 22801 or Thanh.Dang@harrisonburgva.gov.

Thank You!

Many public comments touched on similar themes, including the need for connectivity throughout the entire City, the importance of safety in encouraging walking or bicycling, the need to provide accessibility for all users, and the special importance of serving children and schools. (More information about public events and focus groups can be found in the Appendix of this plan.)

The Process of Creating This Plan

The process of creating the Bicycle and Pedestrian Plan involves a series of inputs, drafts, reviews, and approvals by City staff, citizens, and elected leaders. This process was designed to ensure that the plan faithfully represents the vision of the community, and has the full support of City leadership. The plan process has included:

- A public input to establish a vision and to propose infrastructure projects.
- Analysis and prioritization of proposed projects using the ActiveTrans Priority Tool.
- An initial draft of the 2017 Bicycle and Pedestrian Plan.
- A review and update of the draft plan by City staff and the Bicycle and Pedestrian Subcommittee.
- An open house and public comments on the draft plan.
- A staff update of the plan to incorporate public comments.
- A consideration of the plan by the Planning Commission and Transportation Safety Advisory Commission.
- An adoption of the 2017 Bicycle and Pedestrian Plan by City Council.

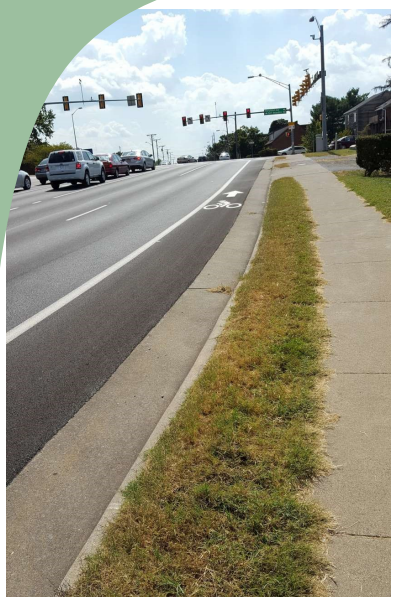
IV. Types of Facilities

A variety of physical improvements could be built to help enable movement by bicycling or walking. As the city continues to provide new and updated transportation infrastructure, it should, where practical, provide facilities that serve a variety of transportation network users, including bicyclists and pedestrians in addition to motorists. This section outlines the specific types of facilities and infrastructure, from very simple to more complex, which can continue being built in Harrisonburg to achieve our bicycle and pedestrian goals.

Bicycle Segments

Bicycle Lanes

A bicycle lane marks out an on-street travel lane for the exclusive use of bicyclists, with pavement striping and signage. Striped bicycle lanes should be a minimum of four feet wide (excluding the gutter) on streets with a curb and gutter, or five feet wide on streets without a curb and gutter. A designated buffer space may also be striped on the pavement to further separate the bike lane from adjacent traffic, if space allows. Bicycle lanes should be designed to avoid obstructions such as storm drains, and should function with the acknowledgement that bicyclists may leave the bicycle lane to make left turns, pass other cyclists, or avoid obstacles or debris in the lane.



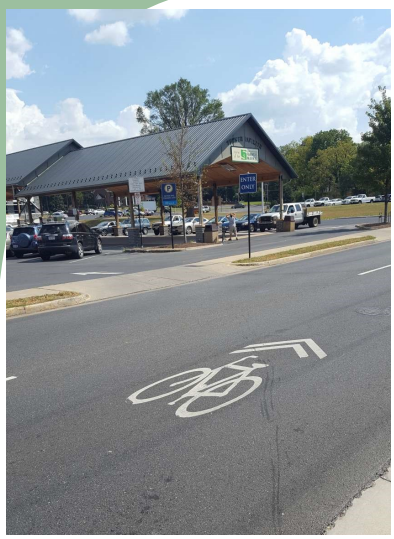
Bicycle Lane.

Generally, bicycle lanes carry bicyclists in the same direction as adjacent vehicle traffic along both sides of the street, although contra-flow lanes are sometimes used, allowing two-way bicycle traffic on streets that are one-way for automobile traffic. Bicycle lanes are typically necessary on streets with a posted speed limit over 25 miles per hour, or with Average Daily Traffic (ADT) greater than 3,000 vehicles per day. On quieter streets, bicycle lanes may not be necessary at all.

Shared Lane Markings

While marked bicycle lanes are best, in some locations there is simply no room. In these places, shared lane markings, known as "sharrows," may be used to notify drivers that a high volume of bicyclists in the roadway should be anticipated. Sharrows are typically appropriate for streets with speed limits of 35 mph or less.

Buffered bicycle lane.



Sharrow.

Sidewalk.

Continental style crosswalk.

While routes where bicyclists share space with automobiles may not be comfortable for some novice bicyclists, such routes can serve more advanced bicyclists and can make important connections within the overall bicycle network.

Climbing Lanes

For roads with a steep hill and only enough width for a bicycle lane on one side of the street, a climbing lane may be appropriate. Climbing lanes are bicycle lanes for the uphill direction only, with a shared lane marking for the downhill direction. This treatment allows vehicles to pass safely in the travel lane while allowing bicyclists safe clearance as their speeds slow going up the hill.

Other Bicycle Treatments

Additional treatments can be found in the National Association of City Transportation Officials' (NACTO) Urban Bikeway Design Guide, and may be considered, when and where they are warranted.

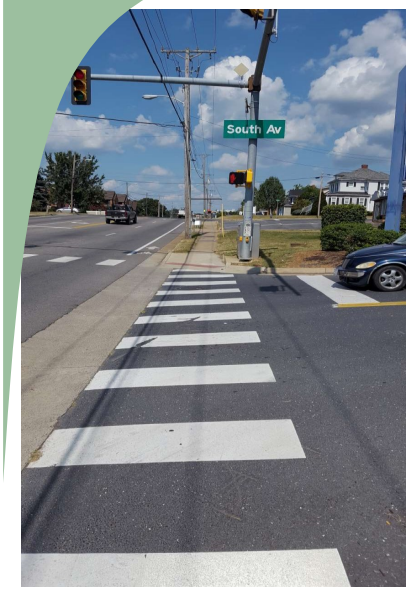
Pedestrian Segments

Sidewalks

Sidewalks are the City's main form of pedestrian access, and exist along many city streets. Harrisonburg maintains approximately 84 miles of sidewalks. Since 2009, the City's Design and Construction Standards Manual (DCSM) requires that sidewalks be built on both sides of all new public streets and along the street frontage of all developing properties. New sidewalks should have a minimum width of five feet to allow two people to walk side by side and convenient access for all users, including those using wheelchairs or other mobility aids. The City's standard sidewalk design calls for a landscaped buffer strip of two to five feet between the street and sidewalk. These buffers provide additional safety and comfort for pedestrians, and where a buffer of four feet or more is available, can allow for tree planting. Approval for sidewalks without a buffer strip is available in certain conditions. Sidewalks should be constructed according to the guidance of this Plan, the City's DCSM, AASHTO guides, and ADA standards. These guidelines and standards should also be followed when constructing all sidewalk elements, including curb ramps and street crossings.

Pedestrian Intersections

Intersections are the greatest safety risk within the transportation network. In order to protect pedestrians, as well as motorists and bicyclists, intersection facilities should be designed for safety, visibility, and efficiency for users of all abilities. At every intersection in the city, pedestrians have a legal right to cross, whether or not crosswalks or signals are present, unless specifically signed otherwise.



Continental style crosswalk with Pedestrian Signal.

Crosswalks

Crosswalk markings are added to intersections to clearly identify to pedestrians where they should cross, and identify to motorists where pedestrians will cross. Increased visibility and awareness provide greater pedestrian safety. Crossings in the City are to be marked with "continental-style" crosswalks featuring a series of large, bold stripes perpendicular to the path of crossing pedestrians. Crosswalks placed mid-block rather than at street intersections are not the norm, but may be used in special conditions, and with adequate study.

Pedestrian Signals

Electronic signals can be installed at signalized intersections to organize safe crossing for pedestrians. All existing Harrisonburg pedestrian signals are actuated signals, where pedestrians must press a button to activate a pedestrian signal sequence. Pedestrian signals in the City are typically concurrent, meaning motorists may turn across pedestrians' paths after yielding to pedestrians. In this scenario, pedestrians usually have more crossing opportunities and less time to wait for a signal.

Curb Extension (photo rendering).

Curb Extensions

Curb extensions are physical extensions of a sidewalk that increase the visibility of pedestrians for motorists and shorten the pedestrian crossing distance. Curb extensions also serve to slow vehicle speeds, further improving pedestrian safety. Curb extensions are appropriate at crossing locations along areas with on-street parking. They can also include landscaping such as grass, trees, or small plants.

Pedestrian Refuge Island.

Pedestrian Refuge Islands

Refuge islands are raised islands 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 one direction of traffic at a time. They also enable pedestrians to stop halfway across the street to wait for a gap in traffic before crossing the second half of the street.

Right-Turn Slip-Lanes

At many arterial street intersections, pedestrians have difficulty crossing due to right-turn vehicular movements and long 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 pedestrians and other vehicles. The triangular 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.

Shared Use Paths

Shared use paths are wide, paved routes for the exclusive use of bicyclists and pedestrians, and are completely separate from regular city streets and automobile routes, though they may run parallel to streets. These paths can provide recreational opportunities as well as serve as important connections and commuting routes. Shared use paths are sometimes located along utility easements or former railroad rights-of-way, and offer a measure of quiet and safety that is often very popular, especially with novice users and children who may be uncomfortable sharing space with vehicle traffic. Shared use paths should be between 10 and 12 feet in width, should be paved, and should be separated by at least five feet when parallel to any roadway. Where space and right-of-way are available, shared use paths have the greatest potential to increase the number of pedestrian and bicycle trips in the city. The safety benefits of shared use paths go far beyond those offered by any other potential improvement type and should be seen as a major focus of the bicycle and pedestrian system.

The Bluestone Trail is a successful 1-mile shared-use path connecting JMU, Port Republic Road, Purcell Park, and Stone Spring Road.

HDPT transit bus.

Bus stop shelter.

HDPT bus with bicycle rack.

Other Facilities

Public Transit

Although not specifically bicycle or pedestrian facilities, public transit routes and facilities must be considered when planning the bicycle and pedestrian network. The Harrisonburg Department of Public Transportation (HDPT) operates a system of transit buses, school buses, and paratransit operations for persons with disabilities. The system also serves the transit needs of James Madison University.

All HDPT transit buses are equipped with bicycle racks, and HDPT and the Department of Public Works continue to coordinate the installation of bus shelters, benches and other amenities with new road and sidewalk projects. HDPT has also been working to identify suitable locations in or around downtown on which to construct a dedicated transit transfer location. This transfer location could contain bicycle and pedestrian accommodations, a taxi stand, and a location for the launching of intercity bus operations that may serve Harrisonburg at a future date. In effect, it could serve as a hub for a wide variety of transportation operations.

Bicycle Parking

Bicyclists will need safe and secure places to leave their bikes when they reach their destination. This will usually mean securely mounted bicycle racks to which riders can lock or chain their bikes. Where possible, bicycle parking should also be covered to protect bicycles and riders from the elements.

Currently, the City's Design and Construction Standards Manual (DCSM) requires 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 four bicycle spaces. The City itself can present a positive example for the provision of bicycle parking by providing ample bicycle parking at its many buildings, parks, schools, and other public facilities.

Covered bicycle parking.

Bike Boxes

Bike boxes are designated areas at the front of a traffic lane at a signalized intersection that provide bicyclists with a way to get ahead of queuing traffic during the red signal phase. The area is painted on the pavement, and works as an extension of the bicycle lane to enhance bicyclist visibility and safety at the intersection, where vehicles making left turns present a major safety hazard to cyclists.

Bike box.

Bicycle Repair Stations

Bicycle repair stations include air pumps and common bicycle repair tools included in a compact pylon to be mounted in public places. They may be installed in public parks, along shared use paths, or in coordination with bicycle parking to allow bicyclists a convenient way to make repairs or adjustments during their journey.

Bicycle repair station.

Wayfinding

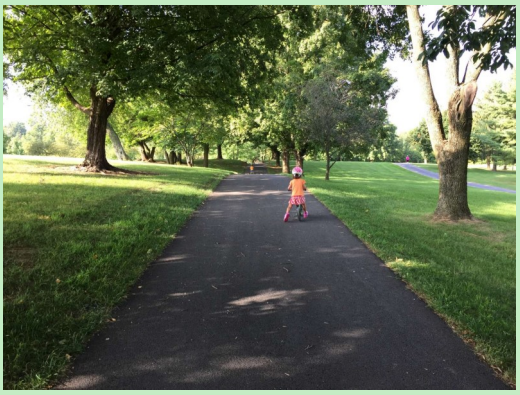
Wayfinding refers to signs, maps, pavement markings, and other methods that help users of the transportation system find their way. Signs are a key component of the bicycle and pedestrian system. Bicycle route signs point bicyclists to major regional or cross-city routes, which may or may not always include bicycle lanes. Directional signage helps point bicyclists or pedestrians to important destinations such as the downtown. The City's previous bicycle plans have committed to following the guidance of AASHTO's Bicycle Guide for route signage, which encourages the use of directional signage with a description of frequented destinations.

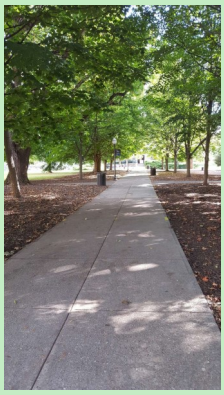
Directional signs point out important destinations.

Bike lane signs complement pavement markings.

The Importance of Shade

Sidewalks, shared use paths, and bicycle lanes that are shaded by trees can provide much more comfortable and attractive conditions for users. Trees provide beauty as well as relief from sun and hot Virginia summers. As the City considers future projects of all types, efforts should be made to incorporate trees that can provide a shade canopy, among other benefits.





V. Network and Facility Recommendations

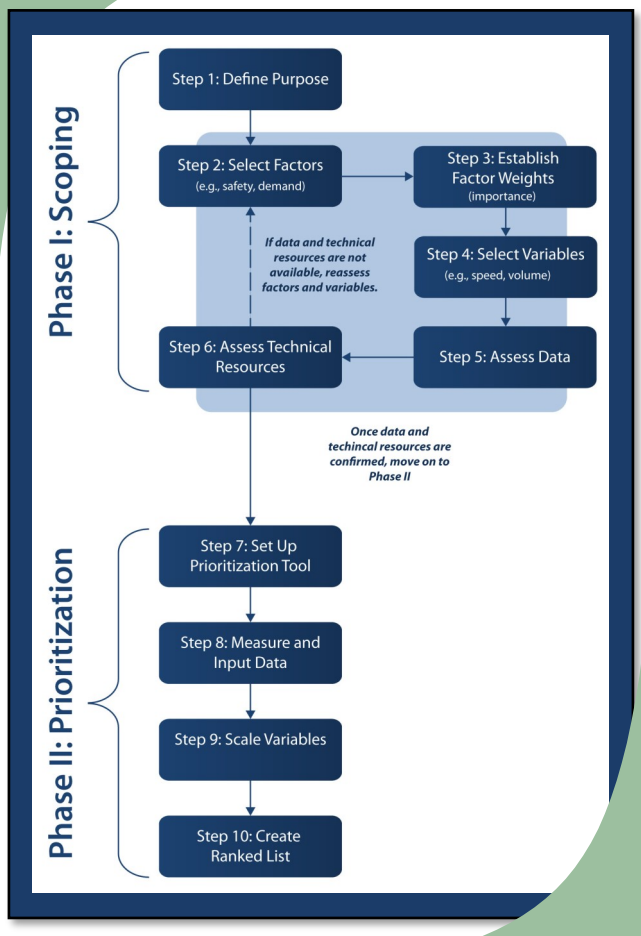
The ActiveTrans Priority Tool

The ActiveTrans Priority Tool was used to prioritize the individual bicycle and pedestrian projects contained in the 2017 Bicycle and Pedestrian Plan. With many needs and limited resources, this method provided an impartial and data-driven way to rank potential projects, raising low-impact projects, urgent safety priorities, and proposals of greatest community need to the top of the list (for more information about the ActiveTrans Priority Tool, see www.pedbikeinfo.org/planning/tools_apt.cfm).

The ActiveTrans model has been used successfully in a number of communities, and is customizable to fit the unique characteristics of a community and the priorities of its residents and leaders. The model was calibrated for use in Harrisonburg based on input from the Bicycle and Pedestrian Subcommittee and city staff. More detail about the methodology used in the ActiveTrans analysis can be found in the Appendix.

The model considered four types of proposed projects:

- **Pedestrian Segments**
  These are sidewalks.
- **Pedestrian Intersections**
  Where new or existing segments cross streets with vehicular traffic.
- **Bicycle Segments**
  These are on-road bicycle facilities like bike lanes.
- **Shared Use Paths**
  Off-street paths and trails for both pedestrians and bicyclists.



ActiveTrans Priority Tool: Major Factors

The variables included in the ActiveTrans analysis were divided into five main factors containing variables from public desires to physical measurements and assessments of safety. Because these variables can be so different, each category was weighted differently. Each category started with a weight from 1 to 10 to determine how much impact on the final results each group of variables had.

- **Stakeholder Input**

  Ideas for new potential bicycle or pedestrian infrastructure projects based on public input about needs, desires, and existing problem areas, as well as projects already proposed in the 2010 Bicycle and Pedestrian Plan, the 2011 Comprehensive Plan, or the City's Capital Improvements Program.

  Category Weight: 3

- **Constraints**

  Physical and other issues that will determine how complex or expensive a proposed project would be to build, including the need to move utilities or purchase land, and whether a project could be divided into several phases to help ease constraints.

  Category Weight: 10

- **Existing Conditions**

  Conditions on the ground at the location of potential projects that can help determine both the complexity of projects and how vital the need for them is. Variables include speed, road width, traffic volumes, and intersection features.

  Category Weight: 10

- **Connectivity**

  With the goal of building up a city-wide network of bicycle and pedestrian facilities that make it possible to travel anywhere in the City without the need for a car, assessing projects based on the importance of their place within the overall network.

  Category Weight: 6

- **Equity**

  Assessing areas of highest activity and highest needs to promote improvements where they will be useful to the greatest number of City residents, especially for underserved population segments for whom driving may not be an option.

  Category Weight: 6

Network and Facility Recommendations

Using the broad range of projects and improvements suggested by staff, citizens, and groups during the public input process, the ActiveTrans Priority Tool was used to prioritize these projects based on the factors discussed in this document. The results of this ActiveTrans analysis in each of the four infrastructure categories - Pedestrian Segments, Pedestrian Intersections, Bicycle Segments, and Shared Use Paths – are included in the following charts. More detail on ActiveTrans methodology can be found in the Appendix.

Projects in each infrastructure category will be evaluated at the time of implementation to determine the exact scope and details of the project, but typical improvements for each category are as follows:

- **Pedestrian Segments -** the addition of sidewalks
- **Pedestrian Intersections -** adding crosswalks, pedestrian signals, or curb ramps
- **Bicycle Segments -** the addition of on-street bicycle lanes
- **Shared Use Paths -** adding new off-street paths for both pedestrian and bicycle use

In reviewing these charts, it is important to note that the ActiveTrans analysis is only one factor in determining what projects the City should undertake, and when. The Implementation Strategies section describes the various ways that the bicycle and pedestrian network evolves, and how this plan is used.

PEDESTRIAN SEGMENTS - *ActiveTrans Priority Rank*

Map ID	Project Name / Location	Score
PS-1	Virginia Ave-Mt Clinton Pk-North City Limits	242.2
PS-2	Erickson Ave-Garbers Church Rd-Erickson Ave Phase I Terminus	238.1
PS-3	E Market St-MLK Jr Way-Linda Ln	227.8
PS-4	S Main St-Mosby Rd-South City Limits	220.1
PS-5	Peach Gove Ave-King Edwards Way-Stone Spring Rd	216.5
PS-6	N Main St- Charles St-North City Limits	208.1
PS-7	Reservoir St-MLK Jr Way-Evelyn Byrd Ave	195.4
PS-8	Port Republic rd-Forest Hill Rd-Bluestone Dr	192.8
PS-9	Port Republic Rd-S Main st-Bluestone Dr	183.4
PS-10	Country Club Rd-Vine St-E Market St	179.1
PS-11	S High St-Maryland Ave-Erickson Ave	167.2
PS-12	Garbers Church Rd-Heritage Center Way-Park Lawn	164.8
PS-13	Reservoir St- Holly Ct-S Carlton St	163.3
PS-14	Portland Dr-Port Republic-End	162.2
PS-15	Chicago Ave-Mt. clinton Pike-Rockingham Dr	158.8
PS-16	University Blvd-Reservoir St-E Market St	157.7
PS-17	W Rock St-N High St-Green Street	155.3
PS-18	Ramblewood Rd-East of Mineral Springs Rd to South of Stone Spring Road	153.7
PS-19	Mt. Clinton Pike-CollegeAve-Virginia Ave	150.8
PS-20	Reservoir St-Myers Ave-S Carlton St	141.3
PS-21	E Gay St-Myrtle St-Summit St	137.7
PS-22	W Gay St-Rockingham Dr-Chicago Ave	137.6
PS-23	Sterling St-E Elizabeth St-Effinger St	136.4
PS-24	Maryland Ave-S High St-Central Ave	135.2
PS-25	Lee Ave-W Gay St-7th St	134.4
PS-26	Reservoir St-Neff Ave-South City Limits	132.2
PS-27	Evelyn Byrd Ave-University Blvd-E Market St	131.0
PS-28	Vine St-N main St-E Market St	130.7
PS-29	MLK Jr Way-Mountain View Dr-Ott St	130.4
PS-30	S High St-Rockingham Square Shopping Center-Erickson Ave	128.2
PS-31	Central Ave-Pleasant Hill Rd- South Ave	127.7
PS-32	Rockingham Dr-Chicago Ave-Taliaferro Dr	127.2
PS-34	Pleasant Valley road-S Main St-South City Limits	126.0
PS-35	Norwood St-Reservoir St-Hawkins-St	124.4
PS-36	Hillside Ave-Greystone St-End	124.4
PS-37	Maryland Ave-Chesnut Dr-S Dogwood Dr	120.0
PS-38	Neff Ave-Reservoir St-Valley Mall	115.4
PS-39	Blue Ridge Dr-Old Furnace Rd-Country Club Rd	114.3

PEDESTRIAN SEGMENTS (*continued*) - *ActiveTrans Priority Rank*

Map ID	Project Name / Location	Score
PS-40	E Bruce St-S Mason St-Federal St	113.9
PS-41	N Main St-N Mason St-Charles St	113.5
PS-42	Pleasant Hill Rd (entire length)	108.1
PS-43	W Rock St-N High St-N Liberty St	107.8
PS-44	W Mosby Rd-S Main St-Millwood Loop	105.2
PS-45	S Dogwood Dr-W Market St-Hidden Creek Ln	104.6
PS-46	E Wolfe St-Sterling St-Vine St	104.3
PS-47	Ott St-Franklin St-E Water St	104.1
PS-48	South Ave-RR Tracks Closest to S High St	100.8
PS-49	Park Rd-Mt Clinton Pk-Harmony Dr	98.9
PS-50	Waterman Dr-W Market St-Chicago Ave	97.1
PS-51	Mountain View dr-S Carlton St-Myers Ave	96.5
PS-52	Myers Ave-Paul St-Mountain View Dr	94.9
PS-53	Harkins St-Reservoir St-E Market St	94.4
PS-54	Paul St-MLK Jr Way-Duke Dr	93.2
PS-55	Mountain View Dr-MLK Jr Way-S Carlton St	93.1
PS-56	W Wolfe St-N High St-N liberty St	90.7
PS-57	Reservoir St- Long Ave-Myers Ave	89.9
PS-58	Greystone St-Smith Ave-Chicago Ave	88.8
PS-59	Ott St- E Grattan St-Franklin St	88.2
PS-60	Sterling St-E Market St-E Elizabeth St	85.8
PS-61	Pear St-Erikson Ave-Pleasant Hill Rd	80.5
PS-62	Paul St-Myers Ave-MLK Jr Way	80.1
PS-63	Stuart St-Taliaferro Dr-3rd St	78.2
PS-64	N Willow St-W Gay St-2nd St	75.6
PS-65	3rd St-Stuart St-N Dogwood Dr	75.5
PS-66	Smith Ave-Existing Sidewalk-Mt. Clinton Pike	74.4
PS-67	Greystone St (entire length)	73.8
PS-68	Jefferson St-Charles St-W Washington St	69.4
PS-69	Pear St-W Mosby Rd-Ruby Dr	66.9
PS-70	Central Ave-Greystone St-Shenandoah St	62.1
PS-71	Shenandoah St-College Ave-Chicago Ave	62.1
PS-72	S Willow St-W Market St-JMU Entrance	60.5
PS-73	Effinger St-Sterling St-Broad St	59.4
PS-74	Myrtle St-E Washington St-Kelley St	57.2
PS-75	Mt Clinton Pk-West City Limits-Chicago ave	48.8
PS-76	Kelley St-Simms Ave-Hill St	41.7
PS-77	Parkwood Dr-Virginia Ave-Park Rd	34.0

PEDESTRIAN INTERSECTIONS - *ActiveTrans Priority Rank*

Map ID	Project Name / Location	Score
PI-1	Port Republic Rd & S Main St	240.5
PI-2	N Main St & Gay St	209.9
PI-3	Peach Grove Ave & Lois Ln	196.2
PI-4	S Main St & Pointe Dr	190.8
PI-5	S High St & W Water St	185.1
PI-6	S High St & Pear St	184.0
PI-7	S Liberty St & W Water St	181.5
PI-8	S Main St & Pleasant Valley Rd	179.2
PI-9	S High St & W Bruce St	177.5
PI-10	N Mason St & E Wolfe St	177.2
PI-11	N Mason St & E Rock St	174.6
PI-12	S Liberty St & W Bruce St	172.9
PI-13	S Mason St & E Water St	170.7
PI-14	Virginia Ave & Mt Clinton Pk	164.3
PI-15	N Liberty St & W Market St	158.7
PI-16	E Market St & Reservoir St/Sterling St	158.3
PI-17	Port Republic Rd & Neff Ave	158.2
PI-18	Chicago Ave & Waterman Dr	153.8
PI-19	N Main St & Emerson Ln	148.3
PI-20	S High St & W Grace St	147.8
PI-21	N Liberty St & W Gay St	145.0
PI-22	Reservoir St & Norwood St	142.0
PI-23	S High St & South Ave	140.8
PI-24	S Main St & Baxter Dr	134.8
PI-25	S Main St & W Kaylor Park Dr	129.2
PI-26	S Main St & MLK Jr Way	126.1
PI-27	Virginia Ave & Harmony Dr	124.7
PI-28	Mt. Clinton Pike at Gift & Thirft	124.2
PI-29	Vine St & E Washington St	121.5
PI-30	Virginia Ave & Acorn Drive	120.6
PI-31	Park Rd & EMU Science Center	117.0
PI-32	Mt Clinton Pk & College Ave	106.0
PI-33	Vine St & Old Furnace Rd	101.0
PI-34	Erickson Ave at Bus Stop for Garbers Crossing	97.6
PI-35	Mt Clinton Pk & Chicago Ave	97.3
PI-36	Neff Ave & Arboretum Trail	96.6
PI-37	Burgess Rd & Harrisonburg Crossing	96.0
PI-38	Mt Clinton Pk & Summit Ave	35.1