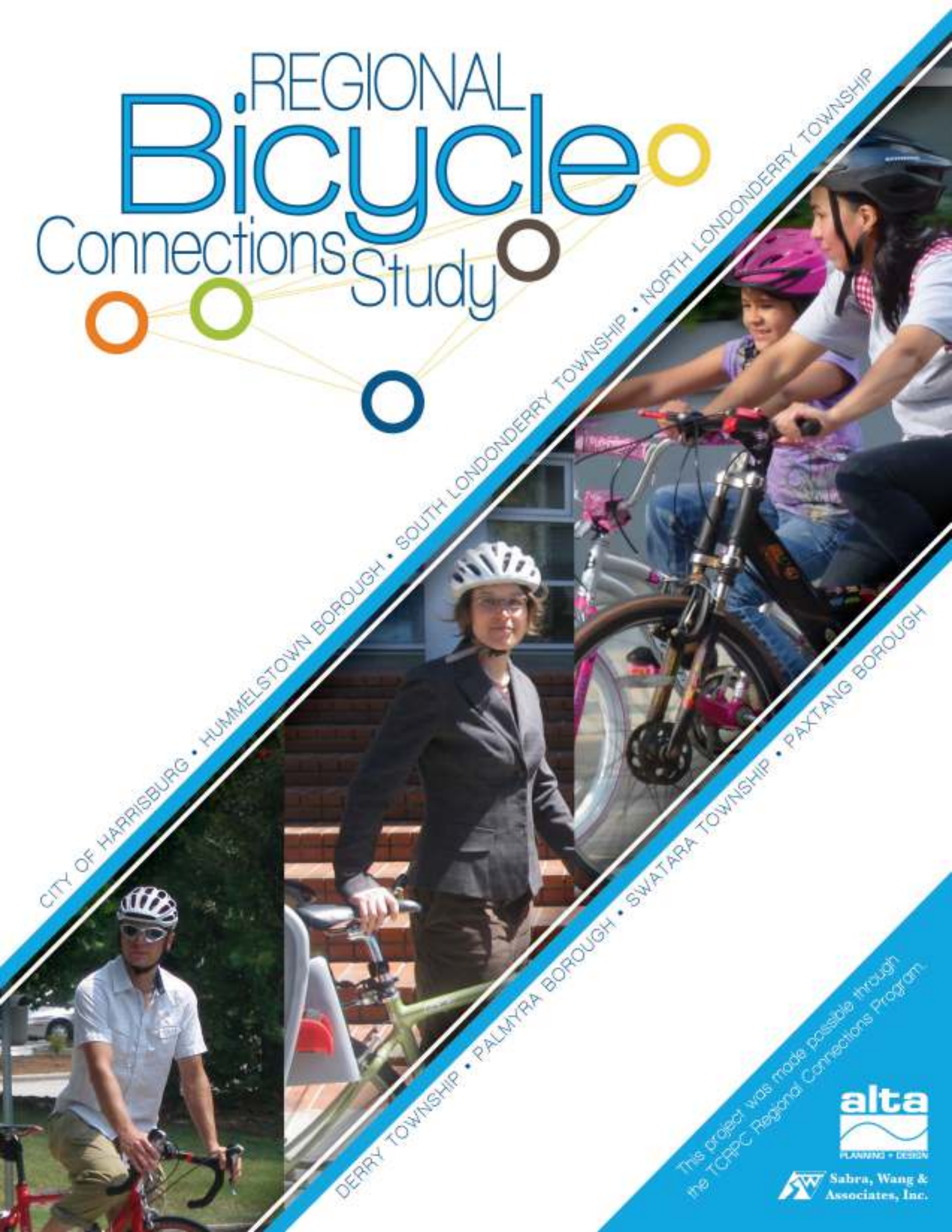
REGIONAL Bicycle Connections Study



CITY OF HARRISBURG • HUMMELSTOWN BOROUGH • SOUTH LONDONDERRY TOWNSHIP • NORTH LONDONDERRY TOWNSHIP

DERRY TOWNSHIP • PALMYRA BOROUGH • SWATARA TOWNSHIP • PAXTANG BOROUGH

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alta PLANNING + DESIGN

Sabra, Wang & Associates, Inc.

REGIONAL Bicycle Connections Study

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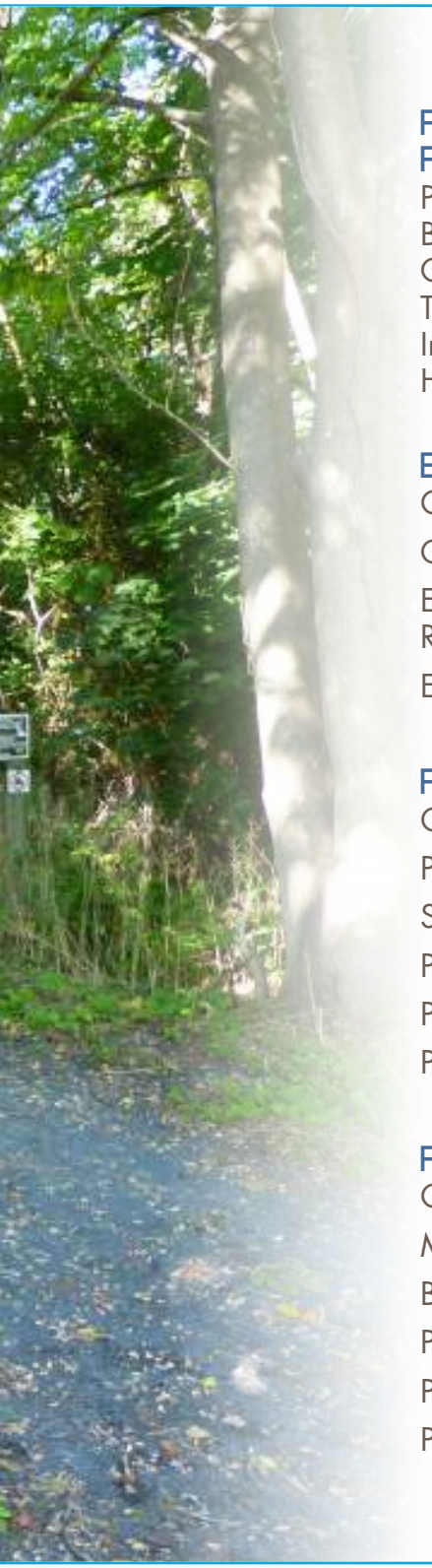


REGIONAL Bicycle Connections Study

Chapter One: Project Overview + Purpose

Purpose and Background

The Region and the Plan

The Regional Bicycle Connections Study is a joint planning effort by the City of Harrisburg, Hummelstown Borough, Palmyra Borough, Paxtang Borough, Derry Township, North Londonderry Township, South Londonderry Township, and Swatara Township. Together these municipalities have crafted a vision to improve the bicycling environment and culture of the region.

The area currently offers a variety of bicycle routes and facilities, such as on-road regional bicycle routes and roadways with paved shoulders, as well as off-road facilities such as the Derry Township Jonathan Eshenour Memorial Trail, Conewago Recreation Trail, and Lebanon Valley Rail Trail. However, even with these facilities many gaps exist both locally and regionally that make bicycling an uncomfortable transportation and recreation option.

This Plan identifies these gaps, the bicycle infrastructure needed to fill them, and bicycle-supportive policies and programs to improve opportunities for two-wheeled travel.

Role of the Regional Bicycle Connections Study

The purpose of the *Regional Bicycle Connections Study* is to bring together municipalities, two counties, regional and state agencies, and stakeholders to develop a vision for the future of bicycling in the region.

Multi-jurisdictional cooperation is critical to the success of this Plan both in facility implementation and seeking funding sources. Also imperative to creating a regional network are the programming elements of education, enforcement, and evaluation. A shift in culture is occurring across the nation and many communities are evaluating how to create safer spaces for multiple modes. Infrastructure and design of the built environment will communicate behavioral expectations and, coupled with programming, will foster the development of a better educated community with citizens who respect the rights and obey the laws of a multimodal society.

This Plan communicates a clear vision, goals, recommendations, and action steps to better connect the region through a network of bicycle facilities and supporting policies and programs. Funded through the Regional Connections Program of the Tri-County Regional Planning Commission, the Plan advances the region's values of safety, connectivity, livability, awareness, and health and wellness.

The recommendations of this Plan build upon previous local and regional plans and are intended to be incorporated into future transportation and land use planning documents and decision-making.

Plan Overview

While bicycle plans benefit many types of bicyclists, recommendations at this scale should be focused on connecting people to places where they live, work, play, and learn and addressing the needs of those "types." While many regional bicyclists are experienced riders and regular bicycle commuters, there are groups who may not have access to vehicles, require access to public transportation stops beyond walking distance of their homes or places of employment, and desire or need safe facilities to access daily needs. There are also the "60% Interested But Concerned" (see pages 4-5) who need designated spaces and separation to overcome uncertainties and bicycle in the area.

To begin to form a network of facilities and recommendations for these communities, the steering committee formed a vision with five thematic goals:

Vision

The *Regional Bicycle Connection Study* will enhance the human-powered component of the regional transportation system by creating consistent design standards, a diverse network of interconnected routes, support facilities, and programs to make bicycling for transportation and recreation more practical and desirable for bicyclists of all ages and abilities.

This vision is intended to guide the development of the regional bicycle system through the year 2030.

Goals

Safety Improve safety for bicycle riders of all ages and abilities through careful planning, design, implementation, and programming.

Connectivity Create a bicycle network that connects to places that people want to go and provides a time-efficient travel option.

Livability Build vibrant and healthy communities by creating a welcoming environment for bicycle riding.

Awareness Increase community support for bicycling as an acceptable and viable means of transportation and educate everyone how to appropriately interact with all modes.

Health & Wellness Increase the use of bicycles for transportation and recreation.

Plan Components

This Plan is designed to guide the bicycle planning efforts and decision-making of participating municipalities and the region by providing a clear purpose (Chapter 1), an assessment of where things stand today (Chapter 2), a multi-faceted public involvement process (Chapter 3), detailed recommendations for bicycle facilities and programs (Chapter 4), and implementation strategies for bicycle-related policies, programs, and infrastructure (Chapter 5).

Also included in this Plan are appendices that are designed to be used as implementation resources. They cover topics such as design guidelines, facility development resources, potential funding sources, and an analysis of bicycling demand in the region.

Benefits of a Bicycle-Friendly Community

The benefits of bikeable communities are well-documented and serve to inform the importance of implementing this Plan. People and businesses are choosing to live and relocate in communities that offer high quality of life amenities, including bikeways and greenways. Changes to the built environment, supported by policy changes and influential programs, can contribute to a region that is supportive of bicycling and provides important regional connections and amenities.

The sections below outline the many benefits of a bicycle-friendly community, including health and physical activity benefits, economic benefits, environmental benefits, transportation benefits, and quality of life benefits. These benefits align with the vision and goals crafted for this Plan.

Health & Physical Activity Benefits

A growing number of studies show that the design of our communities—including neighborhoods, towns, transportation systems, parks, trails, and other public recreational facilities—affects our level of physical activity. Regular physical activity is recognized as an important contributor to good health and only a few lifestyle choices have a large as an impact on your health as physical activity; the Centers for Disease Control and Prevention (CDC) recommend 30 minutes of moderate physical activity each day for adults and 60 minutes each day for children.[1]

Unfortunately, many people do not meet these recommendations because they lack environments where they can be physically active. The CDC reports that "physical inactivity causes numerous physical and mental health problems, is responsible for an estimated 200,000 deaths per year, and contributes to the obesity epidemic."[2]

Having accessible bicycle facilities available, such as bike lanes and paths, can help people more easily incorporate physical activity into their daily lives. Regular physical activity as part of their daily life, such as bicycling, is shown to have numerous health benefits:[3]

- Reduces the risk and severity of heart disease and diabetes
- Reduces the risk of some types of cancer
- Improves mood
- Controls weight
- Reduces the risk of premature death

1 Centers for Disease Control and Prevention. http://www.cdc.gov/physicalactivity/everyone/guidelines/index.html.

2 U.S. Department of Health and Human Services. Centers for Disease Control and Prevention. (1996). Physical Activity and Health: A Report of the Surgeon General.

3 National Prevention Council. (2011). National Prevention Strategy: America's plan for better health and wellness. Retrieved from http://www.healthcare.gov/prevention/nphpphc/strategy/report.pdf.

Hidden Health Costs of Transportation

The National Health Costs of…	$$ (Billions)	Estimate Includes	Source
Obesity and overweight	$142	• Healthcare costs • Lost wages due to illness & disability • Future earnings lost by premature death	National Institutes of Health, National Institute of Diabetes and Digestive and Kidney Diseases. Statistics Related to Overweight and Obesity: The Economic Costs. Available at: http://win.niddk.nih.gov/statistics/index.htm
Air pollution from traffic	$50-80	• Health care costs • Premature death	Federal Highway Administration. 2000. Addendum to the 1997 Federal Highway Cost Allocation Study Final Report, May 2000. Available at: www.fhwa.dot.gov/policy/hcas/addendum.htm
Traffic crashes	$180	• Healthcare costs • Lost wages • Property damage • Travel delay • Legal/administrative costs • Pain & suffering • Lost quality of life	AAA. Crashes vs. Congestion? What's the Cost to Society? Cambridge, MD: Cambridge Systematics, Inc.: 2008. Available at: www.aaanewsroom.net/assets/files/20083591910.crashesVscongestionfullreport2.28.08.pdf

All cost estimates adjusted to 2008 dollars.

Source: The American Public Health Association, 2010, The Hidden Health Costs of Transportation.

The American Public Health Association also recognizes the health benefits of walk- and bike-friendly communities. According to its 2010 report, "Investments in transit, walking and bicycling facilities support transit use, walking and bicycling directly; they also support the formation of compact, walkable, transit-oriented neighborhoods that in turn support more walking, bicycling and transit and less driving."[4] These built environments have repeatedly been associated with the following[4]:

- More walking, bicycling and transit use,
- increased overall physical activity and lower body weights;
- lower rates of traffic injuries and fatalities, particularly for pedestrians;
- Lower rates of air pollution and greenhouse gas emissions;
- and better mobility for non-driving populations.

The CDC determined that creating and improving places to be active could result in a 25 percent increase in the number of people who exercise at least three times a week.[5] A modest increase of 25 percent is significant considering that for people who are inactive, even small increases in physical activity can bring measurable health benefits. The establishment of a safe and reliable network of bikeways and trails can have a positive impact on the health of nearby residents. The Rails-to-Trails Conservancy puts it

4 American Public Health Association. (2010) The Hidden Costs if Transportation

5 U.S. Department of Health and Human Services, Centers for Disease Control and Prevention. (2002). Guide to Community Preventive Services.

simply: "Individuals must choose to exercise, but communities can make that choice easier."[6]

An increasingly growing concern of community leaders and planners alike is how healthy our communities will be in the future. Education, infrastructure, health, and public safety needs are critical challenges at the local level. Transportation and mobility are also key elements of the livability index. Open space and recreational opportunities are other important elements. Promoting bicycle facilities is consistently recognized as an effective strategy to create healthier communities, improve safety, and better the quality of life in localities that have embraced them.

Suburban settings strike a balance between utilitarian (transportation) and recreational bicycling. It is often in these settings, through recreational opportunities, that we teach our children the "rules of the road" and bicycle safety.

Economic Benefits

Transportation Savings

When it comes to transportation costs, **bicycling is one of the most affordable forms of transportation available, second only to walking**. According to the American Automobile Association, the cost of owning and operating a medium-sized sedan for one year, assuming one drives 10,000 miles per year, is approximately $7,804.[7] Owning and operating a bicycle costs just $120 per year, according to the League of American Bicyclists.[8]

6 Rails-to-Trails Conservancy. (2006) Health and Wellness Benefits.

7 American Automobile Association. (2013). Your Driving Costs: How Much are You Really Paying to Drive? 2013 Edition.

8 The League of American Bicyclists. www.bikeleague.org.

The Pedestrian and Bicycle Information Center explains how these lower costs help individuals and communities as a whole:

"When safe facilities are provided for pedestrians and bicyclists, more people are able to be productive, active members of society. Car ownership is expensive and consumes a major portion of many Americans' income."

Bicycling becomes even more attractive from an economic standpoint when the unstable price of gasoline is factored into the equation. Oil prices more than quadrupled between 2000 and

Annual Cost Per Mile

costs		yearly totals
operating costs		
gas per mile		
total miles driven	×	
total gas	=	
maintenance	+	
tires	+	
total operating costs	+ =	
ownership costs		
depreciation		
insurance	+	
taxes	+	
license and registration	+	
finance charges	+	
total ownership costs	+ =	
other costs (washing, accessories, etc.)	+	
total driving costs	=	
total miles driven	÷	
cost per mile	=	

Driving Costs Worksheet. American Automobile Association, Your Driving Costs Report: 2013 Edition.

2008, when gasoline prices topped $4 a gallon.[9] The unreliable cost of fuel reinforces the idea that local communities should be built to accommodate people-powered transportation, such as walking and biking.

Some areas of the region already have traditional mixed-use and generally compact land development patterns; when combined with new strategies for improving bicycle transportation, many of these communities could foster local reductions in auto- and oil-dependency.

Property Values

Bicycle facilities such as bike lanes, paths, and greenway trails are popular community amenities that add value to properties nearby. According to a 2002 survey by the National Association of Realtors and the National Association of Homebuilders, **homebuyers rank trails as the second-most important community amenity out of 18 choices**, above golf courses, ball fields, parks, security, and others.[10] A study of home values along the Little Miami Scenic Trail in Ohio found that single-family home values increased by $7.05 for every foot closer a home was to the trail.[11] These higher prices reflect how trails and greenways add to the desirability of a community, attracting homebuyers and visitors alike.

Environmental Benefits

Air Quality

Providing the option of bicycling as an alternative to driving can reduce the volume of gasoline consumed and resulting car-related emissions, which in turn improves air quality. Cleaner air reduces the risk and complications of asthma, particularly for children, the elderly, and people with heart conditions or respiratory illnesses.[12] Lower automobile traffic volumes also help to reduce neighborhood noise levels and improve local water quality by reducing automobile-related discharges that are washed into local rivers, streams, and lakes. Furthermore, every car trip replaced with a bicycle trip reduces U.S. dependency on fossil fuels, which is a national goal. According to a survey by the National Association of Realtors and Transportation for America, 89 percent of Americans agree that transportation investments should support the goal of reducing energy use.[13]

Environmental Services of Greenways

Greenways and trails are a key component of any bicycle network and carry environmental benefits as well. Greenways protect and link fragmented habitat and provide opportunities for protecting plant and animal species. By conserving plant cover, greenways also preserve the natural air filtration processes provided by plants, filtering out harmful pollutants, such as ozone, sulfur

9 King, Neil. The Wall Street Journal: Another Peek at the Plateau. (2/27/08).

10 National Association of Homebuilders. (2008). www.nahb.com.

11 Rails to Trails Conservancy. (2005). Economic Benefits of Trails and Greenways.

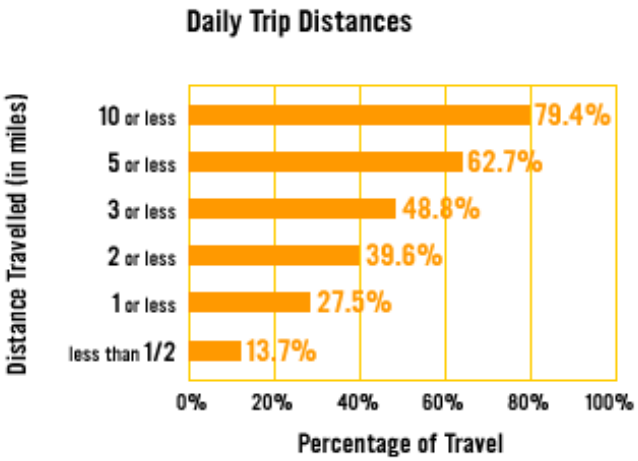
12 Health Effects Institute. (2010). Traffic-Related Air Pollution: A Critical Review of the Literature on Emissions, Exposure, and Health Effects. Special Report 17.

13 National Association of Realtors and Transportation for America. (2009). 2009 Growth and Transportation Survey. www.t4america.org/docs/011609_pr_nart4poll.pdf.

dioxide, carbon monoxide, and airborne heavy metal particles. Finally, greenways improve water quality by creating a natural buffer zone that protects waterways. This natural buffer helps mitigate soil erosion and filters pollution cause by agriculture and road runoff before it enters the water. Greenways also act as a line of defense against natural hazards, such as flooding - a problem that is of special concern to this region after sustaining damage from flooding in 2011.

Transportation Benefits

Providing a well-connected bicycle network provides a safe transportation option for those who are unable or unwilling to drive or who do not have access to an automobile. According to the 2001 National Household Travel Survey, 12 percent of persons age 15 or older do not drive, and 8 percent of U.S. households do not own an automobile. Bicycle improvements can increase access to important destinations for the young, the elderly, low-income families, and others who may be unable to drive or do not have a motor vehicle. They can also free up time for those who may otherwise have to provide rides to other household members.



Almost 50 percent of all trips in the U.S. are 3 miles or less, or less than a 15-minute bike ride. Source: Pedestrian and Bicycle Information Center, www.pedbikeinfo.org

Investing in bicycle facilities can also help to reduce congestion and the pollution, gas costs, wasted time, and stress that comes with it. **Each person who makes a trip by bicycle is one less car on the road or in the parking lot**. A network of wide shoulders, bike lanes, and paths gives people the option of making a trip by bike, which helps to alleviate congestion for everyone. Bicycle facilities can also help to substantially reduce transportation costs by providing a way of getting around without a car for the region's shorter trips. About half of all trips taken by car are three miles or less, equivalent to a 15-minute bike ride.[14] With a safe, convenient bicycle network, some of these shorter trips could be comfortably made by bike, saving money on gas, parking costs, and vehicle wear and tear over time.

Quality of Life

Many factors go into determining quality of life for community residents: the local education system, prevalence of quality employment opportunities, and affordability of housing are all items that are commonly cited. Increasingly though, citizens are demanding a cleaner, safer, more enjoyable community that provides amenities for adults and children alike. Communities with quality bike lanes, trails, and bicycle routes attract new residents as well as new businesses and industries. Getting outdoors and being physically active also

14 U.S. Department of Transportation and Federal Highway Administration. (2009). National Household Travel Survey.

helps to relieve stress, improve mood, and foster social connections between residents.

Transportation and recreation options will be especially important for older Americans in the coming years. According to the Brookings Institution, the number of older Americans is expected to double between 2000 and 2025.[15] Seniors who find themselves unable to drive will find that their mobility is severely limited if other transportation options are not available. While many seniors are capable of driving and riding with traffic. Trails, paths, and separated bicycle facilities will provide seniors with a more comfortable ride for users with mobility impairments or those wanting to take a more leisurely route to nearby shops and services. Off-street paths and trails are also valuable transportation connections because they accommodate motorized wheelchairs, which can provide many seniors with the independent mobility that they would not have otherwise.

Children under 18 are another important subset of our society and equally merit access to safe mobility options and a higher quality of life. In recent years, increased traffic and a lack of pedestrian and bicycle facilities have made it less safe for children to travel to school or to a friend's house. **In 1969, 48 percent of students walked or biked to school, but by 2001, less than 16 percent of students walked or biked to or from school.**

In a 2005 Centers for Disease Control and Prevention survey, 1,588 adults answered questions about barriers to walking to school for their children aged 5 to 18 years.[16] The main reasons cited by parents included distance to school, at 62 percent, and traffic-related danger, at 30 percent.

Strategic additions to the bicycle and pedestrian network could shorten the distance from homes to schools, and overall pedestrian and bicycle improvements can increase the safety of our roadways so that children could once again safely bike in their communities. According to the National Center for Safe Routes to School,

"Walking or biking to school gives children time for physical activity and a sense of responsibility and independence; allows them to enjoy being outside; and provides them with time to socialize with their parents and friends and to get to know their neighborhoods."[17]

Ensuring that children have safe connections to their schools and throughout their neighborhoods can encourage them to spend time outdoors, get the physical activity they need for good health, and enjoy a higher quality of life. Additionally, safe connections can provide young adults a means of transportation to after school jobs or activities.

The Planning Process and Public Involvement

Project Steering Committee

The development of this Plan was guided by the project's Steering Committee, a group of over 20

15 Brookings Institution. 2003. The Mobility Needs of Older Americans: Implications for Transportation Reauthorization.

16 Centers for Disease Control and Prevention. The Importance of Regular Physical Activity for Children. Accessed in 2005 from www.cdc.gov/nccdphp/dnpao/index.html.

17 National Center for Safe Routes to School. (2006). National Center for Safe Routes to School Talking Points.

individuals representing the bicycling interests of the member municipalities and the region. Steering committee members also represented a number of agencies and backgrounds, including the Tri-County Regional Planning Commission, participating municipalities, PennDOT, Capital Area Transit, and local advocacy groups. The Project Steering Committee met with project consultants throughout the process, focusing on project vision and goals (April 2014), existing conditions (August 2014), the draft Plan (January 2015), and the final Plan (March 2015).

Data Collection and Analysis

After collecting baseline information about the study area, the consultants, Alta Planning + Design and Sabra, Wang, & Associates, began assessing existing conditions of the region (Chapter 2). Consultants used aerial photography and geographic information systems (GIS) data to identify opportunities and constraints for bicycle facility development.

These preliminary findings were then tested for applicability and appropriateness through on-the-ground fieldwork. The existing conditions and the preliminary findings were presented to the Steering Committee in August 2014 and to the public in August 2014 at the Hershey Farmers' Market.

Public Involvement

Public involvement efforts for the *Regional Bicycle Connections Study* were carried out throughout the planning process. The consultant team gathered input and feedback both in person and online through public meetings, workshops, and the Plan's website. The website served as a clearinghouse of information with details on the Plan and planning process, informational display boards for events, public input cards, an interactive online WikiMap, and results of bicycling demand and supply analysis. For more information on the public involvement process, please see Chapter 3.

How to Use This Plan

This Plan is the first regional planning effort of its type for the study area. As the first step in developing a more bicycle-friendly region, it is likely the implementation strategies and steps will change as the culture and landscape evolve.

A study may be funded in the short term that may include a long-term implementation step of this Plan. However, many of these recommendations may simply be accomplished as part of any already-scheduled resurfacing or other road or bridge improvements. It is vital that municipalities use these upcoming road improvements as windows of opportunity to improve transportation options by incorporating bicycle and pedestrian improvements when possible. It is acceptable to implement that strategy sooner to create economies of scale in planning and implementation efforts throughout the region.

Action items should be reevaluated each year to revisit priorities for the upcoming year and note accomplishments. Eventually, this study should be conducted again to update the recommendations based on the progress of statewide, regional, and local engineering and programming efforts.

REGIONAL Bicycle Connections Study

Chapter Two: Existing Conditions

Overview

This chapter describes the existing bicycling environment within the *Regional Bicycle Connections Study* area, bicycle network strengths and weaknesses, challenges that need to be addressed to improve the bicycling environment, and current bicycling demand. Later sections of the chapter identify current bicycle-related programs and review the existing plans and policies that have shaped the present-day bicycling environment. Relevant data collected for this Plan is also presented throughout the chapter to provide further insight into existing bicycle conditions in the region.

Current Conditions

GIS Base Maps

Geographic Information Systems (GIS) data was obtained from participating municipalities, PennDOT, and counties within the study area. The map on page 2-5 presents the existing conditions within the study area and serves as the foundation for analyzing the current bicycling environment. Analysis conducted for this study included evaluating the roadway network, identifying popular destinations and existing bicycling routes, documenting existing bicycle facilities, and examining various demographic patterns that may be useful in assessing need for future facilities.

Bicycling can be a necessity or a choice. For both, several types of cyclists exist; those from the most confident to beginners and children. Currently, only some roadways are capable of supporting ridership by the more concerned bicyclists. The efforts of the region to complete the recommendations within this Plan will expand the possibilities for all who need or choose to bicycle.

Trip Attractors & Current Movement within the Region

People currently drive, walk, or bike to a variety of destinations across the region for various purposes. These potential destinations and points of origin for bicyclists are referred to in this document as 'trip attractors'. Regional and local trip attractors include the following:

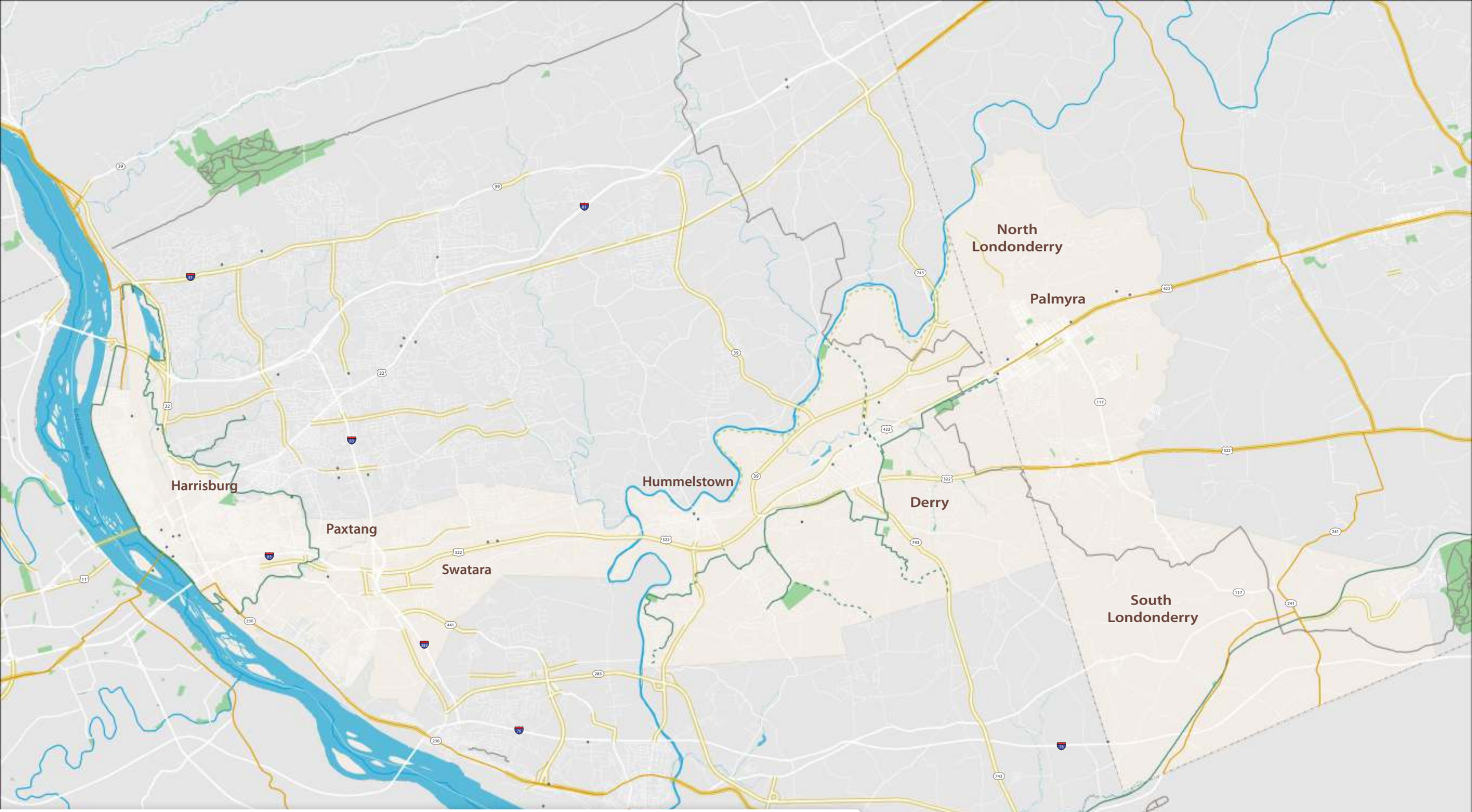
- Downtown districts or "Main Streets"
- Jonathan Eshenour Memorial Trail, Conewago Recreation Trail, Lebanon Valley Rail Trail, Capital Area Greenbelt Trail, and other trails
- Parks: Hodges Heights Park, Italian Park, Shank Park, and other parks in the region

The Pennsylvania State Capital in Harrisburg
(Image courtesy of Commonwealth Media Services)

- Large employers: Commonwealth of Pennsylvania, United States Federal Government, Giant Food Stores, Penn State Hershey Medical Center, Hershey Entertainment and Resorts Company, The Hershey Company, UPS, and other major employers
- Transit facilities: Capital Area Transit and Lebanon Transit
- Restaurants
- Shopping locations: Downtown districts, Harrisburg Mall, Colonial Park Mall, Tanger Outlets, and other shopping
- Higher density/Multi-family residential areas
- Public destinations: Libraries, schools, post offices, seats of government
- Harrisburg University, HACC, Penn State Harrisburg and Penn State College of Medicine
- Attractions: Pennsylvania State Capitol, Hershey Lodge & Convention Center, National Civil War Museum, State Museum of Pennsylvania, Riverfront Park, Hersheypark, Capital Area Greenbelt, Whitaker Center for Science and the Arts, other cultural sites, historic sites, Broadstreet Market and other points of interest geared toward residents and visitors

The above categories of bicycle trip attractors were considered when determining locations for facility improvements. They represent important starting and ending points for bicyclist travel and provide a good basis for planning ideal routes.

Much of the current bicycle movement in the region is recreational, with people using trails and some on-road routes to bicycle for exercise, social rides, family rides, and sightseeing. People who use bicycles for transportation are restricted by the choice of routes that feel safe and the lack of bicycle connectivity between destinations; these deficits limit bicycling for transportation mainly to the most confident riders or riders without other means of transportation.



Existing Conditions

This map is a product of data received from participating municipalities and agencies.
The accuracy and inclusion of facilities is dependant on the quality of this data.

EXISTING

- County
- Study Area
- Parks
- Regional Bike Route
- Multi-Use Trail
- 4ft Shoulders
- Pedestrian Only Trail
- Blueway
- Bus Stop
- Proposed Bike Path (Derry Township)
- Proposed Greenway (Derry Township)

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Miles

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Field Inventory & Observations

Bicycling in the study area is quite challenging due to the lack of on-road bicycle facilities, the presence of narrow and high-traffic volume roadways, a sprawling roadway network, and complex, high-volume intersections. The variation in density and development patterns across the study area present unique opportunities and constraints when developing a bicycle network. The bustling downtown core of Harrisburg has a favorable grid environment but higher traffic volumes, and the lower volume roadways throughout the smaller municipalities create a favorable environment for bicycling but are disjointed and intersect major barriers for bicyclists.

The narrative on the following pages will discuss the opportunities and constraints of the bicycling network and provide a photo inventory of key circumstances throughout the study area.

Currently in the region, there are many examples of both opportunities and constraints for bicycle friendly communities. Opportunities serve as potential to improve the future bikability of the region. Identifying the gaps can lead to opportunities for improvement and/or redirection.

Existing Bicycle System Opportunities

While the study area currently lacks a variety of on-road bicycle facilities, there are numerous assets and opportunities throughout the study area that provide a strong base for facilitating a safe, accessible, and cost-efficient regional network.

Transportation in Harrisburg is facilitated via a compact grid network with corridors that promote relatively low speed with varying volumes of traffic. This creates a favorable environment for short bicycle commutes, cross-town trips, and easy access to important connecting routes to regional destinations. The downtown core of Harrisburg has a strong concentration of attractions and amenities, promoting short bicycle trips for nearby residents and, if well connected, becoming destinations for the region. The Capital Area Greenbelt is another strong attraction that facilitates recreation and transportation around the city.

Large portions of the study area also contain a favorable grid roadway pattern, particularly the historic downtowns of Hummelstown, Hershey, and Palmyra. This grid pattern creates a predictable, option-rich environment where bicyclists can easily navigate and select routes that best suite their travel purpose or level of safety.

Additionally, there exists a high number of low-volume local streets that are presently functioning as bicycle boulevards or neighborhood greenways. These low-stress streets encourage bicycling trips and have enormous potential to be developed into strong components of the regional network.

These assets and attractions are substantial strengths and act as a strong foundation to improving the region's bikeability.

Key Opportunities of the existing bicycle system and roadway network:

- Approximately 65 miles of multi-use trails that function as recreation and transportation opportunities;
- Favorable, low-volume streets offer calm travel options;
- Historic, compact towns with grid roadway networks that are connected and easily navigated;
- Many roadways throughout the study area have more capacity than their traffic volumes warrant. This creates an opportunity to reutilize the space, such as a road diet to add space for on-street parking, landscaping, and bicycle facilities;
- Some of the roadways with extra capacity are scheduled for resurfacing in the near future - incorporating bicycle accommodations during routine maintenance is an opportunity to save costs, time, and resources;
- Many primary schools are located in bikeable areas. Relatively minor infrastructure improvements can greatly improve facilities and increase the safety and number of students bicycling to school;
- The Capital Area Transit and Lebanon Transit systems feature bike racks on the front of buses.
- State BicyclePA Route J runs through Harrisburg and several bike routes have been identified in the Lebanon County Bike Transportation Map (improved and more frequent signage will raise awareness of the bicycling facility and indicate to motorists that bicyclists belong on the road);

The Capital Area Greenbelt is a popular destination for both on-road and recreational bicyclists. Improving bicycle connectivity to trailheads, such as this one on S Paxtang Ave, would improve safety and access for local riders and tourists.

Several roadways have excessive capacity, such as Cherry Street in Palmyra (10 ft travel lanes & 14 ft on-street parking) where there is ample room to accommodate a bicycle lane and maintain parking. Additionally, there is a concrete barrier dissecting the street that was likely installed to mitigate through-traffic. Installing a bike-ped cut-through will improve access to the street for bicyclists while still prohibiting vehicles.

With minor improvements, low-volume neighborhood streets such as Areba Avenue in Derry Township can offer an ideal environment for bicycling and serve as an alternative route for bicyclists wishing to avoid travelling on Route 422.

N 2nd Street is a popular commercial destination in Harrisburg. A road diet could be implemented to add space for pedestrian amenities, landscaping, bike facilities, and pedestrian crossing improvements.

Hummelstown and many of the historic downtowns in the study area are compact and feature a grid roadway network, resulting in a close proximity of key destinations and improved accessibility.

Similar to Northside Elementary School in Palmyra, many schools in the study area are positioned in bikeable areas. Minor improvements such as sharrows, signage, and traffic calming can raise awareness and improve the safety and attractiveness of bicycling to school.

Existing Constraints to Bicycling Mobility

The study area is a collection of various levels of land use densities and roadway types, with multi-lane regional highways intersecting important corridors in each municipality. The high traffic volumes and speeds of these regional highways make traveling by bicycle difficult, creating significant barriers to a bicycle network.

Additionally, many local roadways are narrow, lack paved shoulders, and are generally designed for automobile use only. Many of the roads and intersections were designed some time ago and primarily accommodate motor vehicles. Theses roads and intersections need to be redesigned or re-striped to consider the needs of all transportation modes. Regional attractions often require crossing these high-traffic roadways with complex and intimidating traffic patterns. Navigating these barriers are difficult and act as major detractors to promoting bicycling in the region.

Key Constraints of the existing bicycle system and roadway network:

- Other than the portion of the Capital Area Greenbelt and the Jonathan Eshenour Memorial Trail that run parallel to a roadway, the study area has no on-road bicycle facilities linking destinations (other than shoulders);
- The current trail system lacks a regional connection between the Capital Area Greenbelt, the Jonathan Eshenour Memorial Trail, and the Lebanon Valley Rail Trail;
- The roadway network is not well-connected; developments with curvilinear streets and a single-point entry to major arterials is more common than a grid network in many municipalities;
- Existing right-of-way limitations pose significant challenges to the implementation of bicycle facilities that would require widening during future roadway construction;
- Accommodating bicyclists on the study area's main arterial thoroughfares (specifically, Route 422, Route 322, Paxton Street, and Derry Street) that carry high traffic volumes, numerous driveway entrances, and underpasses will require future feasibility studies to assess conflict zones between bicyclists and motorists;
- Bicycle connectivity into Harrisburg across the railroad tracks is limited due to a lack of separated bicycle facilities across the bridges;
- End-of-trip facilities, such as short and long-term bicycle parking, is limited throughout the study area;
- Bicycle connectivity to transit and secure bicycle parking at transit stations is limited.

Stormwater grates are a hazard for people on bicycles. Many are placed in spaces where bicyclists are expected to ride, forcing riders to maneuver into the travel lane to avoid them. Many grates in the study are placed incorrectly for bicyclists, causing bicycle tires to get caught and injuring riders.

Route 241 has been identified as a Regional Bike Route by Lebanon County and is an example of a narrow roadway corridor that is constrained by utility lines. This can result in insufficient width for drivers to safely pass bicyclists.

Many of the study area's busiest retail, employment, and recreation centers are difficult to access by bike due to them being along high-traffic, high-speed roadways. Corridors such as Route 422 have tremendous potential to generate bicycle traffic, but there are currently too many barriers to encourage bicycle usage.

Northside Drive in South Londonderry Township is an example of a curvilinear street that is common throughout the study area. The design of the road fosters high speed traffic. The width can become an opportunity to add bicycle facilities while maintaining vehicular efficiency.

Many intersections in the study area are complex and intimidating to navigate via a bicycle. Intersection treatments such as lane striping, bicycle loop detectors, and bicycle boxes will be cost-effective solutions to improving the awareness and safety of bicyclists at intersections.

Sections of Derry Street have numerous driveway entrances that cause conflict zones between bicyclists and motorists. Future feasibility studies and driveway access management techniques will be required to improve the multi-modal uses of the roadway.

There is insufficient bicycle parking at important destinations. Increasing the availability of end-of-trip facilities such as parking will encourage residents to take more bicycle trips and mitigate bicycles being secured to public property such as sign posts or trees.

Bicycle Suitability Index Analysis

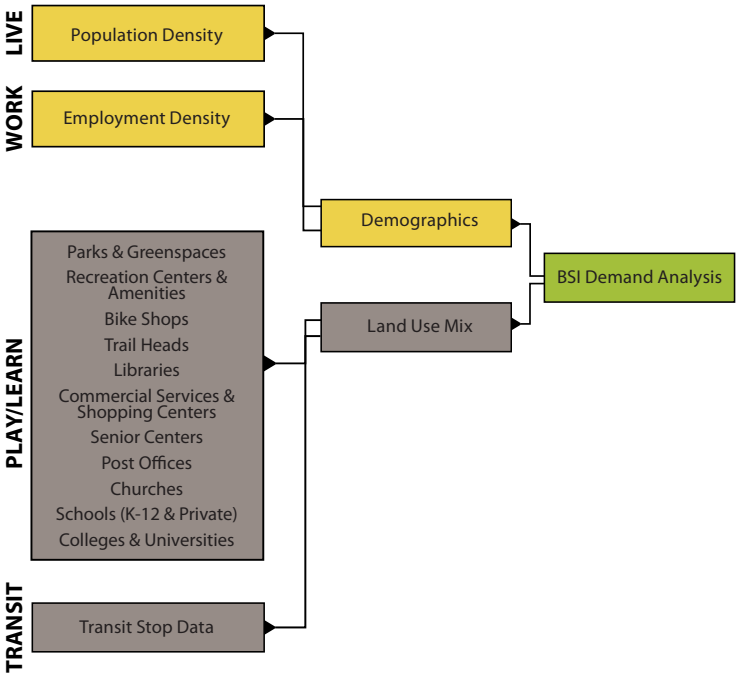
The Bicycle Suitability Index (BSI) provides a general understanding of expected activity in the bicycling environment by combining categories representative of where people live, work, play, access public transit and go to school into a composite sketch of regional demand. Area specific land use and transportation factors, such as Capital Area Transit (CAT) and Lebanon Transit (LT) service, local cultural destinations, schools, and trails are considered, as well as demographic factors.

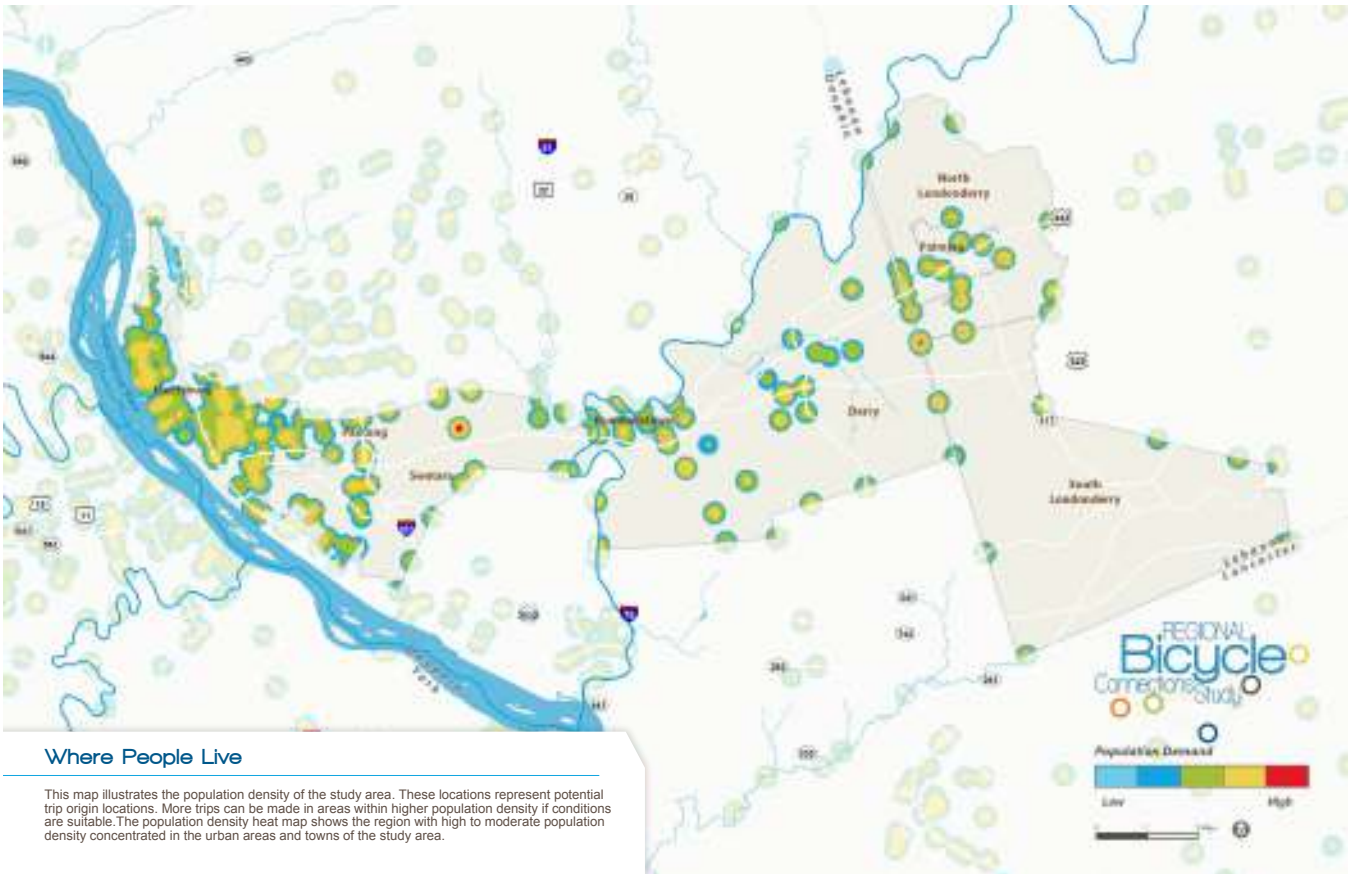
This demand component of the analysis displays concentrations of trip generators and attractors. Areas of high demand are indicated by dark red "heat" spots. These areas of high heat identify places within the study areas where bicyclists are likely to travel to and from; therefore indicating a demand for a bicycle facility to connect each hot spot.

Suitability is used to identify levels of comfort of roadways and specify those that may be suitable for bicycle facilities. Scores in BSI supply analysis are based on roadway characteristics that are known or perceived to have an impact on bicycle safety, comfort, and ease of movement. The purpose of the supply analysis is to determine if infrastructure improvements are warranted given the existing conditions.

Using available data for the entire region, roadways were assigned a score based on the level of stress a bicyclists is likely to experience when traveling along the roadway. In addition, the roadways scored points based on proximity to existing bicycle facilities such as those identified in the Lebanon County Bicycle Transportation Map. Red lines indicated the least suitable roadways for bicyclists due to the existing design. This translates into a route to avoid, or a route requiring significant changes to create a safe and comfortable bicycle route.

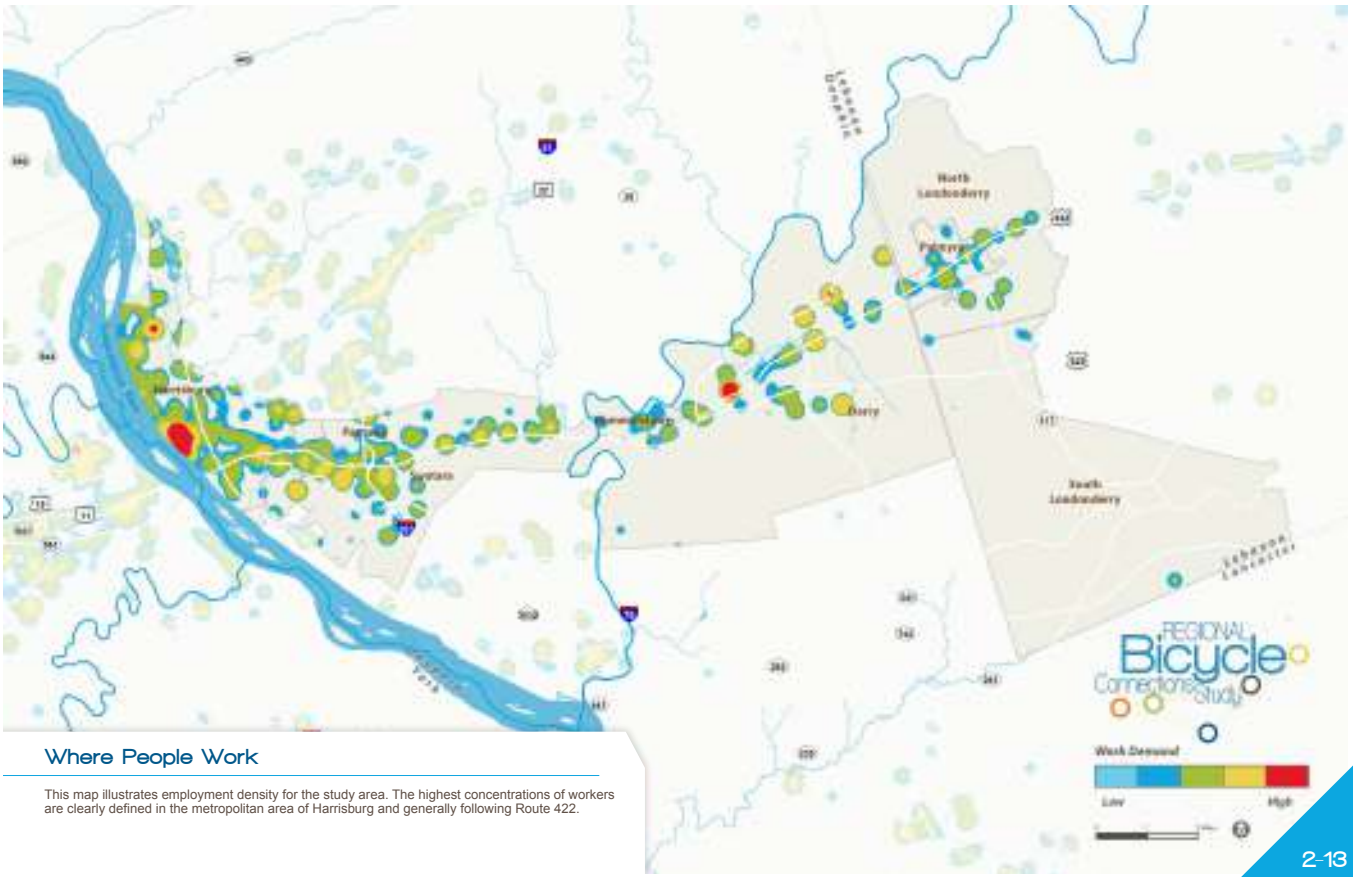
Figure 1 - BSI Regional Demand Flowchart





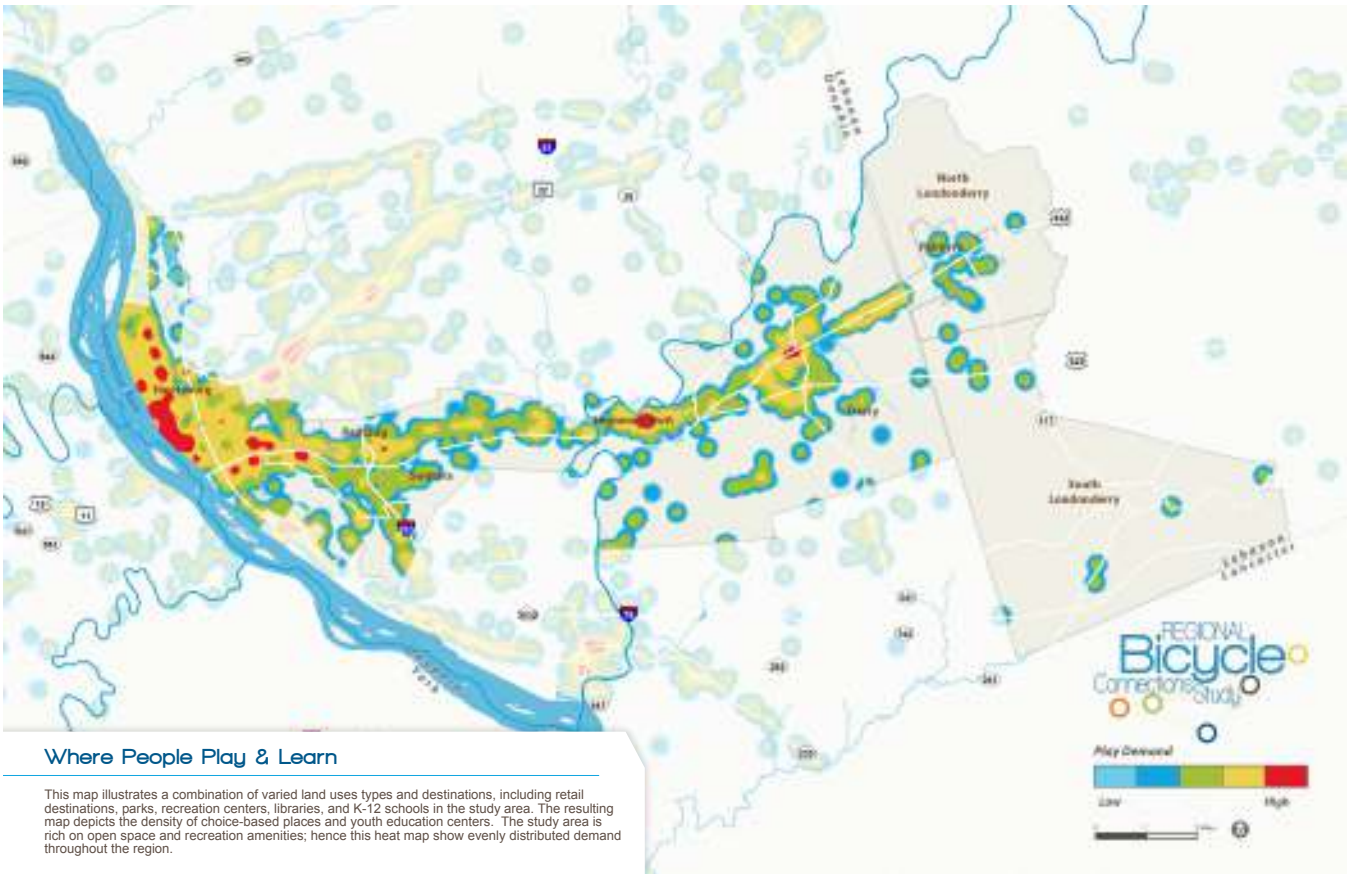
Where People Live

This map illustrates the population density of the study area. These locations represent potential trip origin locations. More trips can be made in areas within higher population density if conditions are suitable.The population density heat map shows the region with high to moderate population density concentrated in the urban areas and towns of the study area.



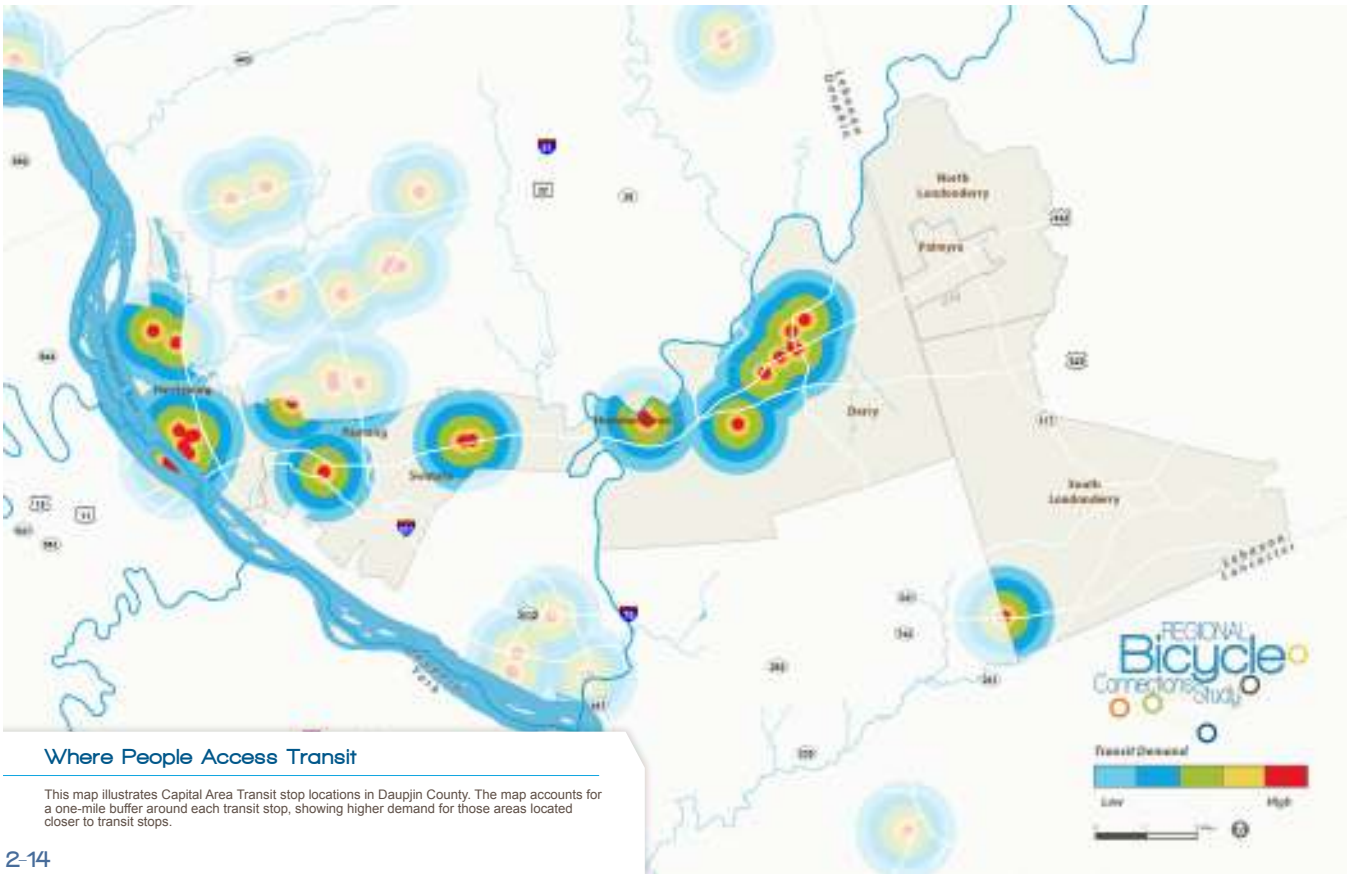
Where People Work

This map illustrates employment density for the study area. The highest concentrations of workers are clearly defined in the metropolitan area of Harrisburg and generally following Route 422.



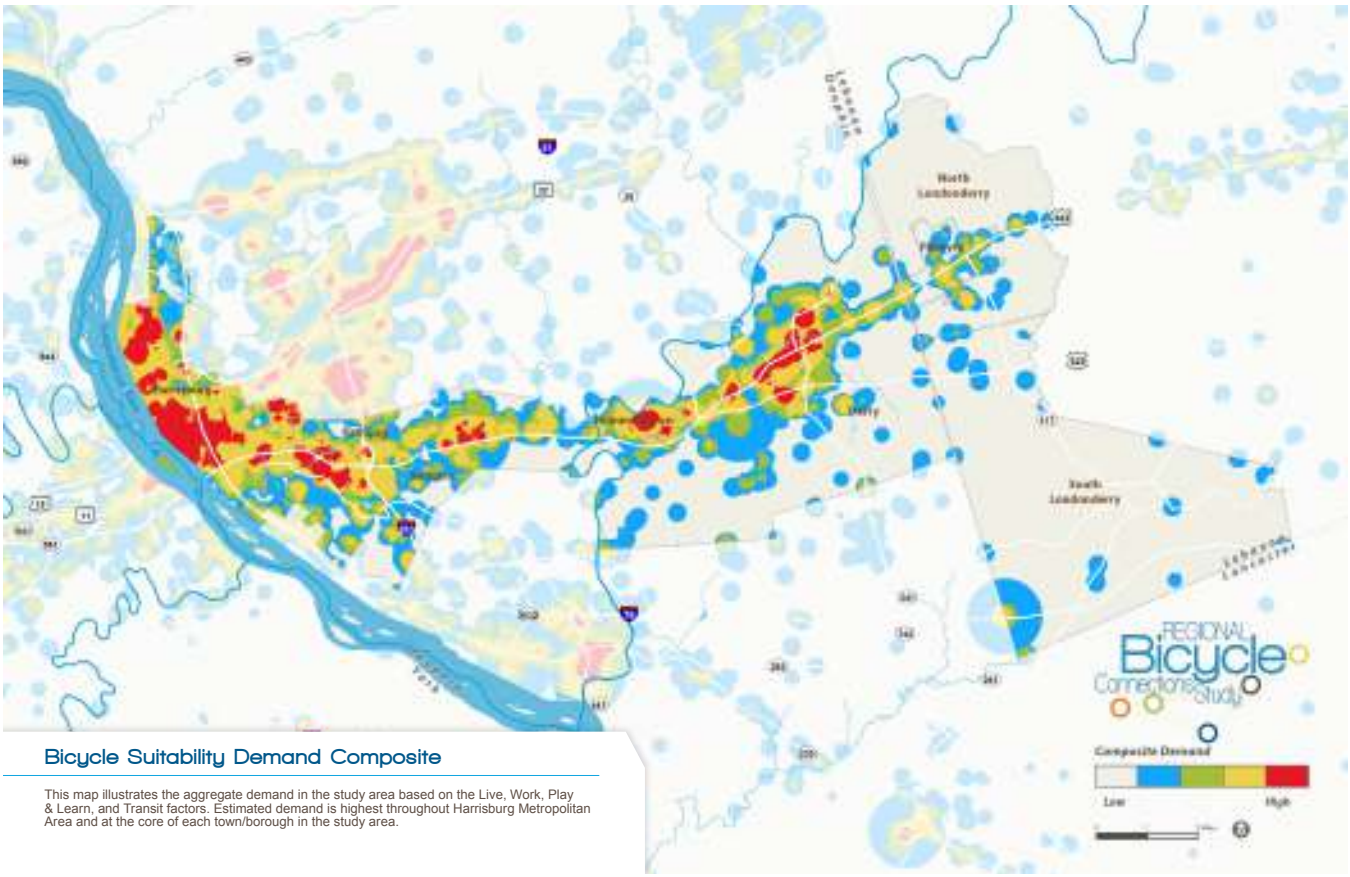
Where People Play & Learn

This map illustrates a combination of varied land uses types and destinations, including retail destinations, parks, recreation centers, libraries, and K-12 schools in the study area. The resulting map depicts the density of choice-based places and youth education centers. The study area is rich on open space and recreation amenities; hence this heat map show evenly distributed demand throughout the region.



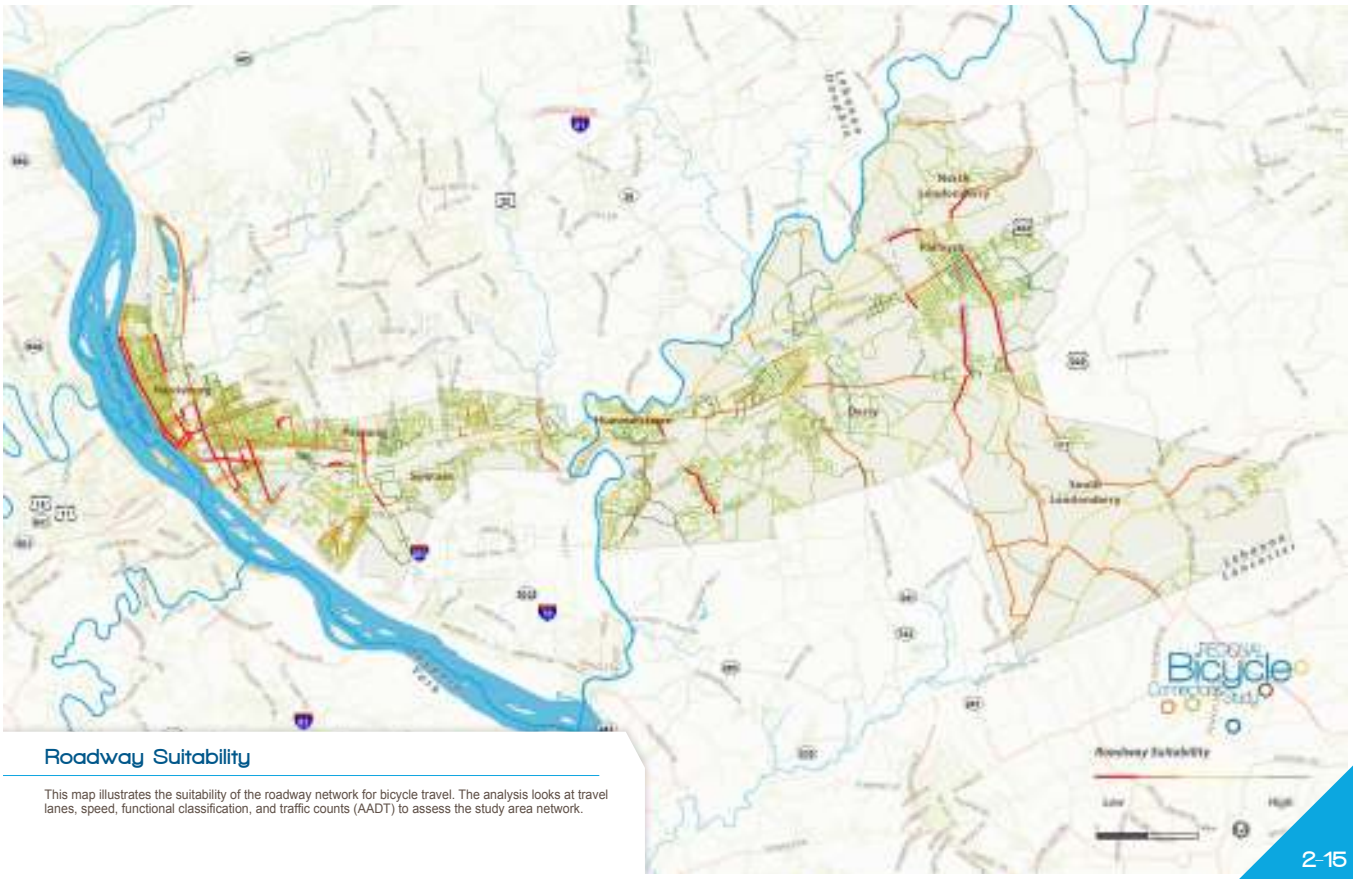
Where People Access Transit

This map illustrates Capital Area Transit stop locations in Daupjin County. The map accounts for a one-mile buffer around each transit stop, showing higher demand for those areas located closer to transit stops.



Bicycle Suitability Demand Composite

This map illustrates the aggregate demand in the study area based on the Live, Work, Play & Learn, and Transit factors. Estimated demand is highest throughout Harrisburg Metropolitan Area and at the core of each town/borough in the study area.



Roadway Suitability

This map illustrates the suitability of the roadway network for bicycle travel. The analysis looks at travel lanes, speed, functional classification, and traffic counts (AADT) to assess the study area network.

BSI Analysis Conclusions

The BSI composite activity model is an important tool for assessing potential bicycle improvements and to guide fieldwork. The model reveals that the estimated demand is highest throughout the Harrisburg Metropolitan Area and at the core of each town/borough in the study area. These downtown areas are also largely composed of lower-speed, grid pattern streets that have a moderate roadway suitability ranking. As a result, these downtown areas should be targeted as priority investment areas to invest in infrastructure to meet latent demand.

Palmyra, North Londonderry, and South Londonderry indicate moderate demand for bicycle accommodations. These areas are likely best served with infrastructure investments coupled with bicycle education and encouragement programs to induce demand. Education and encouragement programs could include increasing bicycle parking, bicycling maps, cycling events, and education programs that teach cycling skills to youths and adults.

Important corridors for priority investments include, but are not limited to:

- N 2nd Street between Paxton Street and Maclay Street
- N 3rd Street between Walnut Street and Maclay Street
- Derry Street from Mulberry Street to N 72nd Street
- Harrisburg Street (Route 441) from Paxton Street to Chambers Street
- Route 322
- Route 422

Existing Policies and Programs Related to Bicycling

The following section provides an overview of existing policies and programs that influence the outcomes of this Plan and should be recognized as tools for enhancing the safety and facility options within the study area.

2007 PennDOT Access and Mobility Policy

In 2007, PennDOT Department policy was revised to require the evaluation of access and mobility needs for bicyclists and pedestrians in all highway and bridge projects. This policy made the PennDOT Bicycle and Pedestrian Checklist a formal part of all project planning, programming, scoping, and design to ensure that bicycle and pedestrian needs are considered throughout a project.

PennDOT Bicycle and Pedestrian Checklist

The Bicycle and Pedestrian Checklist provides a standardized way for DOT staff to evaluate the access and mobility needs of pedestrians and bicyclists and ensure that these needs are addressed in project development. The checklist considers a variety of criteria to evaluate bicycle and pedestrian access and mobility, including consistency with current bicycle and pedestrian planning documents, safety needs, land use patterns, and availability of transit. Based on existing conditions, the checklist identifies bicycle and pedestrian accommodations that should be implemented based on the evaluation of current access and mobility. This checklist is used as part of all PennDOT highway and bridge projects. The checklist can be found here: ftp://ftp.dot.state.pa.us/public/PubsForms/Forms/D-310.pdf.

2008 PennDOT Smart Transportation Guide

This guide, a joint effort of PennDOT and the New Jersey DOT, is used to guide the development of non-limited access roads to address the needs of all road users, including bicyclists and pedestrians. The purpose of the guide is to create a transportation system that works well for all users, is affordable, and supports smart growth community planning goals.

Bike to School Day

Some schools in the region, including Derry Township, have participated in Bike to School Day in the past. Bike to School Day is held in May during National Bike Month and provides education and encouragement opportunities for children to bike to school.

Safe Routes to School and Capacity Building for Increasing Physical Activity Mini-Grants

Penn State Hershey PRO Wellness Center Mini-Grant Program

While funding for the mini-grants ended in 2013, the program serves as a local best practice for following the national Safe Routes to School mission. The program was initiated by the Penn State Hershey PRO Wellness Center who administersed mini-grants to help schools and their

communities increase Safe Routes to School efforts and physical activity programs. The funding was granted by the Pennsylvania Department of Health through the Preventive Health and Health Services Block Grant from the Centers for Disease Control and Prevention.

Bicycling Resources, Rides, and Events

The Harrisburg Bicycle Club (HBC) and the Lebanon Valley Bicycle Coalition (LVBC) both provide websites with a wealth of information on bicycle education, riding tips, suggested ride routes, and bicycle planning in the region and state. The HBC provides regular group rides for a variety of skill levels and interests, special rides, social events, bicycling directions for individual rides, and a calendar of other rides and events. The club also offers and advertises classes on bicycle law, bicycle maintenance, and health topics such as injury prevention and stroke awareness.

The Lebanon Valley Bicycle Coalition was started in the 1980s with an emphasis on recreational bicycling and offered annual fundraising rides, the Tour de Lebanon Valley and No Baloney Century. After several years of inactivity, in 2008, LVBC was reorganized to focus on bicycle advocacy. In addition, there are bicycling activities which are being expanded to include not only rides but mentoring and basic maintenance.

LVBC's Bylaws explain the Coalition's purpose:

- Protect and defend bicyclists' rights.
- Advocate for positive attitudes and public policies that will improve and promote the safety, convenience and acceptance of bicyclists in the Lebanon Valley.
- Advocate for recognition of the bicycle as a vehicle that is used for many purposes including economical transportation, recreation, personal fitness and competition.
- Work with municipal, county and state governments to establish and implement policies and practices that accommodate the needs of bicyclists.
- Advocate for local, state and federal legislation related to improving and promoting the safety and accommodation of bicyclists.
- Join forces with bicyclists, bike clubs and other relevant groups in Lebanon County, the region and the Commonwealth to help assure that bicyclists have a greater voice in making cycling accepted, safe and accommodated.
- Educate bicyclists and motorists on road safety.
- Develop partnerships and other ties amongst community organizations and businesses in order to achieve mutual goals.
- Provide mentoring for new bicyclists and/or new commuters.
- Develop scenic bicycling routes in the Lebanon Valley that can be enjoyed by local bicyclists and touring bicyclists.
- Provide bicycling opportunities for LVBC members who want to participate in Club rides.
- Provide opportunities for bicyclists to network with other bicyclists.

Bicycle Maintenance Clinics

The Harrisburg Bicycle Club (HBC) offers a series of Bicycle Maintenance Clinics to teach riders how to perform basic maintenance tasks on their bikes. Classes have been offered on fixing flats, safety checks, bicycle fit and adjustments, helmet review and fit check, chain review and cleaning, and other bicycle maintenance issues. The clinics are open to both HBC members and non-members, with a requested donation to cover class expenses.

Additionally, Recycle Bicycle fixes abandoned or donated bikes and either returns them to the community or sends them to Pedals to Progress for use elsewhere. The non-profit organization also offers maintenance services and a mobilized bike repair station for kids in the summer.

Existing Plan Review

In order to understand the existing planning environment and provide a basis for new recommendations, this Plan includes a review of previous recommendations created by other planning studies, feasibility studies, and related documents. The plan review uncovered 16 documents that address topics related to regional recreation links, alternative transportation choices, and multimodal connections. They all represent important efforts, provide valuable insight and background, and have influenced the development of this Plan.

The following plans were evaluated to understand recommendations within the study area and those within the context of the study area that support bicycling culture in Pennsylvania. For more detailed information, please consult the document in its entirety.

Capital Area Transit (CAT) Service Study (2010)

The Service Study highlights proposed expansions to route and systems within the Capital Area Transit service area, one of which falls within the Regional Bicycle Connections Study area.

Dauphin County Parks, Recreation, Open Space, & Greenways Study (2009)

This Dauphin County plan discusses on-road and off-road bicycle connections to provide local and regional connectivity.

Dauphin County Comprehensive Plan (2008)

This plan lists existing bicycle trails within the study area, including Stony Creek Trail, Derry Township Jonathan Eshenour Memorial Trail, and the Capital Area Greenbelt. The Capital Area Greenbelt and the Derry Township Pathway received transportation enhancement funds for construction in fiscal years 2005 to 2008. No bicycle facility recommendations are included in this plan.

Harrisburg Area Transportation Study (HATS) Regional Bicycle and Pedestrian Study (2014)

The *HATS Regional Bicycle and Pedestrian Study* outlines several goals and strategic actions to improve the bicycling environment in the Harrisburg area, including education, encouragement, enforcement, and evaluation and planning initiatives.

Harrisburg Area Transportation Study (HATS) 2035 Regional Transportation Plan (2011)

The *HATS 2035 Regional Transportation Plan (RTP)* sets goals to improve the bicycling environment and identifies some bicycle infrastructure, planning, and coordination needs within the study area.

Lebanon County MPO Transportation Improvement Program (TIP) Project Prioritization and Selection Process (2011)

While 'bicycling' was not specifically stated as a criterion for selecting and prioritizing projects in Lebanon's LRTP and TIP, the criterion that directly addresses transportation and is related to bicycling states: Provide transportation choices for residents, businesses, and visitors. No bicycle facility recommendations are included in this plan.

Lebanon County MPO Long Range Transportation Plan (LRTP) (2013)

The Lebanon County MPO LRTP identifies several corridors within the Regional Bicycle Connections Study area for bicycle improvements and other safety improvements that affect bicycling.

Lebanon County MPO Congestion Management Process (CMP) (2014)

This document primarily discusses congestion management from a motorized traffic perspective, but does include some bicycle improvements within the study area.

Palmyra Borough Main Street (US 422) Corridor Study (2010)

This study proposes a phase implementation of bicycle improvements to the Main Street/Route 422 corridor.

Pennsylvania Department of Transportation (PennDOT) Bicycle and Pedestrian Master Plan (2007)

This plan identifies two statewide bike routes that pass through the Regional Bicycle Connections Study area. Route J is the only state bicycle route to pass through Harrisburg and uses a combination of on-road routing and off-road rail-trail. The route is 220 miles in length. Route S, extending 435 miles across the state, is the longest Bicycle PA route. The route is aligned on-road through the Regional Bicycle Connections Study area.

Regional Transit Coordination Study (2011)

This study outlines guidelines for establishing policies regarding regional transit. One guideline states that when a corridor is submitted as a candidate for state funding to support a transit system, a series of evaluation factors should be used for consideration of support, two of which are related to bicycling: 1) development of regulations that include transit, bicycle, and pedestrian, amenities and 2) bicycle and pedestrian amenities such as bike racks, sidewalks, and pedestrian signal activation.

Swatara Creek Greenway River Conservation Plan (1997)

This plan proposes some off-road bicycle trails to be implemented as part of the conservation plan.

Tri-County Regional Planning Commission Regional Growth Management Plan (2011)

This plan covers the tri-county area. Specific bicycling facilities or policies were not outlined in the plan. General transportation principles outlined and related to bicycling facilities included the following: 1) Provide more transportation choices, 2) Improve economic competitiveness through reliable and timely access to employment centers, and 3) Value communities and neighborhoods by investing in health, safety, and walkable neighborhoods.

Tri-County Regional Planning Commission Cross Rivers Connections Study

The Tri-County study identifies several bicycle improvements to roadway corridors, trails, and intersections.

Connections Study
2014

The Tri-County Regional Planning Commission Transportation Improvement Program (TIP) for 2015-2018

Several infrastructure projects scheduled to begin within the study area during the 2015-2018 years will affect bicycling in the area including a project that involves installation and updating the crossing of local bike trail at various locations within the Harrisburg Area. The scope includes, pavement marking, signage, and flashing warning signs.

Lebanon County Bicycle Transportation Map

The Lebanon County Bicycle Transportation Map was created to inform PennDOT, the Lebanon County Metropolitan Planning Organization, municipalities, contracted planners, and engineers which roads are most frequently used by bicyclists to reach their varied destinations. The map can be found by visiting http://www.lebcounty.org/Planning/Documents/MPO%20documents/BicycleTransportationPriorities%20Map4-25-14.pdf.

REGIONAL Bicycle Connections Study

Chapter Three: Public Participation

Overview

Developing a well-informed plan requires the participation of citizens throughout the region who represent a variety of backgrounds and bicycle-related interests. To ensure that members of the public had several opportunities and means of participation, the *Regional Bicycle Connections Study* included a multifaceted public engagement process, using a variety of meetings, events, and project resources to reach individuals for plan input and feedback. This chapter discusses the public participation process, project resources used to raise awareness of the Plan and gather input, and a summary of feedback received through this process.

Public Participation Process

A variety of events and resources were developed so that citizens of the region had the opportunity to participate. A combination of in-person events, hard copy resources, and electronic resources were used to address the different communication needs and preferences of the public. The public participation process included the following:

- Steering Committee Meetings
- Public Outreach Events
- Project Information Resources
  - Project website with link to interactive input map
  - Online interactive input map (WikiMap)
  - Public input cards
  - Informational display boards
  - Hard copy maps

Steering Committee Meetings

The development of this plan was guided by the project's Steering Committee, a group of over 20 individuals representing the bicycling interests of the member municipalities and the region. Steering committee members also represented a number of agencies and backgrounds, including the Tri-County Regional Planning Commission, participating municipalities, PennDOT, and local advocacy groups. The Project Steering Committee met with project consultants throughout the process, focusing on project vision and goals (April 2014), existing conditions (August 2014), the draft plan (January 2015), and the final Plan (March 2015).

Public Outreach Events

Two rounds of public input were planned. The first consisted of a information gathering process to determine the needs and desires of the community. The purpose of the second round was to vet the draft network and Plan.

Round One

Gathering feedback from the community about the existing conditions of biking in the region set the tone for the types of recommendations that are critical in the area. By reviewing existing plans, programs, and infrastructure, the project team gained a better understanding of the implementation process, critical infrastructure gaps, and programming efforts focused on education, enforcement and evaluation.

Participants discussing safety and facilities at the Hershey Farmers Market.

The project website supported the effort to spread awareness of the project. The WikiMap, Steering Committee meetings, and piggy-back event at the farmers market in Hershey provided the project team with the perspective of those who ride, citizens who wish to ride but are intimidated, motorists who interact with bicyclists, enthusiastic advocates, and key decision makers.

Information boards were created to educate participants. By sharing the demand and supply modes with the public, citizens were able to compare their on-the-road experiences with GIS mapping models. For those who were not familiar with the wide variety of bicycle facility types, a pictorial display was used to feature photographs of several different potential treatments - both on- and off-road. Maps were also available for comment. Participants used stickers to indicate where they live, would like to travel on bike, and challenging areas. Route characteristics were also discussed to convey those roads that feel safe today and those that would provide useful connections but are currently uncomfortable for riders.

Round Two

The second round of public input involved the review of the network, a prioritization discussion, and a discussion of key action steps. In addition to a public meeting, a special breakfast was arranged by the Lebanon Valley Bicycle Coalition. This meeting enabled PennDOT, municipal and county leaders, and key stakeholders to vet the network and discuss how each party can become an integral supportive force in creating a more bicycle friendly region. Input was vetted for inclusion in the final Plan by modifying the network, creating additional cost effective solutions, and refining prioritization.

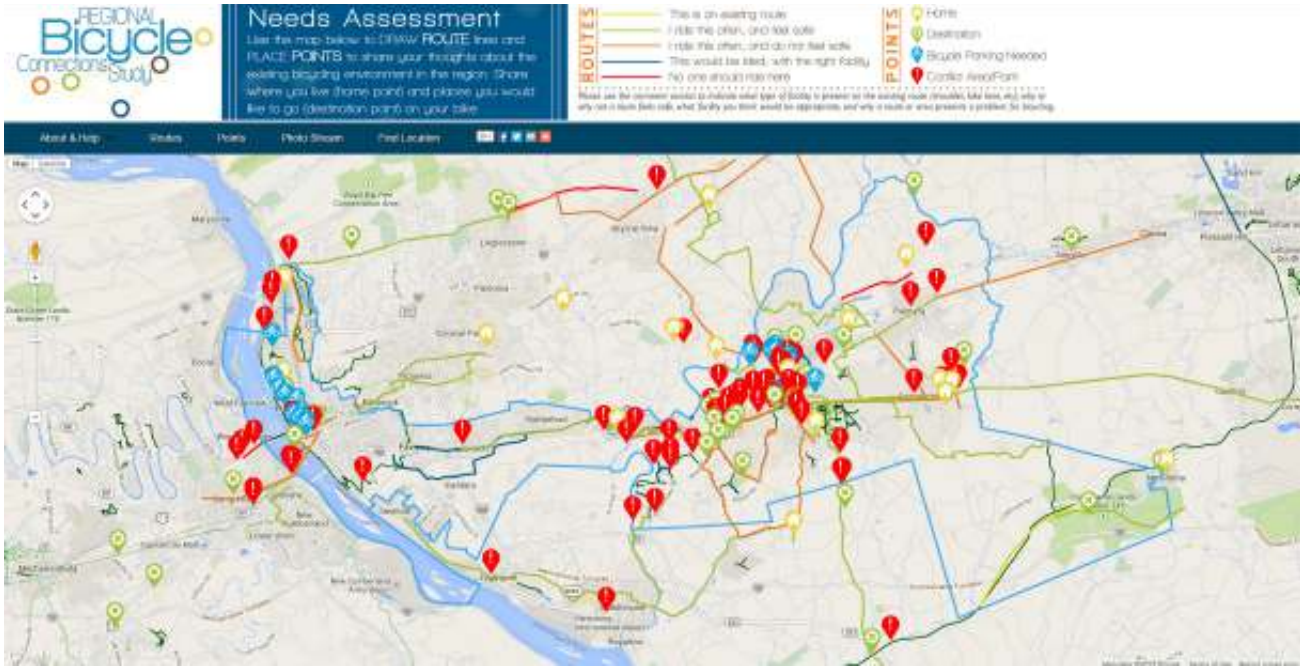
Project Resources

Project Website

A project website was developed to provide project information, maps, upcoming event information, contact information, and additional resources to the public. The website also featured a link to the online interactive input map, offering an additional medium for residents of the region to become engaged and participate in the planning process.

Round Two participants worked in groups to refine the recommended network.

The project website featured details of the study as it progressed, including access to the WikiMap.



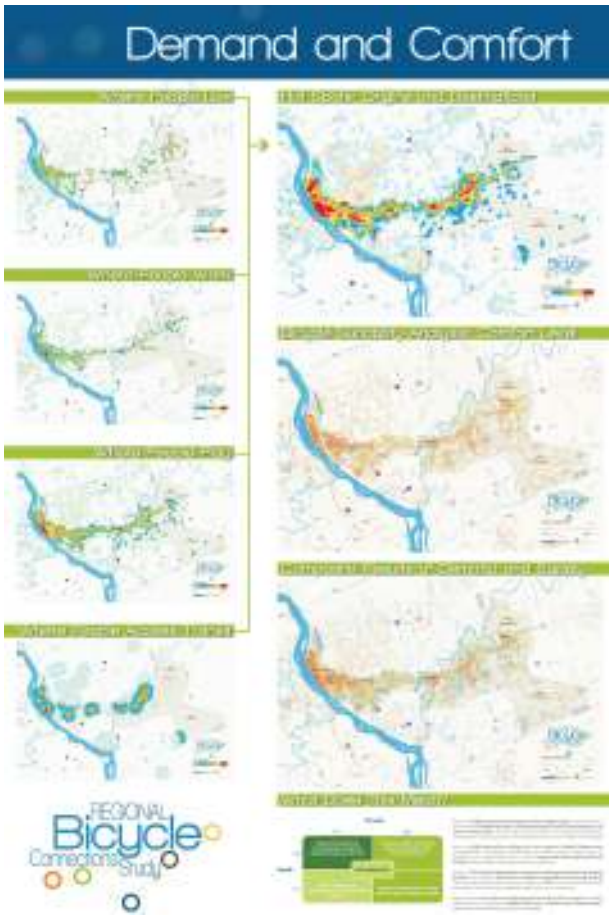
Over 250 unique users provided input on which routes may be suitable for new facilities and where they would like to be able to ride on their bicycles.

Online Interactive Input Map (WikiMap)

A WikiMap of the study area was created online as part of this public participation process. Citizens were invited to electronically draw route lines and place points on the map to share thoughts about the existing bicycling environment in the region. The map allowed participants to draw lines of existing bicycle routes, roadways that feel safe, roadways that do not feel safe, routes that would be ideal with the right facility, and routes that should be avoided. Participants could place points for where they live, bicycling destinations, places where bicycle parking is needed, and identify conflict areas. A comment section allowed citizens to indicate what type of facility is present on existing routes, why a route does or does not feel safe, suggested facility types for proposed routes, and why a route or area presents a problem for bicycling. Over 250 unique users provided comments and information that was formative in the network development.

Public Input Cards

The information card shown here was designed to spread awareness of the project as well as to direct interested citizens to the website and to provide



Information boards help participants and Steering Committee members understand the planning process and analysis tools.

contacts for further information. By providing the general public with access to different avenues of public input, these public engagement components provided a variety of opportunities for the voices of the region to be heard.

Informational Display Boards

A series of project information boards were created to showcase the planning process and garner feedback and support for the Plan's development. These boards presented existing bicycle conditions and bicycling demand in the region, bicycle facility types, vision and goals, and project recommendations. The boards were displayed at Steering Committee meetings and at public outreach events. Feedback received on the boards was incorporated into the final Plan.

Hard Copy Maps

Hard copy maps of each municipality in the study area were developed to gather input on bicycle facility opportunities, constraints, and priorities in

the region. The maps displayed existing bicycle facilities, including bike routes, roadways with four-foot paved shoulders, and multi-use trails. Steering Committee members and the public were invited to mark up the maps at meetings and events to inform the plan's report of existing conditions and recommendations.

Public Participation Takeaways

Overall, while there are some great recreational resources in the region, there is a significant lack of on-road facilities that would serve as encouragement to the "Interested but Concerned" and the bicycle commuting community. Several people we encountered while conducting field work commented how integral the existing trails are to their quality of life. Critical improvements are needed for roadway crossings and intersections to improve both pedestrian and bicyclist safety.

Other than paved shoulders and BicylePA Route J in Harrisburg, the growing bicycling community feels they are not well served by the street network. Improvements were requested to add bike lanes, protected bike lanes (cycletracks), and indications to motorists that would communicate bicyclists are permitted to use the road.

Many motorists and bicyclists admitted they were not aware of all the rules and regulations in place that dictate how to appropriately behave in a multimodal environment. While infrastructure and cultural support seem to exist in Philadelphia and Pittsburgh, citizens felt the state could do more to support and enable smaller communities to become more bicycle friendly.

The map shows that there is significant potential for bicycling, including existing routes that feel safe, routes that could be ideal with a bicycle facility upgrade, and bicycling destinations throughout the region, some of which are already served by routes where bicyclists report feeling safe. However, the map also indicates some major challenges to bicycling. These include a large number of conflict areas, routes with heavy traffic and high speeds that do not feel safe, areas where bicycle parking is needed, destinations that are not currently accessible by a bicycling route that feels safe, and a disconnected network of comfortable routes.

Public input is integral to the planning process. User feedback and desires of the community help formulate network recommendations.

REGIONAL Bicycle Connections Study

Chapter Four: Recommendations

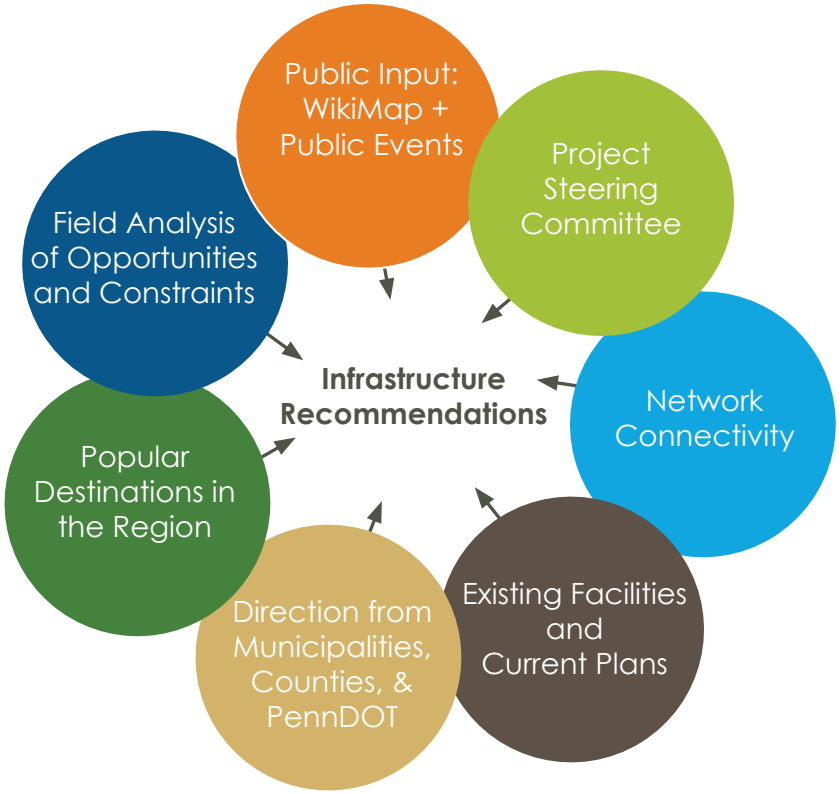
Overview

This Plan recommends a network of bicycle facilities that will link communities, neighborhoods, schools, and businesses across the region. The network consists of existing and proposed facilities such as bicycle lanes, paved shoulders, bicycle boulevards, and signed routes. This chapter includes sections on bicyclist types, bicycle facility types, bicycle network recommendations including bike network maps, the project prioritization process, and program recommendations.

The recommendations presented in this chapter are based on the 5 "E's": Engineering, Education, Encouragement, Enforcement, and Evaluation. Recommendations for the first "E", Engineering, are covered in the first half of this chapter and in the Bicycle Network Recommendations section. Recommendations for the final four "E's" are addressed in the Program Recommendations section.

Methodology

The recommended bicycle network was developed based on information from several sources: input from the municipalities and Steering Committee, public input obtained online and through in-person events, previous plans and studies, review of existing bicycle facilities, noted bicycle trip attractors, and field analysis. Fieldwork examined the opportunities and needs for bicycle facilities along key roadway corridors that make connections between communities and key destinations in the region. Input sources for the Plan are summarized by the diagram below.



This diagram illustrates the inputs used to develop this Plan's recommendations.

Building A Network

Network recommendations are crafted after first developing a baseline of information about the community. This baseline is detailed in the Existing Conditions chapter and includes a review of previously adopted plans, GIS demand and supply modeling, fieldwork, and public needs analysis. The results and outputs of existing conditions tactics are then layered to reveal a framework for:

WHO should be served by the network?

WHERE do they live?

WHERE do they want to go?

WHICH facility types are appropriate?

The WHO

For this region, **the vision and goals of the Plan emphasize safety for all ages and abilities.** Therefore, this network should serve recreation and transportation users of varying skill across a spectrum of income levels. This requires a "hubs and spokes" method for developing a network that connects people from their homes to key destinations and daily services. Essentially, the hubs are high demand areas (downtown, residential neighborhoods, shopping centers) which need to be served by spokes (protected bike lanes or cycle tracks, bike lanes, bike/walk streets, etc.). Serving multiple ages, abilities, and purposes also dictates a level of comfort and safety acceptable for children riding bikes to school, physically challenged individuals recreating and commuting, households without access to a private vehicle commuting to work, and visitors exploring the city.

The 'hubs and spokes' model conceptually illustrates how destinations in the region will be linked through various types of bicycle facilities.

The WHERE

The Live, Work, Play, analysis tells us where people live and key destinations across the community. The supply analysis reveals which roads may be suitable for bicycle facilities. Public input also helps refine these areas of high demand as well as which routes may be ideal for facilities and which to avoid. Input from local staff, public comments, and the demand and supply analysis are layered to narrow potential routes to review in field analysis.

The WHICH

Knowing the WHO and WHERE fuels a more focused field exploration of WHICH routes may become alignments for different types of facilities. With a goal of elevating the protection and comfort as high as possible, the facility selection becomes a delicate balance of what can fit within the existing right-of-way or roadway (curb-to-curb), and where it is critical that the municipalities invest in larger capital projects to implement facilities with protection and organization that enable all levels of cyclists to circulate. Both qualitative and quantitative factors guide the facility selection process.

The WHO: Types of Bicyclists

Bicyclists, or people on bikes, can be categorized into four distinct groups based on comfort level and riding skills. Bicyclists' skill levels greatly influence expected speeds and behavior, both in separated bikeways and on shared roadways. Each of these groups has different bicycle facility needs, so it is important to consider how a bicycle network will accommodate each type of cyclist when creating a non-motorized plan or project. The bicycle infrastructure should accommodate as many user types as possible, with decisions for separate or parallel facilities based on providing a comfortable experience for the greatest number of people. Since this Plan focuses on many user types, it is critical to consider WHO you are connecting to, WHERE, and WHAT facility type may be key to their comfort and safety. In the US population, people are generally categorized into one of four cyclist types. The characteristics, attitudes, and infrastructure preferences of each type are described below.

Strong and Fearless (Approximately 4%)

This cyclist type is characterized by the bicyclists that will typically ride anywhere regardless of roadway conditions or weather. These bicyclists can ride faster than other user types, prefer direct routes, and will typically choose roadway connections even if shared with vehicles over separate bicycle facilities such as multi-use paths.

Enthused and Confident (Approximately 9%)

This user group includes bicyclists who are fairly comfortable riding on all types of bikeways but usually choose low traffic streets or multi-use paths when available. These bicyclists may deviate from a more direct route in favor of a preferred facility type. This group includes all kinds of bicyclists such as commuters, recreational riders, racers, and utilitarian bicyclists.

Interested but Concerned (Approximately 56%)

This user type comprises the bulk of the cycling population and represents bicyclists who typically only ride a bicycle on low traffic streets or multi-use trails under favorable weather conditions. These bicyclists perceive significant barriers to their increased use of cycling, specifically traffic and other safety issues. These people may become "Enthused & Confident" with encouragement, education, and experience.

No Way, No How (Approximately 31% of population)

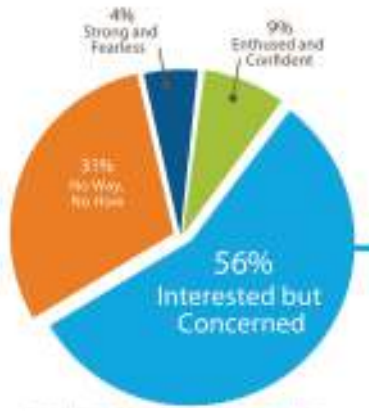
Persons in this category are not bicyclists and perceive severe safety issues with riding in traffic. Some people in this group may eventually become more regular cyclists with time and education. A significant portion of these people will never ride a bicycle other than on rare occasions or under special circumstances (e.g., in a park or with a child).

"Strong and Fearless"

"Enthused and Confident"

"Interested but Concerned"

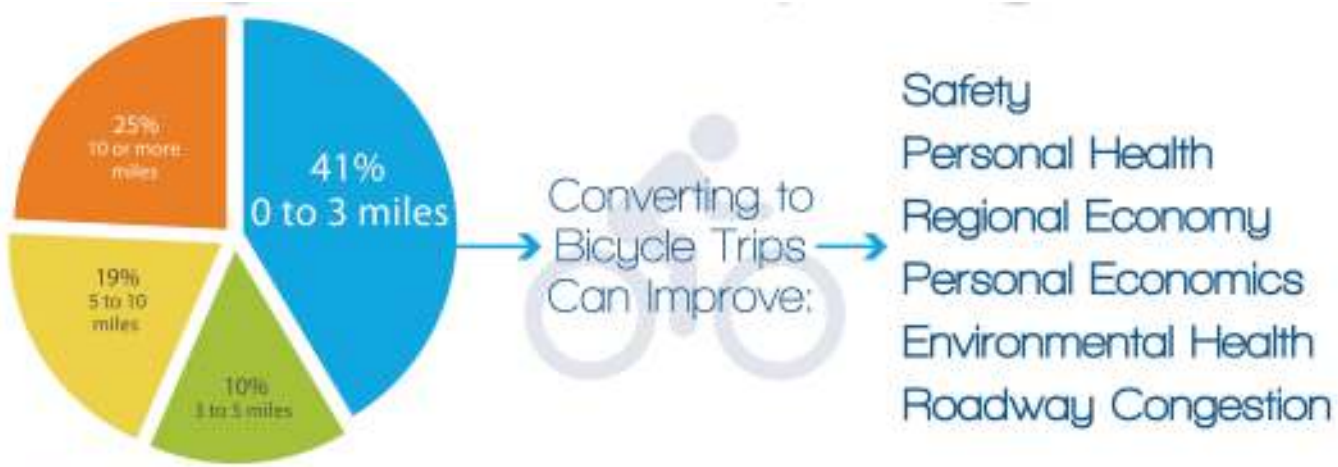
Who We Plan For in Bicycle Master Plans



Source: Adapted from J Dill., N Mcneil. Four Types of Cyclists. 2012.

It is important to plan for the 56% Interested but Concerned. As more of this group choose to bike, benefits like alleviating congestion and increasing travel efficiency for all modes become a reality.

Trip Distances: Benefits of Converting the Short Trips



Todd Litman. Short and Sweet: Analysis of Shorter Trips Using National Travel Survey Data. Victoria Transport Policy Institute. 2012.

The 56% Interested but Concerned are likely to begin venturing out for small trips. Since these comprise 41% of all trips, this can have a huge impact for all modes.

THE WHERE: DEMAND AND SUPPLY

The "hubs" of the network were derived from the demand model, online input map, and public survey. Top priorities for bicycle network connections are the cores and "main streets" of each municipality, schools, dense residential areas, employments centers, and centers of commerce. With the hubs and spokes method, each hot spot in the demand model shows major cores which will need connective "spokes" reaching out to other hot spots throughout the region to connect people with key destinations.

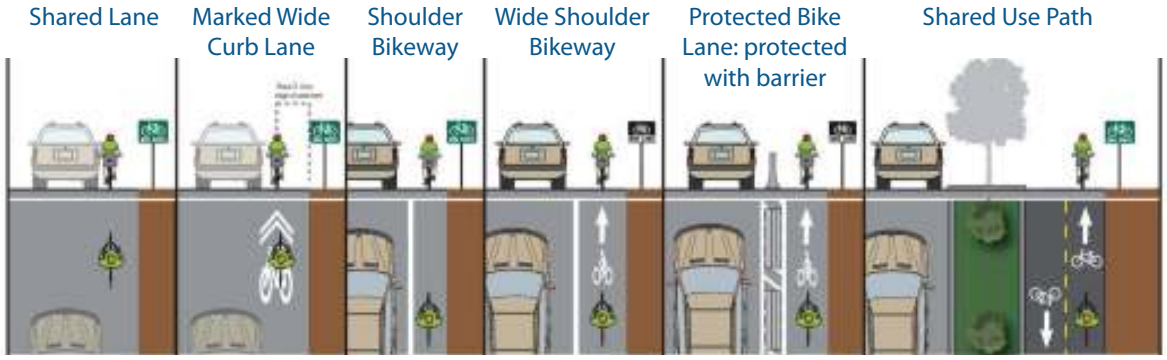
After layering the Bicycle Suitability Index (BSI) (full size map and methodology found in Appendix C: Regional Bicycle Demand) with the demand analysis, there are several roadways that need to be considered for bicycle improvements but currently are not "comfortable" as indicated by the BSI analysis. In these cases, fieldwork is imperative to understanding the current geometry of the roadway and determining if changes can be made to reconfigure the environment to support multiple modes in a safe, organized manner.

The WHICH: Bicycle Facility Types

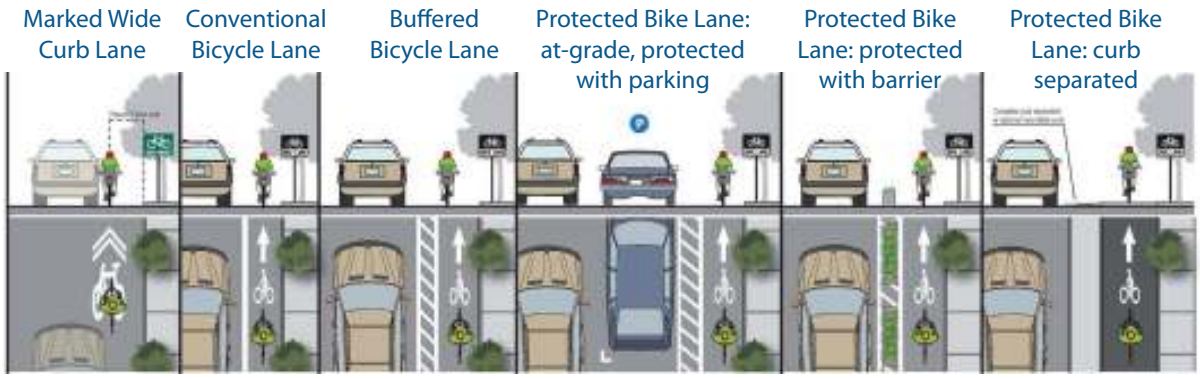
When choosing facility types to generate a well-connected network for the region, it is essential to understand the different types of facilities and in what conditions they should be implemented. The below continuum summarizes multiple bicycle facilities by level of protection. Appendix A provides details for each of the below facilities and how they should be implemented according to national and local standards.

Least Protected → Most Protected

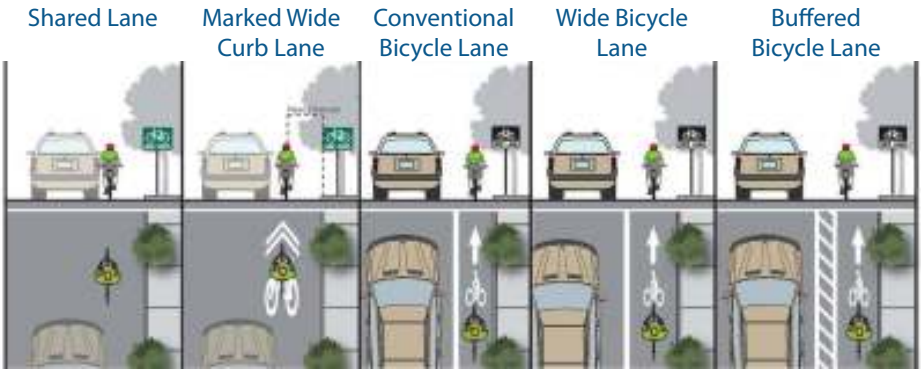
Arterial/Highway Bikeway Continuum (without curb and gutter)



Arterial/Highway Bikeway Continuum (with curb and gutter)



Collector Bikeway Continuum



Signed Shared Roadway (Bike Route/Signed Route)

Signed routes use bicycle signage and markings to increase driver awareness on the roadway. Signed routes may also include traffic calming devices and intersection treatments to improve the safety for bicyclists and all other transportation modes. A signed shared roadway is recommended where calm roadways linking neighborhoods, schools, and parks serve as alternate routes to unsafe bicycling corridors. Sharrows may be used in areas with higher traffic volumes and vehicle conflicts.

Shared Lane Markings (Sharrows)

Shared lane markings are pavement markings used to indicate shared space for bicyclists and motorists. Sharrows are used on roads where dedicated bicycle lanes are desirable but not possible due to constraints (roadway width, on-street parking, etc). Placed every 100 to 250 feet along a corridor, sharrows make motorists aware of the potential presence of cyclists, direct cyclists to ride in a specific direction, and guide cyclists to ride further from parked cars to avoid 'dooring' collisions.

Paved Shoulder

A paved shoulder is the part of a roadway that is continuous to the travel lane, separated by a pavement marking stripe. A minimum of four feet is preferred where possible, although there is no minimum width for paved shoulders. Ideally, paved shoulders should be included in the construction of new roadways or the upgrade of existing facilities, especially where there is a need to accommodate bicycles. Paved shoulders are common on rural roads with low traffic volumes.

Bicycle Lane

Bike lanes designate an exclusive space for bicyclists through the use of pavement markings and signage. The bike lane is located adjacent to a motor vehicle travel lane and is generally used in the same direction as motor vehicle traffic. The bike lane is typically located on the right side of the street, and should be wide enough for a bicyclists to ride comfortably between the adjacent travel lane and either the curb, road edge, or parking lane. The typical width for a bike lane is between four and six feet, depending on the roadway configuration.

Buffered Bike Lane

Similar to a conventional bicycle lane, a buffered bicycle lane has an additional marked buffer component separating the bicyclists from the motor vehicle lane. The purpose of the buffered bicycle lane is to increase separation between motor vehicle traffic and bicyclists on high volume and/or high speed roads, especially those with a high frequency of large vehicle traffic. The added separation increases bicyclists' safety and comfort.

Bicycle Boulevard

Bicycle boulevards are streets with low motorized traffic volumes and speeds, designated and designed to give bicycle travel priority. Bicycle boulevards use signs, pavement markings, and speed and volume management measures to discourage through trips by motor vehicles and create safe, convenient crossing of busy arterials. Many of the design treatments of bicycle boulevards, such as chicanes, bulb-outs, speed humps, etc., not only benefit bicyclists, but they also help create "quiet" streets that benefit residents and improve safety for all road users.

Protected Bicycle Lane / Cycle Track

A protected bike lane, also called a cycle track, is an exclusive bike facility that combines the user experience of a separated path with the on-street infrastructure of a conventional bike lane. A protected bike lane is physically separated from motor traffic and distinct from the sidewalk. Protected bike lanes have different forms but all share common elements – they provide space that is intended to be exclusively or primarily used by bicycles, and are separated from motor vehicle travel lanes, parking lanes, and sidewalks.

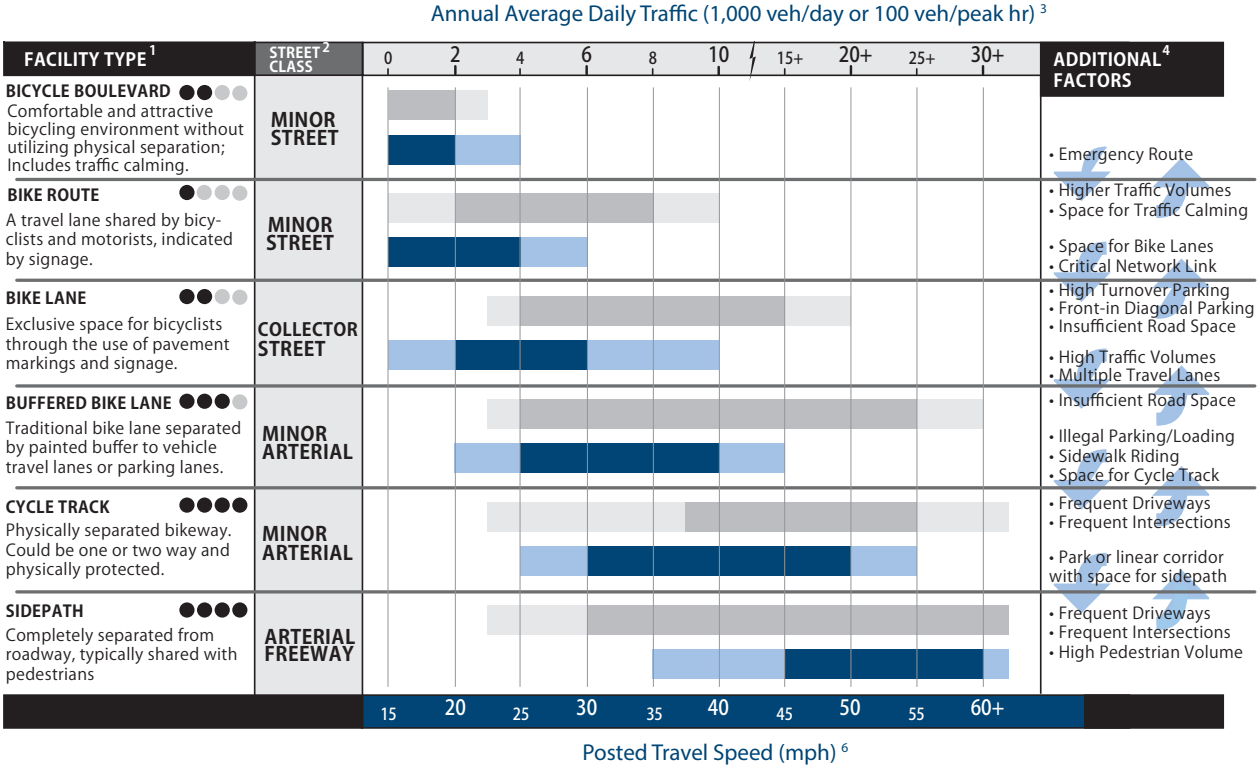
Protected bike lanes may be one-way or two-way, and may be at street level, sidewalk level, or at an intermediate level between the street and sidewalk height. A combination of curbs, medians, bollards, on-street parking, and different pavement/color is used to protect and differentiate the protected bike lane from motor traffic and the sidewalk.

Shared-Use Path

A shared-use path is physically separated from motorized traffic and accommodates pedestrians and two-way bicycle traffic. A shared-use path is often used for recreation and users of all skill levels preferring separation from vehicle traffic. Paths within the roadway corridor right-of-way, or adjacent to a road, are called 'side paths.' Paths within or adjacent to railroad right-of-way are called 'rail-trails' and paths within a greenspace corridor, utility corridor, or public use easement are often referred to as 'greenway trails.'

Layering The Potential

To summarize best practices and regulations from various sources, the chart below accounts for multiple factors that influence comfort and safety. There is a significant impact on cycling comfort when the speed differential between bicyclists and motor vehicle traffic is high and motor vehicle traffic volumes are high. As a starting point to identify appropriate facilities, the chart below can be used as a guide. To use this chart, identify the appropriate daily traffic volume and travel speed on an existing roadway and locate the facility types indicated as appropriate given those key variables.



LEGEND

SEPARATION [5]

- Minimal Separation
- Moderate Separation
- Good Separation
- High Separation

min	VOLUME	max
min	SPEED	max
Acceptable	Desired	Acceptable

Notes:

1. Refers to specific bicycle facilities described in the design guidelines. Many local roads function just fine as they are due to their low traffic volume and speed.

2. The use of functional classes provides some general context for the cases in which bicycle facilities are most likely to be implemented. Land use and additional factors (see 4) should always take precedence in determining which facility type to select.

3. Urban peak hour factors typically range from 8 to 12 percent of AADT. For the purposes of this chart, the peak hour is assumed to be 10 percent of AADT.

4. Noted additional factors include a selection of considerations that may influence the selection of bicycle facility type where roadway speed/volume values overlap over multiple facilities. Many of the factors that suggest increasing separation are common across multiple facility types like bike lanes, buffered bike lanes and cycle tracks.

5. Increased separation of bicycle facilities from motor vehicle traffic typically results in higher levels of user comfort and appeals to wider skill levels of bicyclists.

6. This chart considers posted speed limit only. The 85th percentile speed may vary, and may change with implementation of a bikeway.

Other factors beyond speed and volume that affect facility selection include traffic mix of automobiles and heavy vehicles, the presence of on-street parking, intersection density, surrounding land use, and roadway sight distance. See the right column of the chart for other key issues to consider when selecting an appropriate facility type.

The chart on the previous page (which is derived from guidance provided by American Association of State Highway and Transportation Officials [AASHTO], National Association of City Transportation Officials [NACTO], Federal Highway Administration [FHWA], and other sources) can serve as a useful tool to assist in decision making for the placement and type of bicycle facility, but contextually sensitive considerations and cause and effect scenarios for implementing bicycle facilities (parking removal or lane reductions) do not fall into one simple chart. This stresses the importance of the human element in facility design, including input from users, non-users, staff (including maintenance departments), engineers, planners, and designers.

Additional Considerations

To address the network as a whole and how it functions together as a hubs and spokes model, a wider lens must be used to consider the holistic impact of the system. Stepping away from the minutia of facility options within particular roadway segments, the network must function as a whole. **A hierarchy should emerge with clear defined spaces for bicyclists, connecting major destinations and providing protection, separation, and organization for multiple modes.** Reaching out from these routes can be facilities with less protection due to factors such as lower traffic volumes. The last branches, or spokes, should be those reaching the last mile into demand areas such as residences.

The network recommendations in this Plan compose the backbone of the bicycle system and some of the facilities reaching out into neighborhoods. Additional study of each municipality can help close the last mile or half mile gaps and organize appropriate routes that should become bicycle boulevards. Future additions to the system will help strengthen the backbone and build out the rest of the hierarchy as needed. It is important to consider the following factors as future routes and facilities are planned and constructed.

Accessibility

Readily accessible connections need to be considered a key component of any bicycle network. Accessibility is measured by the distance a bike facility is located from a specified attraction, the ease by which this distance can be traveled by bicycle, and the extent to which all likely origins and destinations are served. For example, some communities in other states have adopted a criterion of having a bicycle facility within one mile of every residence.

Directness

Both bicyclists and motorists desire a direct and quick route to destination points. **Studies have shown that most bicyclists will not even use the best bicycle facility if it greatly increases the travel distance or trip time over that provided by less desirable alternatives.** Generally speaking, experienced and fearless bicyclists prefer directness, while confident and concerned bicyclists prefer comfort and perceived safety as the key characteristics of the bicycle facility.

CONTINUITY

A proposed bicycle network should be viewed as a transportation system and provide continuous, direct connections to numerous attractions throughout the community. If gaps exist in the network, measures should be taken to provide safe and efficient short-term alternatives and long-term permanent solutions.

CONSISTENCY

Providing consistent bicycle facility types should be a goal when planning and designing bicycle networks. To the fullest extent possible, bicycle facilities should provide bicyclists with a relatively consistent facility type (i.e. shared use path, bicycle lane, or shoulder improvement) within key corridors. Switching between facility types can create conflict points, be confusing, and leave bicyclists with a sense of abandonment within the overall network.

ROUTE ATTRACTIVENESS

Bicycle networks or portions of the network should encompass factors as separation from motor traffic, proximity to visual aesthetics, connections to employment centers, major passive and active recreation areas, and the real or perceived threat to personal safety along the facility. These factors tend to encourage novice and recreational bicyclists to view the bicycle as a mode of transportation and enhance the overall bicycle network.

LOW CONFLICT

Bicycle networks should consist of routes that minimize conflicts between bicyclists and motorists and between bicyclists and pedestrians. In addition, areas of high crash incidents should be avoided or addressed directly through intersection improvements and/or other safety improvement measures.

In addition to implementing low conflict bikeways, it's also important to educate riders when they're travelling against traffic or in a manner that creates direct conflict with motorists. Installing Ride With Traffic and Wrong Way MUTCD signage on corridors such as Forge Road and Lingle Avenue will help mitigate high conflict contraflow riding and encourage the use of appropriate facilities.

The perceived safety of a side path (as seen here on Waltonville Road) can make a huge impact for children and more timid bicyclists.

Obtaining buy-in for this Plan from private developers and companies will provide an opportunity for collaboration and gap closures. For example, in the spirit of the vision and goals, it would be an asset for more timid bicyclists to be able to use the path on Old West Chocolate Avenue. Currently, at five feet, the path is too narrow to support pedestrians and bicyclists, especially two-way travel. Expanding this path to ten or twelve feet would close a large gap in the system.

EASE OF IMPLEMENTATION/COSTS

Right-of-way, environmental, historical, and funding constraints, as well as the political climate, must all be considered during the planning process to ensure that implementation of the Plan is actually feasible. For example, land acquisition costs and historical and environmental impacts need to be carefully considered to determine the feasibility of a project.

MULTIMODAL COORDINATION

The integration of bicycling with other modes of transportation, particularly public transit, benefits the entire transportation network. It has been well demonstrated in many American, European, and Asian communities that with the proper facilities and policies, bicycles can have a significant complementary effect on transit systems, resulting in increased ridership. Bicycles provide the on-demand, door stop service that most bus and rail systems are unable to provide. Buses and trains will usually travel faster and farther than most bicyclists. The combination has a synergistic effect amplifying the market area and effectiveness of each. Bicycle facilities also complement park and ride facilities by providing bicyclists and motorists with mode transfer opportunities. Finally, multimodal connections help reduce traffic congestion by providing alternatives to the single occupant vehicle (SOV).

MULTI-JURISDICTIONAL COORDINATION

Providing and anticipating connections across jurisdictional boundaries are necessary in developing a comprehensive plan. Communities need to look outside their borders to ensure there is a level of regional connectivity associated with the local plan. The Tri-County Regional Planning Commission can provide insight and assistance during this process.

SAFETY AND SECURITY OF BICYCLISTS

The design of bicycle facilities needs to be treated as any other transportation project, with personal and traffic safety as key design elements. Safety is an important part of any plan and includes education, enforcement, encouragement, and design of facilities. The concepts of safety, such as safe intersection treatments, must guide the development of all bicycle facilities.

In addition, people on bicycles needs to be educated about safe bicycling practices. Finally, personal security issues need to be addressed, especially when dealing with shared use paths. Appropriate landscaping, lighting, safety call boxes, and frequent patrols are common measures to improve bicycling safety and security.

Project Prioritization Process

The recommendations in this Plan include dozens of individual projects that together make up the overall proposed regional bicycle network. These projects will be developed incrementally over the coming years. Some will be developed based on locally determined priorities, while others will be built as opportunities arise (such as when funding or right-of-way becomes available or when new development facilitates construction). While the partners of this Plan should certainly take advantage of implementation opportunities as they arise, there also needs to be a plan in place for proactively developing the network in a logical and strategic manner. This section outlines a set of prioritized projects for that purpose. These should be pursued for development as part of a coordinated effort among the regional stakeholders.

Prioritization Criteria

The criteria described below were used to guide the prioritization process and can help determine future priority projects as needed.

- Public Support: The proposed network was developed primarily from a combination of stakeholder input, public input, and existing plans. Projects that are already supported by existing plans should take priority.
- Functional Segment: Each priority bicycle project should have an "anchor" or destination on each end, such as a park, neighborhood, school, shopping area, or existing on-road bicycle facility or trail.
- Project Cost: Lower cost projects, particularly those anticipated to provide a high impact through other criteria, are ideal "low-hanging fruit" to pursue in the short- to medium-term.
- Geographic Distribution: Projects should be implemented over time with a relatively even distribution throughout the region.
- Feasibility: Any known major obstacles that would likely prohibit the near-term development of a project were taken into consideration when determining priorities.
- Available Funding: A lack of an identified funding source alone should not prevent a project from being considered a priority. However, if a project already has funding in place, or a likely source has been identified, that project should be considered a strong candidate for priority development.
- Overall Connectivity: The priority projects should provide a logical, connected foundation from which the larger regional bicycle network may expand over time. For example, priority east-west connections should be balanced with priority north-south connections, and they should connect to one another to the fullest extent possible.

Network Prioritization and Cost Estimates

The following charts illustrate the projects in order of priority. Each project contains a "to" and "from" location to define the overall project. Projects that span multiple jurisdictions are identified in a separate table at the end to illustrate the importance of multi-jurisdictional coordination.

It is important to note that the following recommendations are considered "planning level," and the cost estimate, type, and extent of each facility may change as the project progresses through design and construction phases. A buffered bicycle lane may need to be downgraded to a bike lane due to roadway constraints or flexible delineators could be added to a buffered bicycle lane to increase vertical separation.

Derry

Route Name	To	From	Facility Type	Miles	Cost Estimate	Priority
E Areba Avenue	Spring Creek Church	Cocoa Avenue	Bicycle Boulevard	0.85	$121,553.52	Short
W Areba Avenue	Cocoa Avenue	Route 322	Bike Lane	1.45	$53,931.34	Short
Sand Hill Road	Bullfrog Valley Road	Route 322	Bike Route	2.08	$1,315.32	Short
Bullfrog Valley Road	Sand Hill Road	Route 322	Bike Route	2.11	$1,338.60	Short
Chocolate Avenue	Lingle Avenue	University Drive	Buffered Bike Lane	4.00	$254,562.48	Short
Cocoa Avenue	Elm Avenue	Route 422	Shared Lane Marking	0.34	$1,916.48	Short
E Derry Road	Route 422	Olde Course Road	Shared Lane Marking	0.91	$5,110.26	Short
Sipe Avenue	Route 422	Mae Street	Shared Lane Marking	0.32	$1,779.74	Short
Elm Avenue	Cocoa Avenue	Route 322	Protected Bike Lane	0.68	$225,691.74	Short
Route 322	Elm Avenue	Cherry Drive	Multi-Use Path	0.33	$157,615.02	Short
Briarcrest Drive	W Areba Avenue	University Drive	Bicycle Boulevard	0.49	$70,356.00	Mid
South Lane (alley south of E Chocolate Ave)	E Connection to Jonathan Eshenour Memorial Trail	W Connection to Jonathan Eshenour Memorial Trail	Bicycle Boulevard	0.37	$52,739.94	Mid
Centerview Lane	Route 322	Briarcrest Drive	Bike Lane	0.18	$6,678.76	Mid
Cocoa Avenue	Route 322	Elm Avenue	Buffered Bike Lane	0.48	$30,475.62	Mid
Mae Street	Lucy Avenue	Hershey Park Drive	Buffered Bike Lane	0.31	$19,850.76	Mid
Jonathan Eshenour Memorial Trail Ext.	Jonathan Eshenour Memorial Trail at Jacobs Creek Dr	Nye Road	Multi-Use Path	1.26	$901,120.32	Mid
University Drive	Briarcrest Drive	Route 322	Multi-Use Path	0.35	$248,915.58	Mid
Route 422	University Drive	Sipe Ave	Multi-Use Path	0.35	$251,211.60	Mid
Valley Road	Cocoa Avenue	Route 422	Bicycle Boulevard	0.70	$100,203.18	Long
Cherry Drive	W Governor Road	W Areba Street	Bicycle Boulevard	0.35	$50,439.84	Long
E Derry Road	Olde Course Road	Park Avenue	Bike Lane	1.36	$50,690.80	Long
Middletown Road	Route 322	Schoolhouse Road	Buffered Bike Lane	2.34	$148,748.04	Long
Homestead Road	Areba Avenue	Route 322	Multi-Use Path	0.77	$672,439.43	Long
Route 322	Homestead Road	Cocoa Avenue	Multi-Use Path	0.45	$392,984.08	Long

Harrisburg

Route Name	To	From	Facility Type	Miles	Cost Estimate	Priority
2nd Street	Vine Street	Division Street	Bike Lane	3.02	$112,557.58	Short
Front Street	Vine STreet	Division Street	Bike Lane	2.95	$109,917.14	Short
Forster Street	Seventh Street	N Front Street	Bike Lane	0.40	$14,946.02	Short
13th Street	Walnut Street	State Street	Shared Lane Marking	0.11	$633.88	Short
17th Street	Sumner Road	Walnut Street	Shared Lane Marking	1.37	$7,640.48	Short
3rd Street	Forster Street	Maclay Street	Shared Lane Marking	1.0	$5,591.15	Short
4th Street/ Mulberry Street	Walnut Street	Derry Street	Shared Lane Marking	0.70	$3,936.84	Short
Commonwealth Avenue	Walnut Street	Forster Street	Shared Lane Marking	0.35	$1,936.62	Short
Sycamore Street	Paxton Street	S Front Street	Shared Lane Marking	1.09	$6,125.74	Short
Vine Street	Capital Area Greenbelt	2nd Street	Shared Lane Marking	0.10	$554.38	Short
Walnut Street	N Front Street	N 3rd Street	Shared Lane Marking	0.20	$1,093.92	Short
Maclay Street	N Cameron Street	N 6th Street	Shared Lane Marking	0.53	$2,949.98	Short
Walnut Street/N 7th Street	State Street	N 3rd Street	Protected Bike Lane	0.36	$119,120.34	Mid
Dauphin Street	2nd Street	6th Street	Bicycle Boulevard	0.42	$60,641.46	Mid
Walnut Street	13th Street	Parkway Drive	Bicycle Boulevard	0.71	$101,420.88	Mid
19th Street	Derry Street	Capital Area Greenbelt	Bike Lane	0.89	$33,252.60	Mid
Division Street	N Front Street	Sixth Street	Bike Lane	0.57	$21,201.18	Mid
N 6th Street	Forster Street	Division Street	Bike Lane	1.8	$66,561.68	Mid
Reily Street	Seventh Street	N Front Street	Bike Lane	0.46	$17,014.60	Mid
Woodbine Street	Sixth Street	N Front Street	Buffered Bike Lane	0.52	$33,357.96	Mid
Emerald Street	Sixth Street	N Front Street	Buffered Bike Lane	0.52	$32,947.92	Mid
3rd Street	Walnut Street	Forster Street	Bike Lane	0.40	$14,847.18	Mid
4th Street	Reily Street	Graham Street	Bicycle Boulevard	1.54	$220,078.98	Long
N 6th Street/ Hoffman Street	Division Street	Linglestown Road/ PA 39	Bike Lane	2.36	$88,108.80	Long
Paxton Street	Sycamore Street	N Front Street	Buffered Bike Lane	1.37	$87,507.36	Long
State Street (Bridge)	N 7th Street	13th Street	Protected Bike Lane	0.47	$158,028.36	Long

Hummelstown

Route Name	To	From	Facility Type	Miles	Cost Estimate	Priority
Kokomo Avenue	End of Street	Circle Drive	Bike Route	0.27	$171.60	Short
Kokomo Avenue	Campground	End of Street	Multi-Use Path	0.08	$56,320.02	Short
Hanover Street	Hwy 322	S Hoernerstown Road	Shared Lane Marking	0.82	$4,584.50	Short
Main Street	Old Farm Road	E North Alley Street	Shared Lane Marking	1.16	$6,512.64	Short
Quarry Road	Main Street	Poplar Avenue	Shared Lane Marking	0.19	$1,048.34	Short
Kokomo Avenue	Circle Drive	Hanover Street	Shared Lane Marking	0.36	$1,991.74	Short
High Street	W Main Street	East end of High Street	Bicycle Boulevard	1.14	$163,280.04	Mid
Division Street/ Parkside Avenue	Waltonville Road/Quarry Road	S Hanover Street	Bicycle Boulevard	0.35	$49,790.40	Long
Water Street	Division Street	E Main Street	Bicycle Boulevard	0.29	$41,888.88	Long

North Londonderry

Route Name	To	From	Facility Type	Miles	Cost Estimate	Priority
Palmyra Road/ Campbelltown Road	Railroad Street	Cottonwood Court	Bike Route	0.46	$289.20	Short
Leon Avenue	Grubb Road	S Forge Street	Shared Lane Marking	0.27	$1,535.94	Short
Gravel Hill Road	Syner Road	Ridge Road	Bike Route	2.35	$1,487.77	Short
S Railroad Street	S Forge Road	E Elm Street	Bike Lane	0.72	$26,940.96	Mid
E Elm Street	S King Street	S Railroad Street	Bicycle Boulevard	0.53	$75,389.16	Mid

South Londonderry

Route Name	To	From	Facility Type	Miles	Cost Estimate	Priority
Mount Gretna Road	Princeton Avenue	Mount Wilson Road	Bike Route	2.83	$1,794.96	Short
Mount Wilson Road	Spring Lane	Horseshoe Trail	Bike Route	1.78	$1,129.32	Short
Northside Drive	S Lingle Avenue	Forge Road	Buffered Bike Lane	1.04	$66,474.72	Short
Lawn Rd/Hinkle Rd	S Forge Road	Elizabethtown Road	Bike Route	5.6	$3,549.84	Short
Airport Road/ Taxiway Road	Taxiway Road	Forge Road	Bike Lane	0.36	$13,272.80	Mid
Elizabethtown Road	T326	Mount Gretna Road	Wide Shoulder	3.94	$2,496.60	Long
S Forge Road	Hwy 322	Mount Gretna Road	Wide Shoulder	4.06	$2,574.60	Long
Route 322	S Thistledown Dr	S Forge Road	Buffered Bike Lane	1.32	441,230.82	Long

Swatara

Route Name	To	From	Facility Type	Miles	Cost Estimate	Priority
Derry Street/ Pleasant View Road	Bridge Road	Milroy Road	Shared Lane Marking	1.37	$7,666.98	Short
Derry Street	N 40th Street	Wilhelm Road	Bike Lane	0.56	$20,975.26	Short
Derry Street	S 43rd Street	N 40th Street	Shared Lane Marking	0.41	$2,311.86	Short
Chamber Street	Harrisburg Street	Front Street	Shared Lane Marking	1.17	$6,539.14	Short
Derry Street	Milroy Street	50th Street	Bike Lane	2.85	$106,189.46	Mid
Harrisburg Street	Capital Area Greenbelt	Chambers Street/ Ball Field	Bike Lane	1.73	$64,408.38	Mid
Derry Street	N 50th Street	43rd Street	Buffered Bike Lane	0.49	$30,958.02	Mid
Chambers Hill Road	S 40th Street	N Harrisbyrg Street	Bike Lane	0.53	$19,619.74	Long
Chambers Hill Road	Penhar Street	S 40th Street	Buffered Bike Lane	0.74	$46,901.34	Long
Paxton Street	Sycamore Street	32nd Street/ Capital Area Greenbelt	Buffered Bike Lane	0.82	$52,292.16	Long

Palmyra

Route Name	To	From	Facility Type	Miles	Cost Estimate	Priority
Cherry Street	S Horstick Avenue	Hwy 422	Bike Lane	1.50	$55,759.88	Short
N Railroad Street	Ridge Road	Hwy 422	Shared Lane Marking	0.91	$5,114.50	Short
Railroad Street	Hwy 422	E Elm Street	Shared Lane Marking	0.53	$2,956.34	Short
N Forge Street	E High Street	E Ridge Road	Shared Lane Marking	0.61	$3,147.42	Short
E Spruce Street	Railroad Street	Forge Road	Bicycle Boulevard	0.64	$91,219.26	Mid
Forge Road	E Cherry Street	E High Street	Bike Lane	0.33	$12,305.58	Mid
Grant Street	Ridge Road	E Spruce Street	Bike Lane	0.32	$11,910.22	Long
Grant Street	E Cherry Street	E Spruce Street	Bike Lane	0.56	$20,763.46	Long

Multi-Jurisdictional Projects

The following table displays the project recommendations that span multiple jurisdictions. These projects will require resource, funding, and information sharing coordination between municipalities to implement the recommended bikeway.

Route Name	To	From	Facility Type	Miles	Cost Estimate	Priority
S Duke Street / Grubb Road	**Leon Avenue**	**Cherry Street**	**Shared Lane Marking**	**1.20**	**$6,690.72**	**Short**
S King St/Hemlock St/Grubb Rd *(North Londonderry)*	Leon Avenue	E Elm Street	Shared Lane Marking	0.77	$4,324.80	Short
S Duke Street *(Palmyra)*	E Elm Street	Cherry Street	Shared Lane Marking	0.42	$2,365.92	Short
Derry Street	**Mulberry Street**	**Wilhelm Road**	**Shared Lane Marking**	**2.25**	**$12,583.26**	**Short**
Derry Street *(Paxtang)*	S 29th Street	Wilhelm Road	Shared Lane Marking	0.66	$3,714.24	Short
Derry Street *(Harrisburg)*	Mulberry Street	29th Street	Shared Lane Marking	1.58	$8,869.02	Short
Lingle Avenue	**Laudermilch Road**	**Oatfield Lane**	**Bike Route**	**3.22**	**$2,037.84**	**Short**
Lingle Avenue *(South Londonderry)*	Palmyra Road	Oatfield Lane (S. Londonderry border)	Bike Route	0.69	$435.24	Short
Lingle Avenue *(North Londonderry)*	Oatfield Lane (S. Londonderry border)	Crest Lane (N. Londonderry border)	Bike Route	0.79	$498.84	Short
Lingle Avenue *(Derry)*	Route 422	Laudermilch Road	Bike Route	1.38	$875.76	Short
Lingle Avenue *(Palmyra)*	Crest Lane (N. Londonderry border)	Route 422	Bike Route	0.36	$228.00	Short
Ridge Road/Palmyra Bellegrove Road	**Syner Road**	**Lingle Avenue**	**Bike Route**	**4.30**	**$2,729.28**	**Short**
Ridge Road/Palmyra Bellegrove Road *(North Londonderry)*	N Railroad Street	Syner Road	Bike Route	3.80	$2,408.52	Short
Ridge Road/Palmyra Bellegrove Road *(Derry)*	Lingle Avenue	N Railroad Street	Bike Route	0.50	$320.76	Short
S Forge Road	**E Cherry Street**	**Route 322**	**Bike Route**	**2.38**	**$1,509.48**	**Short**
S Forge Road *(South Londonderry)*	North Londonderry/ South Londonderry Border	Route 322	Bike Route	0.99	$627.36	Short
S Forge Road *(North Londonderry)*	E Cyress Street	North Londonderry/ South Londonderry Border	Bike Route	1.03	$655.68	Short
S Forge Road *(Palmyra)*	E Cherry Street	E Cyress Street	Bike Route	0.36	$266.44	Short

Multi-Jurisdictional Projects Continued

Route Name	To	From	Facility Type	Miles	Cost Estimate	Priority
Palmyra Road	**Cottonwood Court**	**Route 322**	**Wide Shoulder**	**1.40**	**$889.44**	**Short**
Palmyra Road *(South Londonderry)*	Cottonwood Court	Sweetwater Drive (S. Londonderry border)	Wide Shoulder	0.87	$549.00	Short
Palmyra Road *(North Londonderry)*	Sweetwater Drive (S. Londonderry border)	Route 322	Wide Shoulder	0.54	$340.44	Short
Waltonville Road/ Quarry Road	**Poplar Avenue**	**Jonathan Eshenour Memorial Trail**	**Buffered Bike Lane**	**0.51**	**$32,634.36**	**Mid**
Waltonville Road *(Derry)*	Route 322	Jonathan Eshenour Memorial Trail	Buffered Bike Lane	0.19	$12,144.42	Mid
Quarry Road *(Hummelstown)*	Poplar Avenue	Route 322	Buffered Bike Lane	0.32	$20,489.94	Mid
E Main Street/ Walton Avenue	**Route 39**	**E Main Street**	**Bike Lane**	**0.66**	**$24,745.30**	**Mid**
E Main Street *(Hummelstown)*	Alison Drive	E Main Street	Bike Lane	0.38	$14,197.66	Mid
Walton Avenue *(Derry)*	Route 39	Alison Drive	Bike Lane	0.28	$10,547.64	Mid
Forge Road	**Northside Drive**	**Leon Avenue**	**Multi-Use Path**	**0.90**	**$643,155.72**	**Mid**
Forge Road *(South Londonderry)*	Northside Drive	N. Londonderry/S. Londonderry border	Multi-Use Path	0.55	$395,185.56	Mid
Forge Road *(North Londonderry)*	N. Londonderry/S. Londonderry border	Leon Ave	Multi-Use Path	0.35	$247,970.16	Mid
Caracas Avenue	**Washington Ave.**	**S Horstick Avenue**	**Bicycle Boulevard**	**1.32**	**$188,364.66**	**Mid**
Caracas Avenue *(Derry)*	Washington Ave.	S Lingle Avenue	Bicycle Boulevard	0.89	$126,721.98	Mid
W Cherry Street *(Palmyra)*	S Lingle Avenue	S Horstick Avenue	Bicycle Boulevard	0.43	$61,642.68	Mid
W Main Street	**Old Farm Road**	**Route 322**	**Bike Lane**	**0.43**	**$16,146.22**	**Long**
W Main Street *(Swatara)*	Village Road	Route 322	Bike Lane	0.22	$8,302.56	Long
W Main Street *(Hummelstown)*	Old Farm Road	Village Road	Bike Lane	0.21	$7,843.66	Long
Swatara Creek Water Trail	**Hershey Campground**	**Fulling Mill Road**	**Multi-Use Path**	**7.55**	**$5,381,600.76**	**Long**
Swatara Creek Water Trail *(Hummelstown)*	Campground	Route 322	Multi-Use Path	4.65	$3,316,668.42	Long
Swatara Creek Water Trail *(Derry)*	Route 322	Fulling Mill Road	Multi-Use Path	2.90	$2,064,932.34	Long
Route 322	**S Thistledown Drive**	**Homestead Road**	**Multi-Use Path**	**2.35**	**$1,675,284.24**	**Long**
Route 322 *(Derry)*	Homestead Road	Derry / South Londonderry Border	Multi-Use Path	2.07	$1,480,257.60	Long
Route 322 *(South Londonderry)*	Derry / South Londonderry Border	S Thistledown Road	Multi-Use Path	0.27	$195,026.64	Long

Regional Bicycle Network Facility Type Totals

Derry

Facility Type	Mileage	Total Cost Estimate
Bike Lane	3.26	$121,522.37
Buffered Bike Lane	7.31	$465,477.41
Protected Bike Lane	0.67	$223,081.06
Bicycle Boulevard	3.65	$521,500.32
Wide Shoulder	N/A	N/A
Multi-Use Path	10.24	$7,302,316.03
Bike Route	6.07	$3,845.95
Shared Lane Marking	1.57	$

Harrisburg

Facility Type	Mileage	Total Cost Estimate
Bike Lane	12.83	$478,261.34
Buffered Bike Lane	2.41	$89,837.09
Protected Bike Lane	0.83	$30,939.74
Bicycle Boulevard	2.87	$410,056.42
Wide Shoulder	N/A	N/A
Multi-Use Path	N/A	N/A
Bike Route	N/A	N/A
Shared Lane Marking	7.03	$39,681.31

North Londonderry

Facility Type	Mileage	Total Cost Estimate
Bike Lane	0.72	$26,839.30
Buffered Bike Lane	N/A	N/A
Protected Bike Lane	N/A	N/A
Bicycle Boulevard	0.53	$75,724.70
Wide Shoulder	0.54	$342.14
Multi-Use Path	0.35	$249,590.88
Bike Route	8.42	$5,334.91
Shared Lane Marking	1.04	$5,820.67

Hummelstown

Facility Type	Mileage	Total Cost Estimate
Bike Lane	0.59	$33,176.35
Buffered Bike Lane	0.32	$11,928.58
Protected Bike Lane	N/A	N/A
Bicycle Boulevard	1.78	$254,320.70
Wide Shoulder	N/A	N/A
Multi-Use Path	2.98	$2,125,088.06
Bike Route	0.27	$171.07
Shared Lane Marking	2.53	$14,159.90

Palmyra

Facility Type	Mileage	Total Cost Estimate
Bike Lane	2.70	$100,647.36
Buffered Bike Lane	N/A	N/A
Protected Bike Lane	N/A	N/A
Bicycle Boulevard	1.07	$152,878.18
Wide Shoulder	N/A	N/A
Multi-Use Path	N/A	N/A
Bike Route	0.71	$449.86
Shared Lane Marking	2.47	$13,824.10

South Londonderry

Facility Type	Mileage	Total Cost Estimate
Bike Lane	0.36	$14,537.95
Buffered Bike Lane	1.37	$51,069.22
Protected Bike Lane	N/A	N/A
Bicycle Boulevard	N/A	N/A
Wide Shoulder	8.87	$5,620.03
Multi-Use Path	0.82	$584,755.78
Bike Route	11.89	$7,533.50
Shared Lane Marking	N/A	N/A

Swatara

Facility Type	Mileage	Total Cost Estimate
Bike Lane	5.89	$219,560.35
Buffered Bike Lane	2.04	$76,044.67
Protected Bike Lane	N/A	N/A
Bicycle Boulevard	N/A	N/A
Wide Shoulder	N/A	N/A
Multi-Use Path	N/A	N/A
Bike Route	N/A	N/A
Shared Lane Marking	2.95	$16,510.56