

BRIGHTON TOWNSHIP

Greenway Plan
2016



Prepared by

PASHEK ASSOCIATES

LANDSCAPE ARCHITECTURE | DESIGN | PLANNING

ACKNOWLEDGEMENTS

A special thank you goes out to the citizens and organizations of Brighton Township for their enthusiasm and input during this study. Also, the time commitment, wealth of knowledge, decision-making ability, and dedication of the following individuals made the Brighton Township Greenway Plan possible.

Brighton Township

John Curtaccio..... Chairman
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Mark Piccirilli..... Supervisor
Bryan K. Dehart Township Manager

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Brighton Township Residents

Last, and most importantly, we thank the residents of Brighton Township who participated in this planning process.

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“Come forth into the light of things, Let Nature be your teacher”
- William Wadsworth

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WHERE ARE WE NOW?



Introduction

Brighton Township has a rich history of planning and has placed great emphasis on all aspects of community planning. Brighton Township adopted its first comprehensive plan in 1974. Its first master park plan was prepared in 1977 for Two Mile Run Park and was updated in January 2015. In 1998 the Township initiated the planning process for a new Brighton Township Comprehensive Plan that was subsequently adopted in June 1999 and amended with the Comprehensive Plan 2007 Update.

With the clear goal of a coordinated parks, open space, and trail system in mind, Township officials are focused on seeking land donations, funding acquisition of important open space parcels, actively constructing park amenities, connecting these amenities with trails and conserving the rural character of the Township. Township residents are proud of their community and welcome the development of the greenway plan to enhance the quality of life within Brighton Township.

Location and Demographics

Brighton Township is centrally located within Beaver County. The township has a total area of 19.5 square miles, of which 19.4 square miles is land and 0.04 square miles, or 0.20%, is water. The Township is served by Interstate 376 and is 19 miles north of the Pittsburgh International Airport.

According to the 2010 U.S. Census, there were 8,227 people, 3,015 households, and 2,215 families residing in the township. The population density was 424 people per square mile. There were 3,145 housing units at an average density of 163 units per square mile. The racial makeup of the township was 97.70% White, 1.10% African American, 0% Native American, 0.60% Asian, 0.01% Pacific Islander, 0.20% from other races, and 0.60% from two or more races. Hispanic or Latino of any race were 1.1% of the population.

There were 3,145 households out of which 29.8% had children under the age of 18 living with them, 63.9% were married couples living together, 6.6% had a female householder with no husband present, and 26.5% were non-families. 24.1% of all households were made up of individuals and 14.4% had someone living alone who was 65 years of age or older. The average household size was 2.52 and the average family size was 2.99.

In the township 21.8% of the population was under the age of 18, 4.9% from 18 to 24, 19.4% from 25 to 44, 30.6% from 45 to 64, and 23.3% who were 65 years of age or older. The median age was 45.2 years. 52.1% of the population is female while 47.9% is male.

Brighton Township is strategically located in proximity to a Petrochemicals Complex being developed across the Ohio River in Potter Township.

In June 2016, Shell Chemical Appalachia LLC made the final investment decision to build a major petrochemicals complex, comprising an ethylene cracker with polyethylene derivatives unit, along the Ohio River in Potter Township. Main construction will start in approximately 18 months, with commercial production expected to begin early in the next decade.

The complex will use low-cost ethane from shale gas producers in the Marcellus and Utica basins to produce 1.6 million tons of polyethylene per year. Polyethylene is used in many products, from food packaging and containers to automotive components.

The project will bring new growth and jobs to the region, with up to 6,000 construction workers involved in building the new facility, and an expected 600 permanent employees when completed.

While this is exciting economic news for Beaver County, the County and its municipalities will experience development opportunities which must be balanced with the desire of the municipalities to manage their growth and development while maintaining and enhancing their natural resources and quality of life. Implementation of the recommendations and strategies within this plan will assist Brighton Township in meeting this objective.

Benefits of Greenways to Brighton Township

Greenways can provide numerous benefits to local municipalities and their residents. Some of the benefits provided through greenway development include:

- Promoting restoration of land and water
- Fostering public recreation, active living, and healthy lifestyles
- Encouraging a network of non-motorized land and water transportation corridors to connect people to our resources
- Exploring opportunities to expand motorized off-highway vehicle and snowmobile trails
- Conserving natural, ecological and hydrologic infrastructure resources
- Building capacity at the local level for implementation and education
- Encouraging economic development
- Promoting active living and healthy lifestyles

- Promoting sustainable land development
- Enhancing the quality of life
- Preserving rural scenic character

How was the Greenway Plan Developed?

For many, the term greenway evokes visions of recreational and outdoor pursuits. For others, the term greenway evokes concern over restrictions to development and the loss of property rights. Throughout the planning process, we have taken efforts to ease concerns, educate the public to confirm the truth, dispel myths, and build consensus by establishing defensible rationale for establishing a greenway network within Brighton Township.

A Three Step Process

This plan was developed utilizing a three-step process that answers three questions:

- **CHAPTER ONE: WHERE ARE WE NOW?** - This is the inventory phase. This chapter provides a summary of the information gathered regarding the natural, cultural, historic, and recreational assets of the Township that are the building blocks of the greenway corridors.
- **CHAPTER TWO: WHERE DO WE WANT TO BE?** - This is the analysis phase. In this chapter the vision, goals, and objectives for greenways in Brighton Township are defined, and the data collected during the first phase is analyzed and synthesized into a proposed network of natural system and recreational greenways linking important destinations throughout the Township and surrounding communities.
- **CHAPTER THREE: HOW DO WE GET THERE?** - This is the recommendation phase. This chapter reveals the specific action items required to implement the plans' recommendations. It includes concrete tools, such as a recommended management structure, prioritized recreation and natural system greenway corridors, as well as identified potential partners and funding sources.

This document provides the reader with the planning process and rationale that resulted in the vision, goals, objectives, recommendations, and implementation strategies to create a greenway system in Brighton Township.

What Is A Greenway?

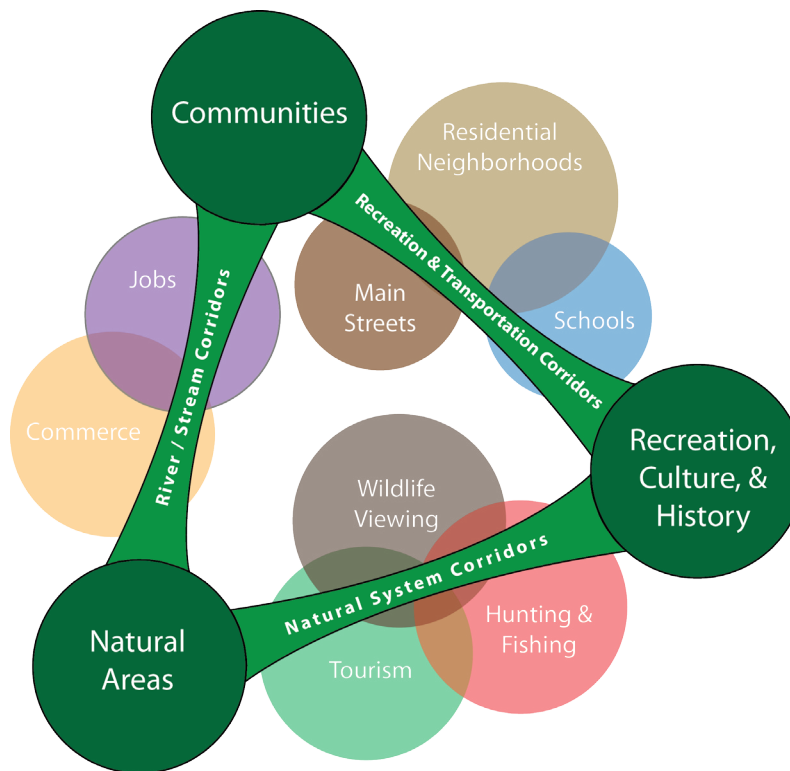
The Pennsylvania Department of Conservation and Natural Resources defines Greenway as follows:

'Some greenways are recreational corridors or scenic byways that may accommodate motorized and non-motorized vehicles. Others function almost exclusively for environmental protection and are not designed for human passage.'

A greenway is a corridor of open space. Greenways vary greatly in scale, from narrow ribbons of green that run through urban, suburban, and rural areas to wider corridors that incorporate diverse natural, cultural and scenic features.

Greenways can incorporate both public and private property, and can be land or water-based. They may follow old railways, ridge tops, stream corridors, wetlands, and include water trails for non-motorized craft. Others function almost exclusively for environmental protection and are not designed for human passage.

Greenways differ in their location and function, but overall, a greenway will protect natural, cultural and scenic resources, provide recreational benefits, enhance the natural beauty and the quality of life in neighborhoods and communities, and stimulate economic development opportunities.



Recreation and Transportation Greenways

Provide for recreation, alternative transportation and economic development opportunities and may include:

- Shared Use Paths (Rail-Trails)
- Hiking Trails
- Safe Routes to Schools
- Bike Lanes
- Shared Roadways
- Single Track (Mountain Bike)
- Equestrian Trails
- Water Trails

Natural Systems Greenways

Natural System Corridors: Provide corridors of open space primarily designated for conservation of high-quality or unique natural resources promoting stewardship and conservation of land for recreation, wildlife habitat, agricultural production, and timber production.

- Protect habitat of State species of special concern
- Provide stream side buffers
- Conserve unfragmented forests
- Promote smart growth and sustainable development
- Conserve agricultural lands

Greenway planning should be specific to the needs and desires of the community. Therefore, Brighton Township has undertaken this process to facilitate the development and implementation of greenways within the Township. This plan is funded in part by a grant from the Pennsylvania Department of Conservation and Recreation Resources Community Conservation Partnerships Program.

PURPOSE OF THE GREENWAY PLAN

The Brighton Township Greenway Plan provides a blueprint for making decisions regarding greenway and trail development that will enhance the quality of life for residents of the Township.

This Plan proposed a network of connections between parks, schools, natural areas and various cultural and historic resources. These connections will help to preserve the Township's natural systems and its unique character and quality of life, while providing valuable recreational opportunities for local residents.

The Greenway Plan as a Decision-Making Tool

The greenway plan serves as a flexible tool for making decisions regarding land and water-based recreation and transportation improvements as well as the conservation of natural, cultural, historic and scenic resources. By encompassing a variety of issues pertinent to these resources, the plan will lay the foundation for the continued success of open space conservation and an improved quality of life in Brighton Township.

Specific policy details and greenway locations may be adjusted as needed throughout the planning process and during implementation.

Sound greenway planning includes an inventory and analysis of natural features, cultural and historic assets, and of parks and open space; along with collaboration between the Township, private groups, and interested citizens to form policies for development and/or conservation. This multi-layered approach, involving Brighton Township and its decision makers, yields strategies for natural resource conservation and greenway initiatives within the Township.

Summary of Existing Planning Efforts

Beaver County Comprehensive Plan

In connection with Beaver County's 1999 Comprehensive Plan, "Horizons: Planning for the 21st Century," a survey was distributed to Beaver County residents that asked a series of questions about recreation and open space needs.

- 80% of those responding said that development of walking/biking trails, as a means to enhance quality of life, was a priority.
- Over 70% indicated that they wanted more access to unstructured recreational opportunities such as hiking, fishing, bicycling, and picnicking.
- And, about 80 percent wanted to see the development of local waterways and waterfronts for recreational use.

These responses demonstrate a strong need for more greenways and trails.

Bradys Run Park Master Plan - 2008

The goals of the Bradys Run Park Master Plan parallel the Beaver County Greenways and Trails Plan's goals, and several of the Greenways recommendations relate directly to the County Parks studied in this report. Among those recommendations are:

- Establishment of conservation corridors along Bradys Run; and
- Developing a loop shared-use trail / "share the road" bike route loop in Bradys Run Park, along with several "share the road" bike routes connecting Bradys Run Park to other points in surrounding municipalities.

Trail System Improvement Recommendations

During the Master Plan process, much public input focused on improvements to and marketing of the Bradys Run Park trail system. The proposed trail system features just over 14 miles of trails, including approximately 7 miles of new/re-constructed sustainable trails, and 7 miles of existing trails to remain. The plan also proposes to obliterate approximately 3.9 miles of unsustainable trails and other existing trails that encroach onto neighboring properties.

Brighton Township Comprehensive Plan Update 2008

The Vision stated in the Comprehensive Plan Update states Brighton residents are proud of their network of trails that traverses the Township. With the clear goal of a coordinated parks, open space, and trail system in mind, Township officials are focused on seeking land donations, funding acquisition of important open space parcels, and actively constructing park amenities.

Trail	Mileage
Bradys Run North	3.1
Bradys Run South	2.5
Wildwood Loop Trail	2.75
South Drive	1.75
Logstown Trail	1.0
Walkers Loop	1.0
Calland Arboretum Trail	0.75
Outdoor Multi-Purpose Trail	0.75
Lake Trail	0.5
Total	14.1

During the preparation of the 1999 Comprehensive Plan, the community expressed a strong interest in the area of park, recreation and open space. Because of this, the Township placed an emphasis on implementing actions to address the following key points:

- Improve and maintain existing recreation areas;
- Offer recreation for all ages and families;
- Acquire more land for central park and other recreation facilities;
- Acquire land for passive recreation prior to development; and
- Provide areas and space for biking and hiking trails, both on and off road.

These areas of emphasis were reconfirmed in the 2008 Update.

Beaver County Greenways and Trails Plan

The Beaver County Greenways and Trails Plan aims to enhance the quality of life in Beaver County by providing the County with a blueprint for the implementation of Greenways that will protect natural resources and provide recreation opportunities. The Greenways and Trails Plan sets forth the following objectives for Greenways implementation:

1. Establish conservation corridors that preserve and link high-priority habitats, sensitive environmental features, rural landscapes, and protected open space;
2. Build and interconnected network of diverse recreational trails connecting population centers to State and County parks, State Game Lands, and other significant recreational areas/amenities that promote active lifestyles and provide alternate means of transportation between the County's major destinations; and
3. Ensure that greenways and trails development works hand-in-hand with other economic development initiatives in Beaver County to foster growth, attract new businesses, and bring and retain young people by providing a high quality of life.

Brighton Township Bicycle / Pedestrian Network Feasibility Study

The following table summarizes the bicycle lanes and trails proposed in the Bicycle/Pedestrian Study completed in 2002.

Recommended Bicycle Lanes and Trails			
Location	Bicycle Lanes	Share-the-Road	Multi-Use Trail
Brighton Road	1.32 miles		
Dutch Ridge Road from Beaner Hollow to Tusca	5.19 miles		
Tusca Road from Pleasant Drive to Dutch Ridge	4.42 miles		
Brady's Run and Grange Roads	3.80 miles		
Darlington and Chapel Roads between Dutch Ridge and Tusca	2.85 miles		
Barclay Hill Road between Tusca and Industry Borough	1.70 miles		
Gypsy Glen Road between Beaver Borough and Dutch Ridge Road		2.76 miles	
Mudlick Hollow and Sebring Roads between Vanport Borough and Tusca		3.69 miles	
Beacom and Brady's Ridge Roads		2.00 miles	
Beacom Road to Brady's Run Road through Brady's Run Park		0.75 miles	
Medical Center and Friendship Ridge Health and Fitness Trail			2.53 miles
Two Mile Run Trail between Beaver School District Complex to Brighton Municipal Complex			4.92 miles
Totals	19.28 miles	9.20 miles	7.45 miles

Trail Heads

- Two Mile Run Community Park, Gypsy Glen Road
- Hardy Field, Tuscarawas Road
- Lower Bradys Run Park, near destination playground
- Upper Bradys Run Park, Beacom Drive.
- Brighton Township Building, Brighton Road
- Park-n-Ride, Brighton Road/Tuscarawas Roads intersection
- Beaver School Complex, Gypsy Glen Road

Other Recommendations

- Ban all motorized vehicles, other than maintenance vehicles, from bike lanes.
- Require the use of helmets when bicycling.

- Require reflectors, bicycle headlights and reflective clothing when bicycle riding during non daylight hours.
- Adopt standards for lane markings and signage for bike lanes.
- Support shared use paths and bicycle compatible roadway design.
- Require bicycle parking facilities to be placed at commercial buildings.
- Require that all subdivision and land development projects that have frontage adjacent to the proposed pedestrian/bicycle network recorded in the Township's Pedestrian / Bicycle Feasibility Study to construct pedestrian sidewalks and bicycle facilities to achieve the highest level of bicycle level of service possible.
- Require construction of pedestrian and bicycle facilities to be constructed in accordance with Township standards and specifications.
- Require that all subdivision and land development projects provide additional right-of-way or easements, as required to achieve the highest level of bicycle level of service possible.
- Develop and adopt site development guidelines reflecting the Township's standard cross sections for pedestrian sidewalks, bicycle lanes, multi-purpose trails and protected multipurpose trails

Ohio & Beaver River Water Trails

The Pennsylvania Fish and Boat Commission has designated non-motorized water trails on both the Ohio & Beaver Rivers in Beaver County. Although not directly accessible from Brighton Township, these water trails are accessible to Brighton Township residents from Bridgewater and Beaver Boroughs.

Bradys Run Park

Beaver County, Pennsylvania

Park Amenities

- A** Beaver County Department of Public Works & Waste Management Office
- B** Outdoor Courts Complex
 - Tennis Courts
 - Basketball Courts
 - Action Park - Bikes, Blades & Boards
 - Roller Hockey Rink
- C** Four Winds Recreation Center
 - Ice Rink
 - Indoor Tennis Courts
 - Indoor Walking Track
 - Restrooms
- D** Paved Walking Track
- E** Beaver County Waste Management & Recycling Center
- F** Equestrian Arenas
- G** Mountain Bike Trailhead
- H** Paved Multi-Purpose Trail
- I** Beaver County Softball / Baseball Complex
- J** Bradys Run Lodge
- K** Maple Syrup Camp
- L** Lake Trail
- M** Bradys Run Lake Spillway
- N** Swimming Beach/Boat Launch
- O** Accessible Fishing Pier & Shelter
- P** Four Seasons Pavilion
- Q** Bradys Run Playground
- R** Edward L. Calland Arboretum
- S** Dog Park

Legend

- Four Winds Recreation Center
- Picnic Shelters 2-18
- Restrooms
- Swimming Beach
- Boat Launch



Trails

- Bradys Run Trail North 3.1 miles
- Bradys Run Trail South 2.5 miles
- Wildwood Loop Trail 2.75 miles
- South Drive 1.75 miles
- Logstown Trail 1 mile
- Walkers Loop 1 mile
- Calland Arboretum Trail .75 mile
- Outdoor Multi-Purpose Trail
- Lake Trail
- Secondary Trail Loops

Contact Information

Bradys Run Park
121 Bradys Run Rd.
Beaver Falls, PA 15010

Recreation Department
(724) 770-2060

Park Maintenance
Evenings & Weekends
(724) 624-0579

Sheriff's Department - Non Emergencies
(724) 775-0880

For all emergencies dial 911

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Beaver County Board of Commissioners
Sandie Egley Daniel C. Camp III Tony Amadio

Three Rivers Water Trail		15 R	6 Leetsdale Launch
0.0	Point State Park - Fort Pitt Museum		At the end of Petrun Road, Leetsdale. PA Fish & Boat Commission access area - PFBC or DCNR launch permit required. (-80.224985; -80.224987)
0.1 R	North Shore Attractions - River Field, Carnegie Science Center, USS Renoq submarine, Rivers Casino	16.7	Ambidge-Woodlawn Bridge, 1926
0.1 R	1 Heinz Quay Launch Along North Shore Riverfront Park at Heinz Field. Take out for North Shore attractions. Long Carry from stadium parking lots. (-80.444813; -80.015098)	17 R	Old Economy Village - Historic Site
		18.7 R	Legionville and Logstown - Historic Site
		23.2 R	Beaver County Historical Society & Landmarks Foundation - William Vicky Mansion.
0.7 L	2 Marine Terminal - Beware commercial traffic!	23.4 R	7 Freedom Launch 8th Street, Freedom. (-80.684761; -80.255607)
0.8 L	Saw Mill Run	23.4 R	Lazarus Plaza, Freedom.
0.8 L	West End Bridge, 1932	24.2	Monaca East Rochester Bridge, 1959
1.6	Brunots Island	24.9 R	8 Rochester Launch At the end of New York Road, Rochester. PA Fish & Boat Commission access area - PFBC or DCNR launch permit required. (-80.698369; -80.281837)
2.6	Ohio Connecting Railroad Bridge, 1915		
2.6 L	Charters Creek	25	Monaca Rochester Bridge, 1986
2.7 R	Western Penitentiary	25.2 L	Monaca Riverfront Park
2.8 R	9 Westhall Street Launch Next to Western Penitentiary. A short ramp leads to a pebble beach. (-80.47801; -80.043437)	25.2 L	P&B Railroad Station - Sixth Street, Monaca
		25.3 R	Beaver River
31.1 R	10 Sewage Treatment Plant - Beware strong outflow!	25.3 L	New Philadelphia Society Church - Historic Site
33	McKees Rocks Indian Mound - Historic Site	25.4 R	Bridgewater Crossing Riverfront Park
33	McKees Rocks Bridge, 1931	25.4 R	9 Bridgewater Crossing Bridge At Bridgewater Crossing Riverfront Park. At the end of Mulberry Street Extension in Bridgewater. (-80.694993; -80.222858)
49	Davis Island	25.5	Pittsburgh & Lake Erie Railroad Bridge, 1910
49	Neville Island	25.5 R	10 Monaca Launch Atlantic Avenue, Monaca. (-80.691771; -80.289459)
5.4	Pittsburgh, Charters & Youghiogheny Railroad Bridge, 1894 (Back channel)	25.7	Beaver Riverfront Park
6.3	11 Emsworth Lock & Dam - Going downriver, approach from river right. 412-766-6213	26.2 R	Pond McIntosh - Historic Site
6.8	12 Emsworth Dam - Ohio River back channel, no lock use main channel.	27.9 R	I-376 Beaver Valley Expressway Bridge, Vanport. Built 1970
7.9 L	Dravo Corporation Shipyard - Historic Site	29.1 R	Merrill Lock No. 6 - Historic Site
7.9 R	13 Kilbuck Launch At the end of E. Beaver Street, Glenfield. PA Fish & Boat Commission access area - PFBC or DCNR launch permit required. (-80.514297; -80.120287)	29.4 L	14 Industrial Facility Beware strong outflow!
8.4 L	Memorial Park, Neville Island	29.4 L	Raccoon Creek
8.6 L	Fairfield Inn Suites, Neville Island	30.5 R	Ohioview Peninsula Access Road
8.7	I-79 Pittsburgh Naval & Shipbuilders Memorial Bridge, 1976	31.1 R	Ohioview Peninsula
8.8 R	Greater High Aquatic Club - Ohio River back channel	31.4 R	Montgomery Slough
9.1 R	Riverside Park, Glenfield	31.5	15 Montgomery Lock & Dam - Going downriver, approach from river left. 724-643-8400
9.5 R	Paradise Beach - Ohio River back channel	34.1 L	16 Shippingport Borough Launch At the end of Johnson Drive, Shippingport. Marked for Borough residents only. (-80.630184; -80.425565)
9.6	Corapolis - Neville Island Bridge, 1994-95	34.6 L	17 Security Zone - See map callout for instructions.
9.7	Robert Morris University Island Sports Complex	35.1	Phillis Island - National Wildlife Refuge
11 R	U.S. Coast Guard Station	37.1	Georgetown Island - National Wildlife Refuge
11.6 R	14 Chestnut Street Launch At the end of E. Beaver Street, Glenfield. PA Fish & Boat Commission access area - PFBC or DCNR launch permit required. (-80.533689; -80.1885259)	38.5	Smith Ferry Petroglyphs - Historic Site
		38.8 R	Smith Ferry Oil Fields - Historic Site
11.6	Walnut Beach - Historic Site	39.3 R	East Life Field
11.8 R	15 Walnut Street Launch Access to Sewickley Riverfront Park. A 400' carry leads to a dock and pebble beach. 0.5 mile walk to the Beaver St. business district. (-80.533621; -80.1885259)	39.3 R	17 Ohioville Lock 57 Park Launch Mouth of Little Beaver Creek. (-80.645913; -80.512518)
12 R	Sewickley Riverfront Park	39.7 R	Beginning Point of the U.S. Public Lands Survey
12.4 R	Sewickley Community Center	42.3 R	Babbs Island - Private Property
		42.4	Ohio Valley Boat Club
		42.9 L	U.S. Route 30 - Lincoln Highway Jennings Randolph Bridge, 1977
		42.9 L	18 Chester City Park Launch At the end of Louella Avenue, Chester, West Virginia. (-80.619414; -80.567767)
		43.4 L	Holiday Yacht Club
		43.4 L	Smith Landing Campground
		43.5 R	19 East Liverpool Broadway Wharf Launch At the end of Broadway Street, East Liverpool, Ohio. (-80.414932; -80.575874)
		44.2	East Liverpool Yacht Club
		44.2	Homer Laughlin China Company Newell Toll Bridge, 1905
		46.1	Kennedy Park Marina, Inc.

Ohio River Water Trail

13.5	21 Dashiels Lock & Dam - Going downriver, approach from river left. 724-457-8430
13.5 R	Morrow Pontefract Park
13.9 L	Shouse Park
14.2 L	Shousetown Boatyard - Historic Site
15.9	Leetsdale Archaelogical Site - Historic Site

0.0 R	Point State Park (40.441; -80.0095)	17.6 R	Economy Run: SM, W, M, W, C	80.2371
0.0 R	Pocketed submarine: SM, W, M, W, C	17.6 R	Old Lock 4: SW (40.404; -80.0043)	80.2372
0.6 L	Sandbar: SM, W, S, W, W, C (40.4863; -80.0246)	17.6 L	Logstown: SM, W, M, W, C (40.0187; -80.2034)	80.2373
1.7 L	Head of Brunot Island: S, W (40.4622; -80.0377)	20.1 R	Old coal dock and pilings: SM, W, S, W, C (40.6471; -80.2367)	80.2374
1.8 L	West End Bridge to Railroad Bridge: SM, W, C (40.4548; -80.0373)	22.7 R	Grows Run: S, W, W (40.6666; -80.2502)	80.2375
2.5 L	Charters Creek confluence: LM, HS (40.4642; -80.0502)	22.5 L	Creek mouth: M, M (40.6719; -80.2559)	80.2376
2.5 L	Charters Creek channel: LM, C (40.4642; -80.0502)	23.0 R	Freedom Valley: M (40.6788; -80.2535)	80.2377
3.1	100 yards out from Alconso discharge to McKees Rocks Bridge: SM, W, C (40.4756; -80.0475)	23.6 R	Dutchman Run: SM, W, S, M, C (40.6852; -80.2562)	80.2378
4.5	Davis Island north bank: SM, W, C (40.4867; -80.0623)	23.6 L	Near pilings: SM, W, C (40.6838; -80.2585)	80.2379
5.5	Ohio River main channel: SM, W, S, W, C (40.4939; -80.0749)	25.0 L	Monaca Monaca Rochester Bridge: SM, W, C (40.6929; -80.2852)	80.2380
6.5 L	Restricted area below dam to rock bank below Exon tank farm: SM, W, S, W, HS (40.5039; -80.0929)	25.2 L	Monaca Waterworks Park: SM, LM, LM (40.6992; -80.2852)	80.2381
6.1	Emsworth Dam back channel: SM, W, S, W, HS, CR, C (40.498229; -80.09629)	25.4 R	Water Plant discharge: SM, LM, LM (40.6964; -80.2856)	80.2382
7.1 R	Ohio River back channel, Corrugated steel wall: SM, W, S, W, HS, CR, C (40.5019; -80.1072)	25.4 R	Beaver River to Dam: LM, LM (40.6976; -80.2888)	80.2383
7.9 R	Ohio River back channel, concrete to interstate 79 Bridge: SM, W, S, W, HS, CR, C (40.5048; -80.1184)	26.1 L	Between Railroad Bridge and Beaver Valley Expressway Bridge: SM, C (40.6826; -80.3034)	80.2384
8.0 R	Ohio River back channel, Neville Island lagoon: M (40.5083; -80.1322)	27.9 R	Two Mile Run: W, S, M, W, W (40.6997; -80.3323)	80.2385
8.6	Kilbuck Run confluence: SM, W, HS, W, C (40.5158; -80.1314)	29.3 L	Lock 6: M, W, S, M, W (40.6686; -80.3507)	80.2386
9.1 L	Montour Run: SM, W, S, W, C (40.5341; -80.1467)	29.3 R	Blaccorn: SM, W, S, W, C (40.6686; -80.3507)	80.2387
12.1	Old lock wall, rocky upstream end of wall: SM, W, C (40.5288; -80.1767)	29.6 L	Below Pumpouse: HS, LM, C (40.6638; -80.3496)	80.2388
12.5 R	Narrows Run: SM, HS (40.5375; -80.1945)	29.6 L	Water Discharge: HS, SM, C (40.6578; -80.3564)	80.2389
13.5	Dam tailwaters: SM, W, S, HS, SM, C (40.5544; -80.2080)	30.8 R	Upstream of Montgomery Dam: LM (40.6587; -80.3702)	80.2390
13.6 R	Little Sweeney Creek: W, S, M, W, C (40.5554; -80.2080)	31.6	Dam Tailwaters: W, S, M, HS, W, C (40.6483; -80.3880)	80.2391
14.1 L	Flaugherty Run: SM, W, S, W, C, HS (40.5575; -80.2173)	35.2	Around Phillips Island: SM (40.6232; -80.4397)	80.2392
15.4 R	Big Sweeney Creek: SM, W, HS, W, C (40.5731; -80.2245)	37.6	Around Georgetown Island: SM, W, C (40.6384; -80.4742)	80.2393
17.0 L	Two water discharges, 70 yds apart: HS, W, S, W, S, HS, SM, W, C (40.5839; -80.2875)	38.7 R	Upper Dry Run: SM, W, C (40.6449; -80.5006)	80.2394
		39.5 R	Little Bed Creek confluence: LM, CR, W, S, M, W, C (40.6407; -80.5099)	80.2395
		39.7 R	Along Bank: SM (40.6393; -80.5155)	80.2396
		42.5	Either side SR 18 Bridge: C, HS, WS, LM (40.6211; -80.5646)	80.2397
		42.7 R	Slab Rock: SM (40.6185; -80.5656)	80.2398
		42.9 L	Middle Run: SM, W, HS, W, C (40.6150; -80.5669)	80.2399
		43.4 R	East Liverpool Launch: SM, HS (40.6147; -80.5758)	80.2400
		43.5 L	Outside bend of river, rock cover: SM (40.6135; -80.5811)	80.2401

Natural Infrastructure Inventory

An inventory and assessment of the green infrastructure network in Brighton Township was essential to developing the greenway plan. Green infrastructure refers to a strategically planned and managed, interconnected network of natural lands and open spaces that have ecosystem values and provide essential functions to the human population.

The foundation of the green infrastructure network are the building block components, which are briefly described below. These elements are analyzed to define the locations of Brighton Township's proposed Natural System Greenway corridors.

The building blocks were inventoried, assessed and mapped in three categories:

- (1) Natural Infrastructure
- (2) Ecological Infrastructure
- (3) Hydrologic Resources

Natural Infrastructure

The natural infrastructure building blocks were inventoried and analyzed, and are documented on the Natural Infrastructure Inventory Map.

Steep Slopes

Soils in areas with steep slopes are generally unstable, which can result in landslides, an obvious safety concern for communities. When disturbed, these unstable soils can also create erosion and sedimentation problems which can lead to degradation of water quality downstream. Steep slope features are essential to the natural system; they contribute to open space networks, connect forested areas to water resources (protecting water quality), provide habitat for wildlife and vegetation, and provide travel corridors for animal and avian species.

The United States Geologic Survey (USGS) provides maps detailing the topography of the entire United States. From this mapping, a Digital Elevation Model (DEM) was created, which was utilized to do a surface analysis of Brighton Township. From this analysis, the locations of two categories of steep slopes were identified.

- Steep Slopes greater than 25 Percent
Slopes greater than twenty-five percent are typically considered to be environmentally and structurally sensitive and should be conserved to protect the health, safety, and welfare of people and property.
- Steep Slopes between 15 and 25 Percent
Development of slopes between 15 and 25 percent should be limited. When development must occur on these slopes, special care should be taken to ensure the health, safety, and welfare of people and property.

The township is very hilly in nature, making for many areas of steep slope. Several steep sloped valleys are located along Bradys Run, Twomile Run, Fourmile Run and Sixmile Run as well as several of their tributaries. The most notable areas of steep slope are found in the southern section of the township near the Ohio River and within Bradys Run County Park.

Interior Forest

The Pennsylvania Natural Heritage Partnership (PNHP) provided mapping of large tracts of contiguous forest blocks throughout the state of Pennsylvania. Contiguous forest blocks offer enhanced habitat value over forested areas that may be fragmented by roads or other land uses. These forest blocks should be maintained as best possible to preserve habitat, protect water quality, and sustain flyways. For this study, forest blocks were reduced to include only Interior Forest areas. This was done by creating an interior buffer measuring 100 meters from the forest edge and removing it from each forest block.

The Interior Forest areas are important because they provide a home for plant and animal species that require the type of habitat that is isolated from other, non-forested areas. Interior Forest is defined as forested land cover that is at least 300 feet (approximately 100 meters) from non-forested land cover or primary, secondary, and local roads. Roads that are not wide enough to break the canopy of the forest are not excluded from these areas.

Notable areas of interior forest land are located along Twomile Run west of Interstate 376, in Two Mile Run Park, on the ridges above Route 51 south of Bradys Run, along Four Mile Run and on the ridges above Six Mile Run and its tributaries.

Wetlands

Wetlands were delineated and mapped using data from the U.S. Fish and Wildlife Service's National Wetland Inventory (NWI).

Wetlands are a necessary resource for the well-being of environment and ecology, and have many green infrastructure functions. Wetland soils absorb water from precipitation, and their plants slow the flow of water thereby enabling wetland areas to retain and release water slowly into streams. These benefits provide stormwater management and flood control functions that are not easily replaced. Wetlands also filter out sediment, chemicals, and fertilizers, cleansing the water before recharging groundwater and stream resources. Wetlands are also home to many plants and animals, and are a source of food and habitat for nesting bird populations of North America. More than 46% of U.S. endangered and threatened species need wetlands to survive.

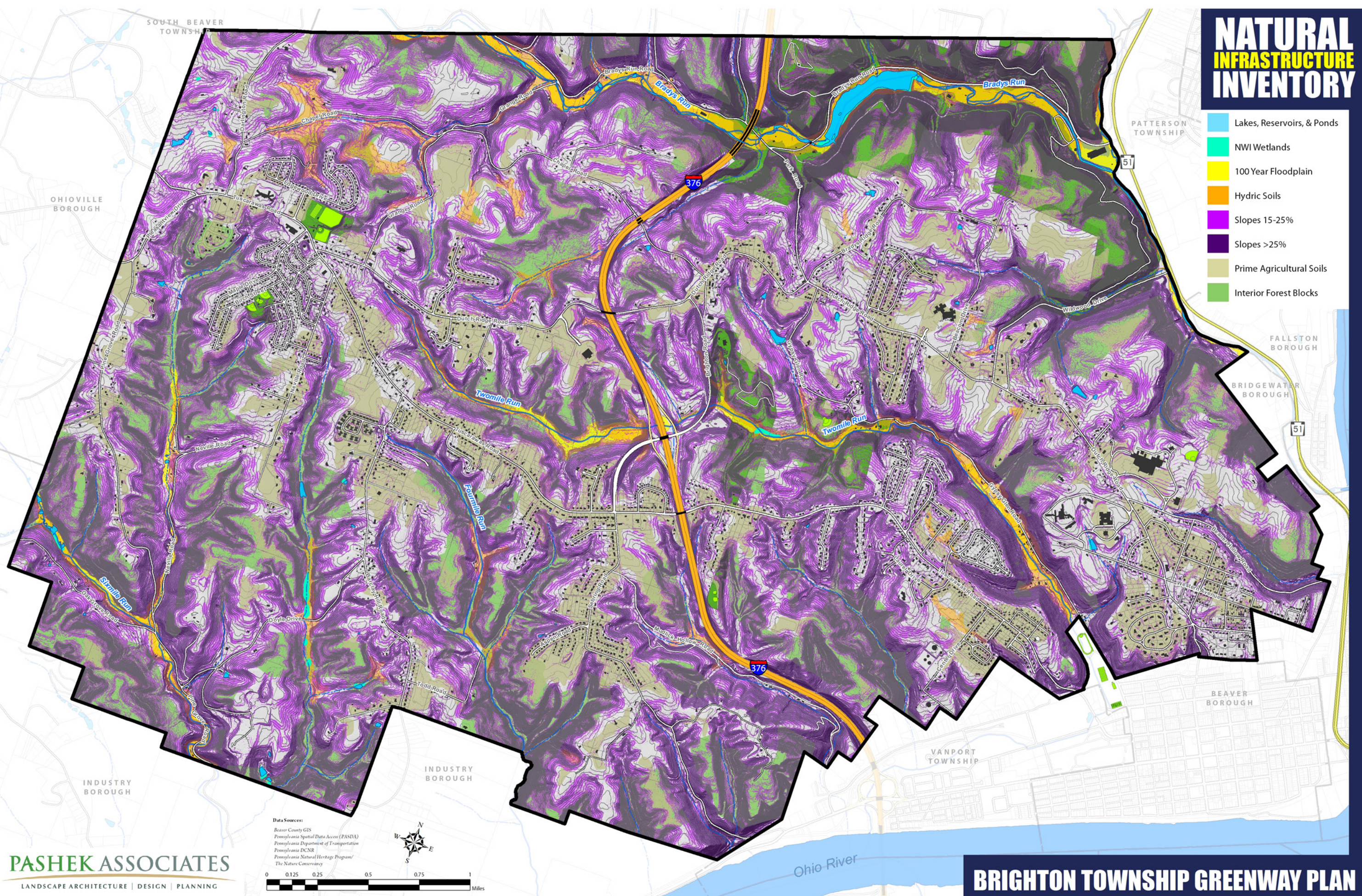
The notable wetlands in Brighton Township are found along Two Mile Run, Six Mile Run and a tributary to Six Mile Run, as well as a large area above the lake in Bradys Run.

Hydric Soils

Hydric soils are critical soil types when considering greenway development. Hydric, or wet soils, are typically located in low lying areas and provide natural stormwater management functions in periods of wet weather. They also serve as a natural filtration system to remove pollutants from stormwater runoff between water reaches of tributaries, streams, and/or aquifers. Hydric soils are also typically wet enough during the growing season to support the growth of wetland vegetation. It is generally recommended that development in or

NATURAL INFRASTRUCTURE INVENTORY

- Lakes, Reservoirs, & Ponds
- NWI Wetlands
- 100 Year Floodplain
- Hydric Soils
- Slopes 15-25%
- Slopes >25%
- Prime Agricultural Soils
- Interior Forest Blocks



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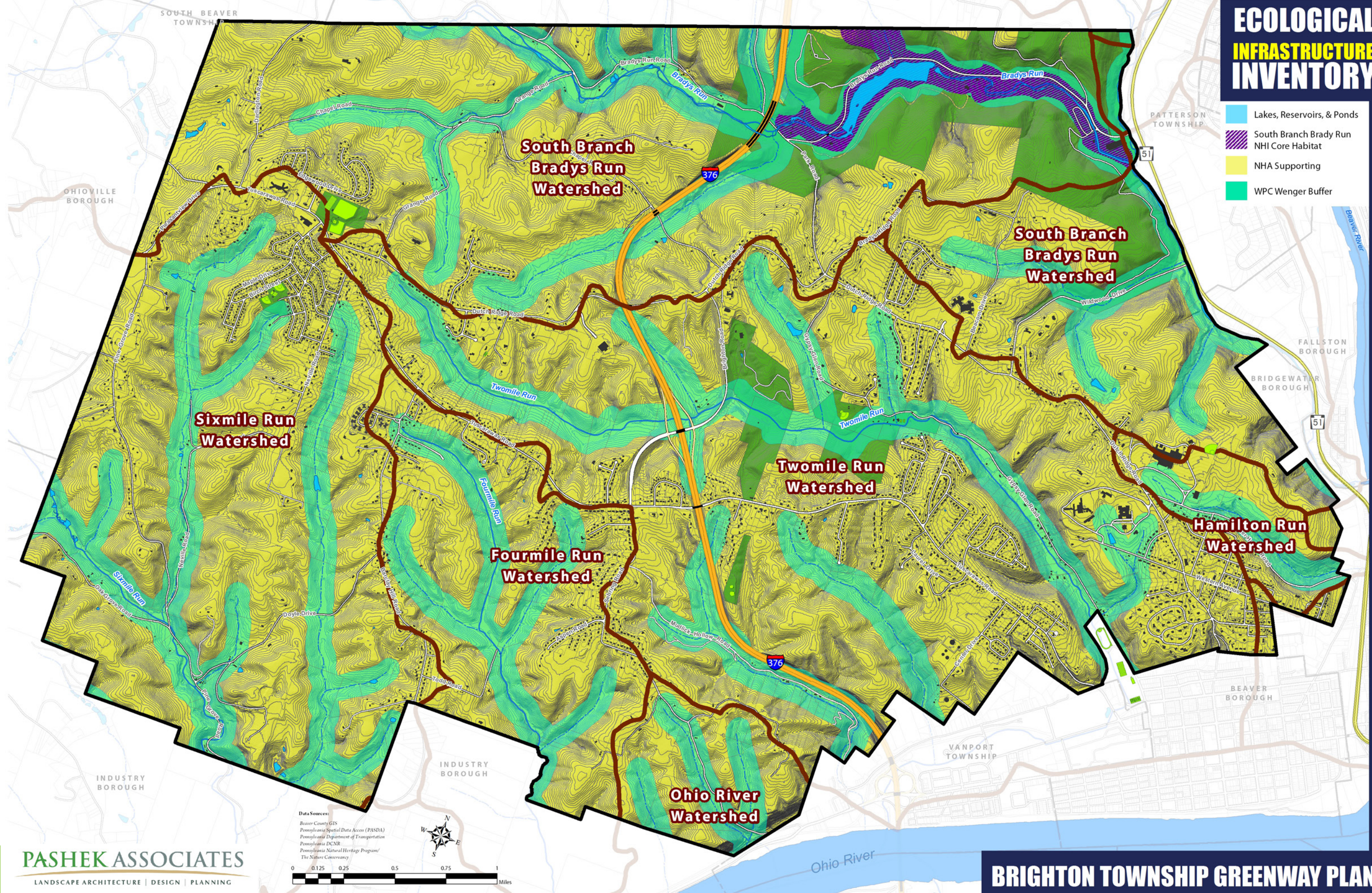
Data Sources:
Beaver County GIS
Pennsylvania Spatial Data Access (PASDA)
Pennsylvania Department of Transportation
Pennsylvania DCNR
Pennsylvania Natural Heritage Program/
The Nature Conservancy



BRIGHTON TOWNSHIP GREENWAY PLAN
Beaver County, Pennsylvania

ECOLOGICAL INFRASTRUCTURE INVENTORY

-  Lakes, Reservoirs, & Ponds
-  South Branch Brady Run NHI Core Habitat
-  NHA Supporting
-  WPC Wenger Buffer



Data Sources:
 Beaver County GIS
 Pennsylvania Spatial Data Access (PASDA)
 Pennsylvania Department of Transportation
 Pennsylvania DCNR
 Pennsylvania Natural Heritage Program/
 The Nature Conservancy



0 0.125 0.25 0.5 0.75 1
Miles

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BRIGHTON TOWNSHIP GREENWAY PLAN
 Beaver County, Pennsylvania

around hydric soils be done sensitively, so as to conserve the benefits these critical soils provide.

One Hundred Year Floodplain

The Federal Emergency Management Agency (FEMA) delineates floodplains for the nation through its floodplain management program. In Pennsylvania, floodplains are governed by the Floodplain Management Act, Act of Oct. 4, 1978, P.L. 851, No. 166. These regulations are designed to encourage sound land use practices when planning for land use in floodplains. Protecting the health, safety, and welfare of people and properties within floodplains from floodwaters is essential. In addition, conserving and restoring the efficiency and carrying capacity of streams in Pennsylvania is a vital component to maintaining a sound ecological system.

Conserving and restoring the efficiency and carrying capacity of streams in Brighton Township is a vital component to maintaining sound green infrastructure.

Significant floodplain areas are found along Bradys Run, Two Mile Run and Six Mile Run.

Ecological Infrastructure Inventory

The following ecological infrastructure resources were inventoried and analyzed. These ecological building blocks are documented on the Ecological Infrastructure Inventory Map.

Lakes, Streams and Rivers

The following hydrologic infrastructure resources were inventoried and analyzed. These building blocks are documented on the Ecological Infrastructure Inventory Map.

The most prominent hydrologic resources in Brighton Township are Bradys Run Lake, South Branch Bradys Run, and Two Mile Run. There are two additional named streams recognized by the USGS and PADEP, they are Four Mile Run and Six Mile Run.

The Pennsylvania Code Chapter 93 sets forth water quality standards for surface waters of the Commonwealth of Pennsylvania, including wetlands. These standards are based upon water uses which are to be protected and will be considered by the Department in implementing its authority under The Clean Streams Law and other statutes that authorize protection of surface water quality. Nothing in this chapter shall be construed to diminish or expand the authority of the Department to regulate surface water quality as authorized by statute.

Bradys Run is designated as a Trout Stocked Fishery (TSF). Trout Stocking Fisheries are designated as such for the maintenance of stocked trout from February 15 to July 31 and maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat.

Twomile, Fourmile and Six Mile Run are designated as Warm Water Fisheries (WWF). Warm Water Fisheries are designated as such for the maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat.

Four Mile Run Sub-Watershed is designated for Exceptional Brook Trout Habitat (Beaver County Greenways Plan – Habitat Map).

Riparian Buffers

Areas delineated by this data set represent riparian regions of streams, wetlands, and rivers for both water quality protection and habitat. The areas of this buffer are based on extensive modeling using methods developed by Seth Wenger in “A Review of Scientific Literature on Riparian Buffer Width, Extent and Vegetation”. The purpose of this model was to delineate the area of land with the greatest influence on water quality. The mapping of the buffers was prepared by the PNHP.

Important Bird Areas

Formed in 1996, Pennsylvania developed the first statewide Important Bird Area (IBA) program in the country. A group of scientific advisors (known as the Ornithological Technical Committee) has identified over 80 IBA sites encompassing over two million acres of Pennsylvania’s public and private land. These areas include migratory staging areas, winter roost sites and prime breeding areas for songbirds, wading birds, and other species. Pennsylvania is making an important contribution to the conservation of bird habitat in the western hemisphere. Penn’s Woods are critical to many interior forest birds, providing nesting habitat to 17% of the world’s Scarlet Tanagers and 9% of the Wood Thrushes. By focusing attention on the most essential and vulnerable areas, the IBA program helps to promote proactive habitat conservation, benefiting birds and biodiversity. Audubon Pennsylvania works with a multitude of partners across the Commonwealth to advance the conservation of Important Bird Areas.

A query of the IBA database indicates that Brighton Township is not within an IBA.

Natural Heritage Areas

In 2014 the Western Pennsylvania Conservancy published the Beaver County Natural Heritage Inventory Update, for the Pennsylvania Natural Heritage Program. The Pennsylvania Natural Heritage Program (PNHP) is a partnership between the Western Pennsylvania Conservancy (WPC), the Pennsylvania Department of Conservation and Natural Resources (DCNR), the Pennsylvania Game Commission (PGC), and the Pennsylvania Fish and Boat Commission (PFBC).

PNHP collects and stores location and baseline ecological information about rare plants, rare animals, unique plant communities, significant habitats, and geologic features in Pennsylvania. The PNHP database is Pennsylvania’s chief storehouse of such information with over 20,000 detailed digital occurrence records. Though not a regulatory organization, as part of its function PNHP provides expert input on species impacted by projects that require permits as issued by the Pennsylvania Department of Environmental Protection (DEP). Although data from PNHP feed into the environmental review tool known as the Pennsylvania Natural Diversity Inventory (PNDI), the process of environmental review is housed within DCNR, PFBC, and PGC.

A Natural Heritage Area (NHA) is an area containing one or more plant or animal species of concern at state or federal levels, exemplary natural communities, or exceptional native biological diversity. NHAs include both the immediate habitat and surrounding lands important in the support of these elements. They are

mapped according to their sensitivity to human activities, with designations of Core Habitat and Supporting Landscape areas. The sensitivity of each designation varies significantly according to the particular plant, animal, or natural community habitat that the area represents and is discussed in detail in each NHA Site Description.

- Core Habitat – areas representing critical habitat that cannot absorb significant levels of activity without substantial negative impacts to elements of concern.
- Supporting Landscape – areas directly connected to Core Habitat that maintain vital ecological processes and/or secondary habitat that may be able to withstand some lower level of activity without substantial negative impacts to elements of concern.

The Beaver County Natural Heritage Inventory 2014 Update documents three Natural Heritage Areas that are within watersheds associated Brighton Township, they include:

- South Branch Brady Run NHA
- Lower Raccoon Creek NHA
- Ohio River NHA

Each are further described herein.

South Branch Brady Run NHA

PNHP Significance Rank: State

This stretch of the South Branch of Brady Run, along with the adjacent uplands, supports a sensitive species of concern, which cannot be named here at the request of the jurisdictional agency overseeing its protection. The tributary valley to the northwest contains a large population of heartleaf meehania. This may be the only native population of this species on public land in Pennsylvania, and this is a good site for wildflower enthusiasts to see the species in the wild.

Threats and Stresses

Maintaining suitable aquatic habitat is the key to the continued success of the aquatic species of concern. Runoff from dirt and gravel roads in close proximity to waterways can contribute to physical degradation of their channels and erosion and sediment pollution in streams and rivers. Loss of forest cover within the core areas may also result in increased water temperatures and disruption of natural nutrient cycling linked to the river. If forest cover is substantially reduced within the watersheds, water quality is likely to decline from increased sediment loads. Removal of forest cover on steep slopes is especially problematic because of the potential for increased runoff and erosion following storm events. Specific threats and stresses to the elements present at this site include the following:

- The species of concern relies on good water quality. Erosion, whether caused by deforestation, poor agricultural practices, or the destruction of riparian zones, leads to increased silt loads and shifting, unstable stream bottoms. Siltation and contaminants such as heavy metals, pesticides, and abandoned mine drainage are potential threats to these species.

- Garlic mustard (*Alliaria petiolata*) is intermixed with the heartleaf meehania in the lower part of the valley, and multiflora rose (*Rosa multiflora*) is also present.

Conservation Recommendations

The following steps are recommended to ensure the persistence of these species at this site:

- Conserve the forested riparian buffers of all streams and wetlands. Conserve at least a 100 meter (328 feet) buffer of native woody vegetation where it exists along the waterways and establish at least a 30m (100 foot) buffer where it is lacking to help reduce erosion, sedimentation, and pollution. Additionally, best management practices (BMPs) that focus on limiting the introduction of non-point sources of pollution into surface and groundwater should be applied to the surrounding area. The forested buffers at this site are minimal in some places, and could be improved.
- Invasive plant species at this site should be controlled. Removal of garlic mustard and multiflora rose is effective if efforts are sustained

Lower Raccoon Creek NHA

PNHP Significance Rank: State

The lower reaches of Raccoon Creek, along with the adjacent uplands, supports the blue-tipped dancer (a damselfly species of concern) as well as two sensitive species of concern, which cannot be named at the request of the jurisdictional agencies overseeing their protection.

Raccoon Creek is a 4th order stream, with a low to moderate gradient. It has had a history of problems with abandoned mine drainage, although many of the worst discharges have been remedied through the installation of treatment systems. Freshwater mussels were once present in the creek, but no live mussels have been found in many decades. Conditions might now be appropriate for mussels to return, but it will take time for them to recolonize the creek from the Ohio River.

Threats and Stresses

Aquatic life was declining in Raccoon Creek by 1908, and in 1924 coal mine drainage killed what aquatic life remained. In recent years many of the worst discharges have been remedied through the installation of treatment systems.

Maintaining suitable aquatic habitat is key to the continued success of the aquatic species of concern. Runoff from dirt and gravel roads in close proximity to waterways can contribute to physical degradation of their channels and erosion and sediment pollution in streams and rivers. Loss of forest cover within the core areas may also result in increased water temperatures and disruption of natural nutrient cycling linked to the river. If forest cover is substantially reduced within the watersheds, water quality is likely to decline from increased sediment loads. Removal of forest cover on steep slopes is especially problematic because of the potential for increased runoff and erosion following storm events.

Specific threats and stresses to the elements present at this site include:

- Damselflies rely on good water quality, although the tolerances of individual species to different

types of pollution are not well-understood. Both sensitive species of concern are also vulnerable to water quality degradation. Erosion, whether caused by deforestation, poor agricultural practices, or the destruction of riparian zones, leads to increased silt loads and shifting, unstable stream bottoms. Siltation and contaminants such as heavy metals, pesticides, and abandoned mine drainage are potential threats to these species.

- Exotic invasive plant species threaten to compete with and displace native species. Numerous invasive species are present in this part of the Raccoon Creek valley. Among the most abundant are Japanese knotweed (*Polygonum cuspidatum*), garlic mustard (*Alliaria petiolata*), dame's rocket (*Hesperis matronalis*), multiflora rose (*Rosa multiflora*), and barberry (*Berberis thunbergii*).

Conservation Recommendations

This site includes Rocky Bottom Natural Area, owned and protected by the Independence Conservancy. The following steps are recommended to ensure the persistence of these species at this site:

- Conserve the forested riparian buffers of all streams and wetlands. Conserve at least a 100 meter (328 feet) buffer of native woody vegetation where it exists along the waterways and establish at least a 30 meter (100 foot) buffer where it is lacking to help reduce erosion, sedimentation, and pollution. The forested buffers at this site are minimal in some places, and could be improved.
- Best management practices (BMPs) that focus on limiting the introduction of non-point sources of pollution into surface and groundwater should be applied to the surrounding area.
- Avoid fragmenting the remaining forested areas with additional buildings or infrastructure. The primary conservation concern for this habitat should be to focus on safeguarding the quality and expanse of the natural landscape. While providing the primary habitat for the populations of species of concern, the natural landscape also helps to protect water quality of Raccoon Creek.
- Control invasive species of plants to prevent native species from being crowded out by introduced species. Continuing invasive species monitoring and control will be necessary.

Ohio River in Beaver County NHA

PNHP Significance Rank: Global

Over fifty percent of the land within Brighton Township drains into tributaries of, or directly into, the Ohio River.

This NHA represents a nearly 25-mile stretch of the Ohio River, its entire length in Beaver County. Starting at the Ohio and Pennsylvania state line the NHA Core Habitat contains the aquatic and near shore habitats of the Ohio River all the way to the Beaver and Allegheny County boundary south of Ambridge. The site supports a diversity of species of concern, 22 in total, including several birds, fishes, mussels, one damselfly, a Silver Maple Floodplain Forest community, and five sensitive species of concern. It is this great diversity of species of concern which contributes to the high ecological significance and conservation value of this site.

Peregrine falcons require a combination of large open areas for hunting and tall, inaccessible ledges as

nesting and brood-rearing sites. The State Route 51 Bridge over the Ohio River at Monaca provides such habitat for Peregrine falcons. The surrounding urban environment also provides ample prey resources in the form of feral rock pigeons (*Columa livia*) and other non-native bird species. Similarly, abundant fishes and nest platforms support multiple pairs of nesting osprey along the river. Bottomland forests of the Ohio River islands and its shores provide habitat for breeding Prothonotary warblers, one of just a couple of sites for this songbird in southwestern Pennsylvania.

Aquatic habitats of the Ohio River support fish of the Large River Community and offer warm water temperatures, shallow shorelines, deep channels, and slack water impoundments behind dams (Walsh et al. 2007). Among the fish species of concern at this site are indicators of this community type, including the smallmouth buffalo and the river redhorse.

Currently, there are six species of state rare mussels which have populations within this NHA. Among these mussels is the three-horn wartyback which was thought to have been extirpated from Pennsylvania. However, in 2002 this species was re-discovered in the silt deposits around Phillis Island – seen for the first time in the state since before 1920. Historically, the mussel diversity in this section of the Ohio River was much richer with an additional 21 species of mussels once known from here. Many of these species were globally rare, but have now been extirpated from this part of the river, if not from the entire state, as a result of heavy industrial development, damming, and dredging.

Development impacts over the years have been felt by other taxa as well. Several rare plant species have been extirpated from this section of the Ohio River. Blue false indigo, last observed here in 1938, used to be found on scoured cobble bars in the river, but a suppressed flood regime has likely prevented this plant from persisting. Globally imperiled Tennessee pondweed, last seen here in 1952, and smartweed dodder, last found here in 1900, are also among species lost from this area.

Threats and Stresses

Nearly all the elements of concern at this site are affected by the quality of hydrologic conditions of the Ohio River system. From Prothonotary warblers needing flooded forests with cavity trees for nesting to mussels like the mapleleaf depending on aquatic microorganisms like phyto- and zooplankton for food to fish like the river redhorse requiring clean gravel and boulders substrates to support their invertebrate food sources and for nesting, the aquatic integrity of the Ohio River is essential to the persistence of these species. With the Ohio River in Beaver County traversing through so much urban development there are a number of threats related to these species' critical needs.

Threats to native mussels include the construction of dams, non-native invasive species such as the zebra mussel (*Dreissena polymorpha*) and the Asian clam (*Corbicula fluminea*), stream channelization, water pollution, sedimentation from poor agriculture and forestry practices, bridge and road construction, and habitat loss through dredging.

Dredging removes sand and gravel substrate, and the deep depressions that remain often fill with silt and debris unsuitable for colonization by riverine mussels. Altered substrate and flow resulting from gravel extraction can reduce or eliminate mussel populations. Dredging can alter river hydrology and increase silt in the water column. In addition to the direct effects to mussels, suspended sediments from excavation activities have led to the loss or reduction of fish and macroinvertebrate habitat.

Specific threats and stresses to the elements present at this site include:

- Development of Ohio River islands, riparian forests, and near shore habitats could result in loss of forest habitat and degradation of aquatic habitat.
- Non-point source pollution contributes excess nutrients, sediments, and pesticide run-off which degrade aquatic systems.
- Agricultural and industrial pollution, impoundments, siltation, turbidity, and competition with non-native species threaten both fishes and mussels.
- Disturbance from routine bridge maintenance and other human activities within 300m of the Peregrine falcon nest structure during the breeding season (late February through July) and osprey nest locations during March through July.
- Risk of raptor collision (especially for juveniles) with automobiles, buildings, power lines and towers, and other objects.
- Risk of avian mortality from pesticides or other chemical contaminants.

Conservation Recommendations

The following steps are recommended to ensure the persistence of these species at this site:

- Protect Ohio River habitats through acquisitions and easements of riparian buffer zones. Reduce siltation, chemical and sewage discharges, and monitor Core Habitat for potential sources of pollution and siltation. Maintain substrate characteristics, hydrologic connectivity, and maintain and/or improve existing flow regimes.
- Avoid or minimize in-stream disturbances and modifications such as sand and gravel dredging and construction of new dam impoundments.
- Control sediment runoff from mining, row crop agriculture, forestry, and degradation of riparian zones and aquatic habitat by livestock. Restore riparian vegetation and fence livestock from tributary streams in the Supporting Landscape and providing alternate water sources. Regulate land use in the Supporting Landscape and monitor construction, mining and agricultural activities to minimize siltation and acid runoff.
- Maintain natural fish fauna by restricting stocking of non-native species and educate about the spread of non-native mussels through angler equipment.
- Maintain the Ohio River aquatic system to include fish spawning, rearing (juveniles), and dispersal (migration corridors) habitat.

Recreation and Transportation Inventory

Various recreation and transportation facilities are depicted on the Recreation & Transportation Infrastructure Inventory Map. These facilities include:

County Facilities

- Bradys Run County Park & Trails

Township Facilities

- Two Mile Run Park - Brighton Township
- Hardy Fields - Brighton Township
- Dawson Ridge Park - Brighton Township
- Ellis Field - Brighton Township
- CAMBEV Park - Brighton Township
- Richmond Little Red School House
- Brighton Township Municipal Building and Public Works Site
- Brighton Township Volunteer Fire Department Social Hall
- Brighton Township Commuter Bike Lanes
- Proposed Bike Lanes
- Proposed Shared Roadways
- Brighton Township Municipal Authority properties

Other Facilities

- Gypsy Glen Park - Beaver Borough
- New Horizon School/Beaver County Health and Welfare Complex - Beaver County
- Beaver Area Middle & High School
- Heritage Valley Health System
- Seven Oaks Country Club - Private
- Dutch Ridge Elementary School - Beaver Area School District

Adjacent Municipal Points of Interest

- Merrill Lock #6
- Beaver County Courthouse
- Fort McIntosh Site
- College Square Elementary
- Matthew Quay House
- Beaver Borough Riverfront Park
- Beaver Area Historical Museum
- Bridgewater Historic District
- Beaver Historic District
- Bridgewater Riverfront Park
- Dunlap Mansion
- Rochester Riverfront Park
- Beaver County YMCA
- Patterson Township Recreation Area

In addition to these features, the Ohio River North Shore Trail Feasibility Study proposes several options for the alignment of the Ohio River Trail through Beaver and Vanport Boroughs. It would be logical for Brighton Township to connect its residents to this proposed regional trail system.

Last, there is a Federal and State recognized water trail extending along the Ohio River, the Ohio River Water Trail.

Brighton Township Points of Interest

- 1 Bradys Run County Park
- 2 Two Mile Run Park
- 3 Hardy Fields
- 4 Dawson Ridge Park
- 5 Ellis Field Park
- 6 Golf Course
- 7 Dutch Ridge Elementary School
- 8 Cambev
- 9 New Horizon School
Beaver County Health & Welfare Complex
- 10 Beaver Area Middle & High School
- 11 Heritage Valley Health System
- 12 Municipal Building & Public Works Site
- 13 Volunteer Fire Department Social Hall
- 14 Richmond Little Red Schoolhouse

Adjacent Municipal Points of Interest

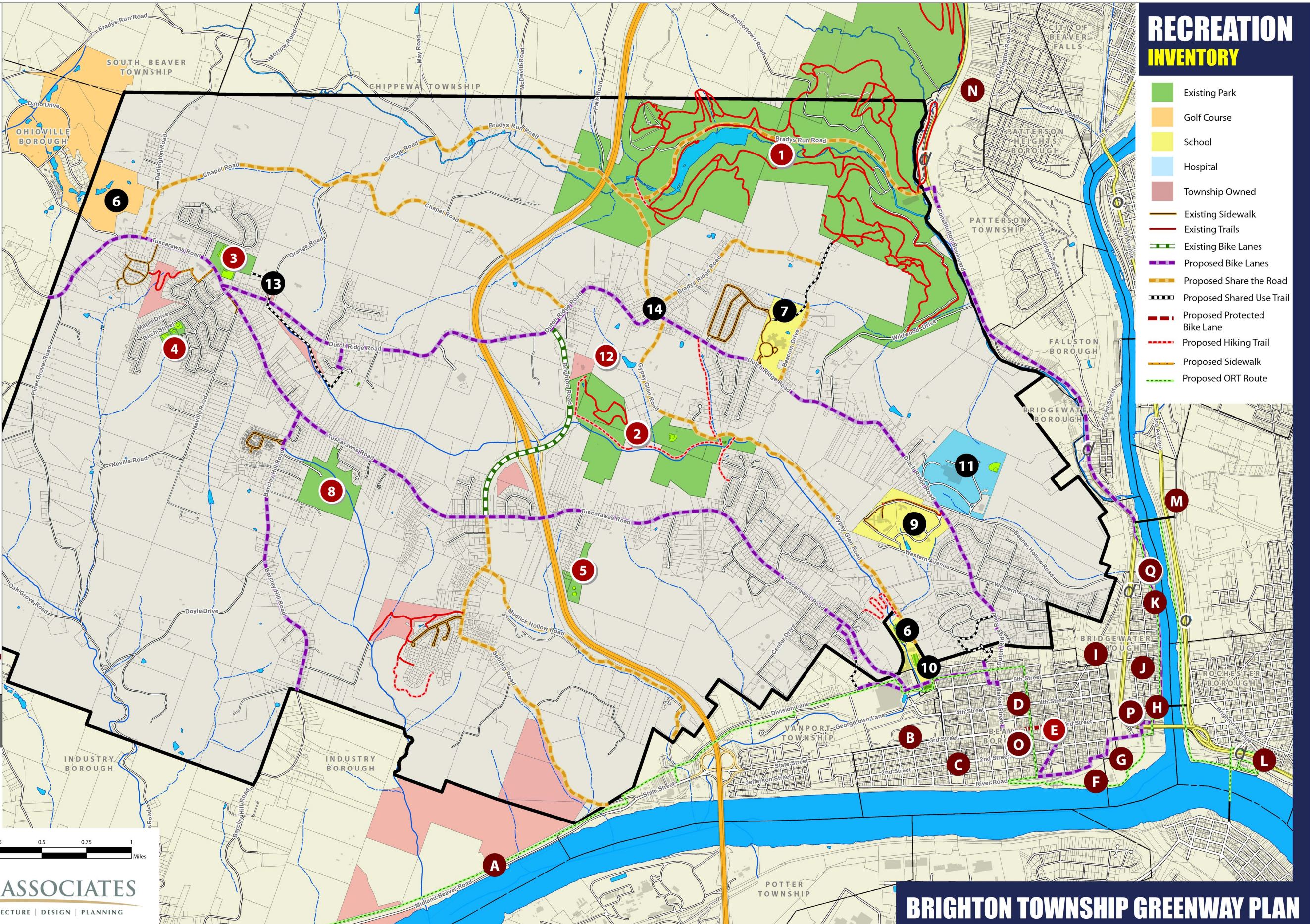
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- H Bridgewater Historic District
- I Beaver Historic District
- J Bridgewater Riverfront Park
- K Dunlap Mansion
- L Rochester Riverfront Park
- M Beaver County YMCA
- N Patterson Township Recreation Area
- O Beaver Business District
- P Bridgewater Business District
- Q Bridgewater Commercial District
- R Gypsy Glen Park

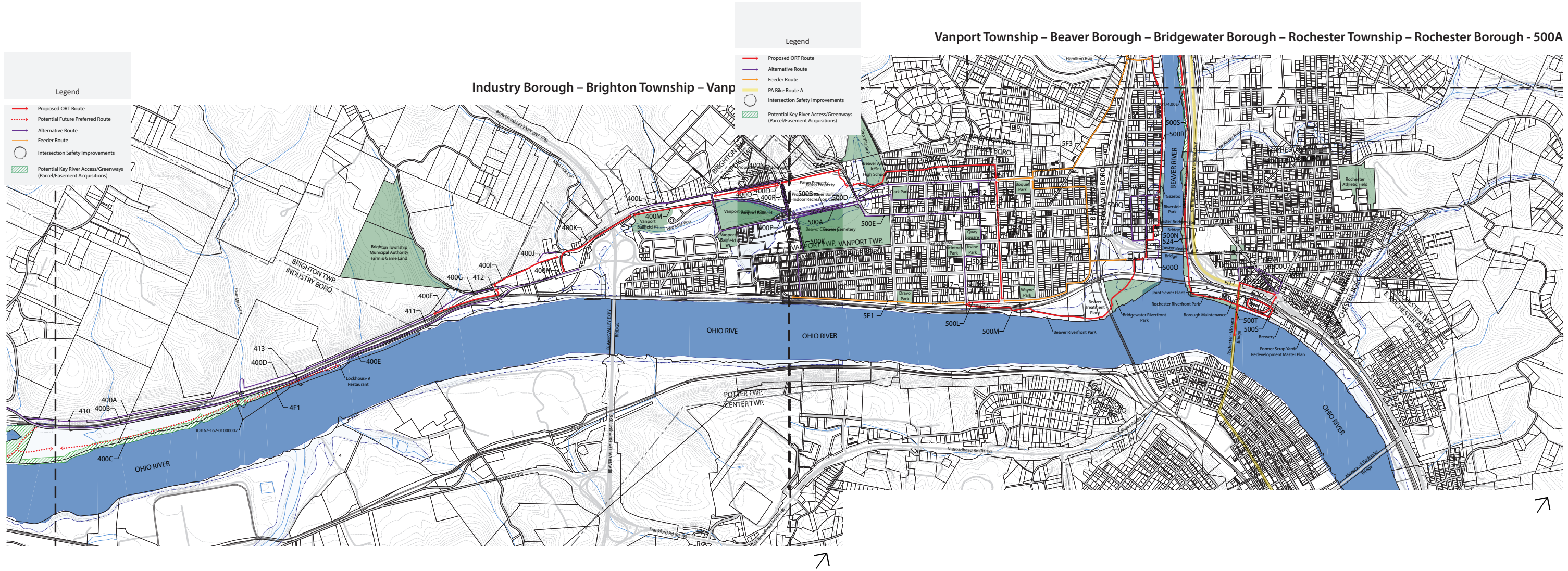
- Brighton Township Hub
- Neighboring Community Hub

Data Sources:
Beaver County GIS
Pennsylvania Spatial Data Access (PASDA)
Pennsylvania Department of Transportation
Pennsylvania DCHP
Pennsylvania Natural Heritage Program/
The Nature Conservancy

RECREATION INVENTORY

- Existing Park
- Golf Course
- School
- Hospital
- Township Owned
- Existing Sidewalk
- Existing Trails
- Existing Bike Lanes
- Proposed Bike Lanes
- Proposed Share the Road
- Proposed Shared Use Trail
- Proposed Protected Bike Lane
- Proposed Hiking Trail
- Proposed Sidewalk
- Proposed ORT Route





Ohio River North Shore Trail Feasibility Study, 2012, Stromberg/Garrigan & Associates

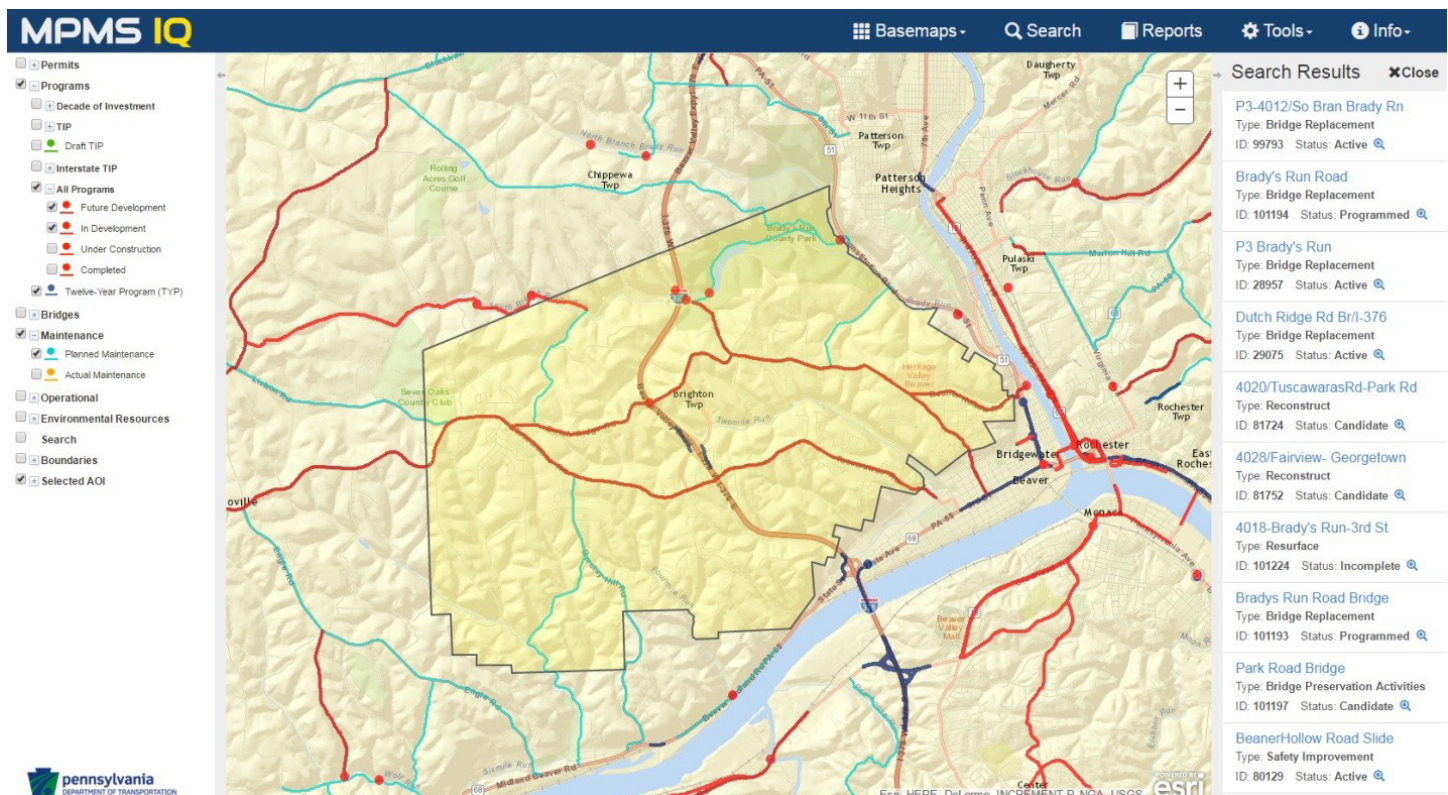
PennDOT Multi-Modal Project Management System Interactive Query (MPMS IQ)

Multi-Modal Project Management System Interactive Query (MPMS IQ) is a web-based GIS mapping application for accessing highway and bridge project data for the Commonwealth of Pennsylvania. This application is provided by the Pennsylvania Department of Transportation. (PennDOT)

MPMS IQ is a web-based GIS mapping application for accessing highway and bridge project data for the Commonwealth of Pennsylvania. This application is provided by the Pennsylvania Department of Transportation by visiting http://www.dot7.state.pa.us/MPMS_IQ/Splash.aspx

MPMS IQ features include:

- Project listing of search results appearing on the right
- New measurement tool to easily add color coded points, lines, and polygons to the map
- Traffic camera layers for viewing real-time traffic
- Google Street View with a location indicator on the map
- The ability to select and choose the symbology for external layers



A query of this database identifies three future development projects within Brighton Township. They are:

- 1. S.R. 4028 – Fairview – Georgetown Tuscarawas Road
ID No: 81752
Type: Reconstruction
Status: Candidate
Estimated Let Date: 12/25/2025
- 2. S.R. 4018 – Bradys Run Road to Third Dutch Ridge Road
ID No: 101224
Type: Resurface
Status: Incomplete
Estimated Let Date: None
- 3. S.R. 4020 – Tuscarawas to Park Road Dutch Ridge Road
ID No: 81724
Type: Reconstruction
Status: Candidate
Estimated Let Date: 12/25/2025


Recognizing this plan contains recommendations for improving bicycling along these roadways, Brighton Township must continue to communicate their goals, objectives, and the recommendations of this plan to PennDOT so they are included in the scope of work as each project enters the design phase.

Walk Score & Bike Score

Walk Score and Bike Score are tools that have been developed to assist real estate professionals in advising their clients on the walkability and bikeability of communities that their clients are considering. Utilizing GIS data and mathematical algorithms that take into consideration existing pedestrian and bicycle infrastructure, population density, distance to amenities, density of amenities, block length, intersection density, topography, connectivity


The Walk Score is a reflection of how easy it is to get around without a car. However, it does not take into account how pretty the area is for walking.




Walk Score	Description
90–100	Walkers’ Paradise: Most errands can be accomplished on foot and many people get by without using a car.
70–89	Very walkable: It’s possible to get by without driving.
50–69	Somewhat walkable: Some stores and amenities are within walking distance, but many everyday trips still require a bike, public transportation, or car.
25–49.....	Car-Dependent: Only a few destinations are within easy walking range. For most errands, driving or public transportation is a must.
0–24.....	Car-Dependent (Driving Only): Virtually no neighborhood destinations within walking range.




 Type an address, neighborhood or city Go


Car-Dependent

Beaver County

Commute to **Downtown New Castle** 

 60+ min  60+ min  60+ min [View Routes](#)

 **Favorite**  **Map**  **Nearby Apartments**

[More about](#) 

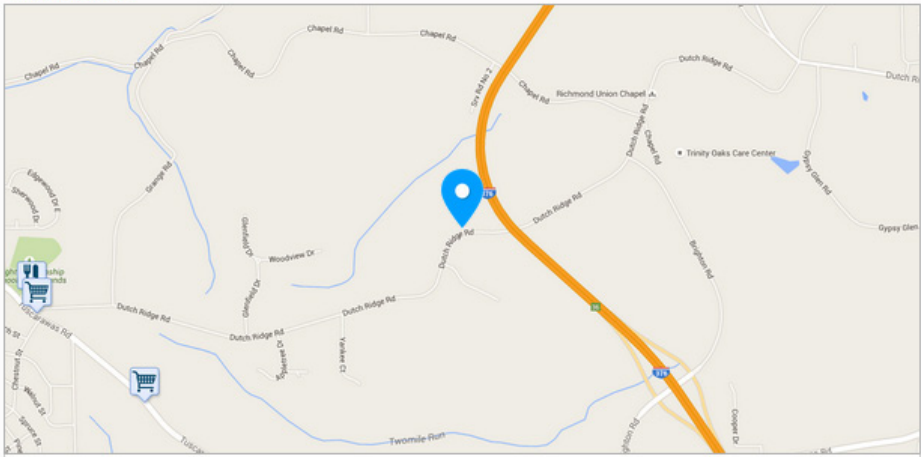
Walk Score

0

Car-Dependent

Almost all errands require a car.

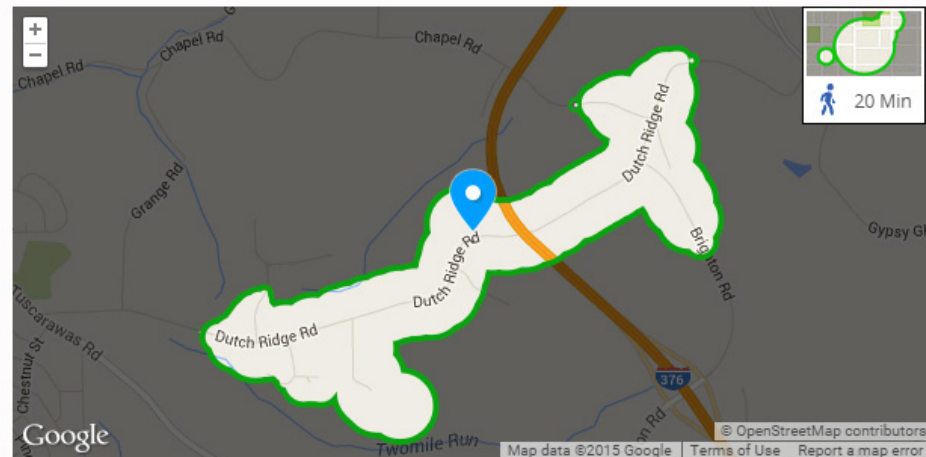
[Score Details](#)



Both the Walk Score and Bike Score for Brighton Township are '0' indicating that it is very challenging to travel in the Township without a car.

Travel Time Map

Explore how far you can travel by car, bus, bike and foot from this location.

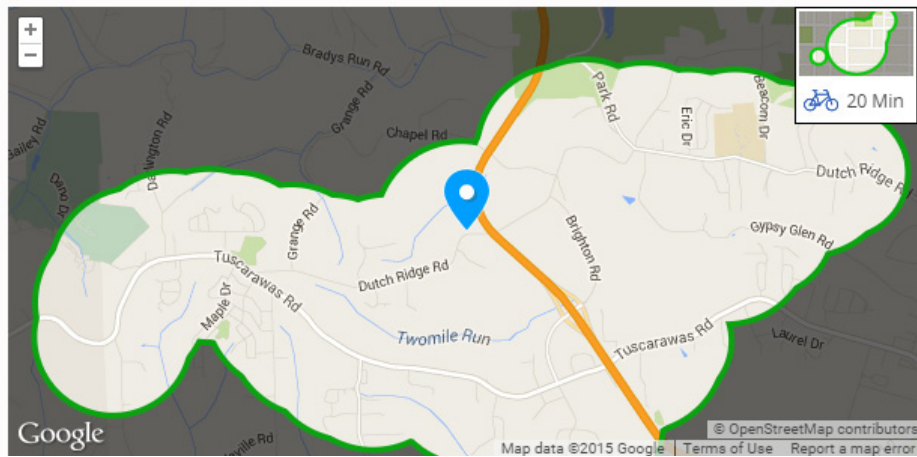


Bike Score Description

- 90–100..... Biker's Paradise - Daily errands can be accomplished on a bike.
- 70–89 Very Bikeable - Biking is convenient for most trips.
- 50–69 Bikeable - Some bike infrastructure.
- 0–49 Somewhat Bikeable - Minimal bike infrastructure

Travel Time Map

Explore how far you can travel by car, bus, bike and foot from this location.



Conducting the same query for Beaver Borough results in Walk and Bike Scores of '74' indicating Beaver is very walking and bicycling friendly.

This analysis confirms that improving pedestrian and bicycle connectivity within the Township is a worthy initiative.

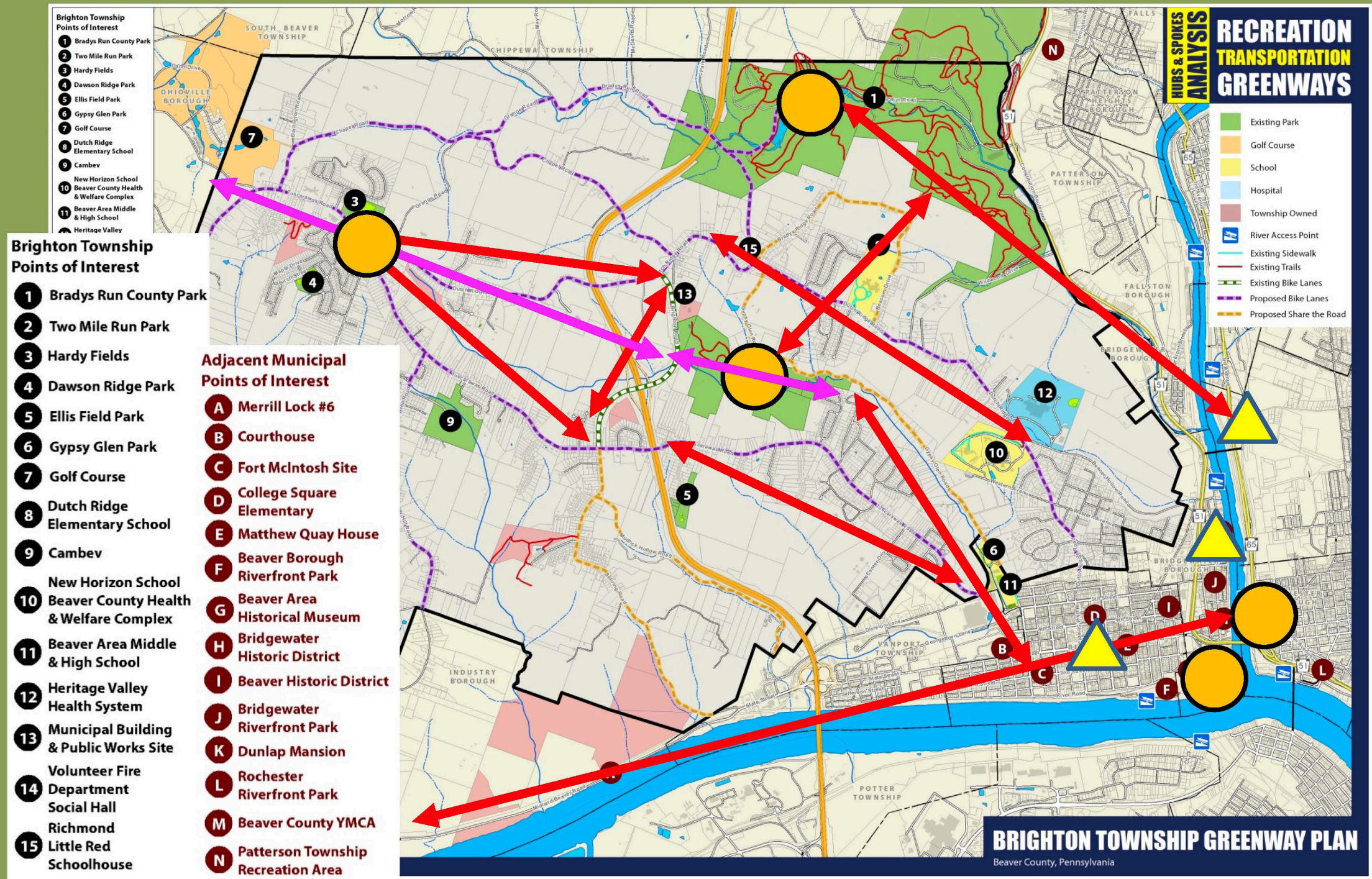
Hubs and Spokes Analysis

Building the framework of the Brighton Township greenway network began with laying out the natural systems greenways corridors. These corridors follow the most highly functional existing natural features within the County, such as forests, significant stream corridors, and wildlife habitats. Overlaying this natural systems backdrop, the plan adopts a “hubs and spokes” structure for its recreation and transportation greenways network.

The “hubs”, sometimes called nodes, are the significant destination points such as trail towns and important recreation areas. The spokes, or corridors, will provide the links between them. In some areas, natural system corridors are distinct from recreational trails and in other areas they coexist.

Finally, because greenway elements such as streams, wildlife habitats, and some recreation and transportation trails do not terminate at the Township’s boundaries, the greenways network proposes that recreation and transportation corridors continue outward and form connections to natural and recreational assets in neighboring municipalities.

Identifying Potential Recreation & Transportation Greenway Corridors



WHERE DO WE WANT TO BE?

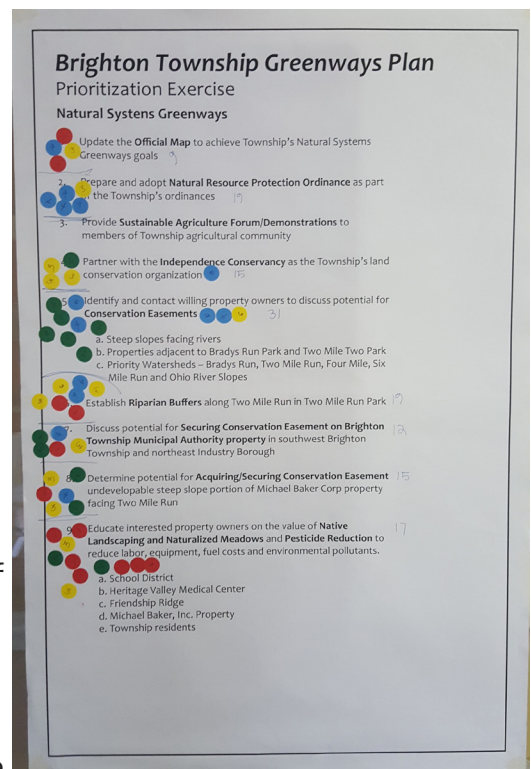


Public Input

Public participation was an important component of the Brighton Township greenway planning process. Throughout the process, every effort was put forth to collect data, input, thoughts, and opinions on issues related to greenways within the Township. Stakeholders and residents at large had several opportunities to voice their opinions on greenway issues at two public meetings. In addition four steering committee meetings were held with stakeholders to obtain their guidance and opinions.

Summary of Steering Committee Meeting No. 1, September 3, 2014

The agenda for this meeting consisted of: introductions, what are greenways & trails – recreation & transportation/conservation, brief overview of county greenway plan, review of scope of work and project schedule, what is your vision, and what are your goals and objectives for greenways and trails in Brighton Township, who will be the key players in achieving vision for greenways and Trails in Brighton Township, review and receive input on recreation resource inventory and natural resource infrastructure inventory, and to discuss strategies for public participation.



1. What the term greenway mean to you?
 - a. Green spaces for recreation, including winter recreation such as cross country skiing.
 - b. Connecting Brighton Township with trails to its recreation resources.
 - c. Accessible areas with recreational assets.
 - d. Wildlife habitat
 - e. Green infrastructure – using nature to perform functions so we do not have to invest in as much infrastructure to replicate it.

- f. Riparian corridors – streamside areas that serve as habitat, stormwater storage areas during large rain events, stormwater filters, groundwater recharge areas, etc.
 - g. Natural areas for the enjoyment of nature, passive/undeveloped recreation opportunities.
 - h. Open space – Conservation or Recreation, or both.
2. What is your vision, and what are your goals and objectives for Greenways and Trails in Brighton Township?”
- a. Provide connectivity to destinations.
 - b. Landscape scale conservation – views & open space.
 - c. Used by residents of the community/communication of use beyond our community.
 - d. Maintain what is created.
 - e. Diverse and compatible recreation opportunities.
 - f. Education – environmental, cultural, etc.
 - g. Funding to implement.
 - h. Ownership – we need champions, who will be our champions?
 - i. Shale development – are there new opportunities we can capitalize on?
 - j. Sewer right-of-ways – are they an opportunity?
 - k. Tourism equals dollars.
3. What is your vision, and what are your goals and objectives for Greenways and Trails in Brighton Township?
- a. Provide connectivity to destinations.
 - b. Landscape scale conservation – views & open space.
 - c. Used by residents of the community/communication of use beyond our community.
 - d. Maintain what is created.
 - e. Diverse and compatible recreation opportunities.
 - f. Education – environmental, cultural, etc.
 - g. Funding to implement.
 - h. Ownership – we need champions, who will be our champions?
 - i. Shale development – are there new opportunities we can capitalize on?
 - j. Sewer right-of-ways – are they an opportunity?
 - k. Tourism equals dollars.
4. John then asked attendees to identify potential partners:
- a. They will evolve.
 - b. County Parks.
 - c. County Complex.
 - d. Heritage Valley Beaver (The Medical Center).
 - e. Shale industry.
 - f. Beaver Area School District.
 - g. Agricultural base within community.
 - h. North Country Trail Association – Wampum Chapter.

- i. Ohio River Trail Council – Dr. Vincent Troia – opportunities within Bradys Run/Route 51 corridor.
- j. Municipalities

Summary of Steering Committee Meeting No. 2 - October 9, 2014,

The agenda for this meeting was as follows: review and receive comments on Brighton Township, greenways vision statement, review and receive comments on Recreation Resource Inventory and Natural Resource Infrastructure Inventory, present, discuss and receive input on Transportation Analysis, - Hubs and Spokes Analysis, Natural Systems Greenway Analysis, and discuss criteria we will use to establish greenway corridors.

1. Attendees were asked for comments or questions they have on the Recreation Resource Inventory and the Natural Resources Infrastructure Inventory. There were no comments on these maps.
2. Transportation Analysis map was reviewed with attendees. This analysis shows the existing bicycle infrastructure along Brighton Road, the remaining proposed bicycle infrastructure (as proposed in the Brighton Township Bicycle Lanes Study – 2002), existing roadway speed limits, and existing sidewalks. The map also identifies the existing slopes throughout the Township as the steeper slopes present barriers to bicycling and walking.

It was noted that the existing sidewalks in the following areas are missing from the analysis:

- a. Nicholas Drive – Barclay Hill Estates Plan
 - b. Aspen Drive – Aspen Fields Plan
 - c. Brighton Fields Plan
 - d. Ashley Ridge Plan
3. Next, the Hubs and Spokes Analysis map was reviewed. This map shows the bike and pedestrian generators and destinations in Brighton Township and adjacent municipalities. Attendees then discussed the desired lines and paths of least resistance between generators and destinations. Suggestions included:
 - Gypsy Glen Road: Path of least resistance between the Township and Beaver Borough.
 - Dutch Ridge Road: Connects a lot of the Township's residential development to one another. Also, School to Heritage Valley Beaver and County Complex (Friendship Ridge)
 - Unnamed tributary to Two Mile Run between Gypsy Glen Road and Dutch Ridge Road may offer a potential trail corridor.
 - Two Mile Run stream corridor between Brighton Road and vicinity of Appletree Drive – maybe candidate for Official Map.
 - Attendee asked if there was an old road/trail/rail corridor from the Eaton property in Beaver up to Tuscarawas Road. John to investigate.
 - Dutch Ridge Road through School property, to Beacom Drive corridor, to upper portion of Bradys Run Park.
 - Third Street in Beaver (Main Street providing goods and services)
 - East Second Street in Beaver, under railroad viaduct, to Wolfe Lane in Bridgewater

- Market Street in Bridgewater to the Veterans Bridge
- Veterans Bridge to Rochester – Beaver County YMCA
- Veterans Bridge to State Route 51 to Bradys Run Road (through Bradys Run Park).

Attendee commented that he sees a lot of bicycle traffic along State Route 51 between the Veterans Bridge and Bradys Run Park.

4. The Natural Systems Greenway Analysis map was reviewed. This map shows the convergence and overlap of Natural Resource Inventory elements that begin to define important natural resource corridors within Brighton Township. Where two or more elements overlap they are highlighted in green, and the more elements that overlap the darker green the area is on the map.

Attendees were asked if the corridors that are developing represent what they expect natural system greenway corridors would be within Brighton Township. Attendees concurred.

5. Attendees the answer the following questions. John collected the responses and they are summarized here:

- a. Destinations I would like to connect within Brighton Township include....

- Bradys Run Park with Two Mile Run Park
- Major housing plans, the hospital, parks, Tusca shopping center, then onto Beaver, State Route 51 & Vanport. Also look at connecting north to Chippewa Township – beautiful country up there.
- Any park/recreation venue, neighborhoods, schools, commerce, or tourist attractions, i.e. historical, cultural, agricultural, etc.
- Neighborhoods with township-owned land - most notably along Two Mile Run. Also, neighborhood-to-neighborhood connections are very important as well, especially among the smaller subdivisions that have single exits onto collector roads. The goal in my mind is that adults and children should be able to go for safe, relatively lengthy walks starting at their front door and have some variety in where they walk, whether in neighborhoods, in nature, or a combination of both.
- Bradys Run Park, Two Mile Run Park/creek corridor, Hardy Field, between neighborhoods, to Beaver Borough, to High School, local streets to connecting trails.

- b. I would walk and bike more in the Township if...

- Bradys Run Park were connected with Two Mile Run Park
- There were trails and vistas
- A map connecting destination points, along with adequate parking & restroom facilities being in place.
- If safe access were provided along collector roads (namely Tusca and Dutch Ridge) that so many neighborhoods empty onto. Or, if more public paths existed between subdivisions, that would be even better. Although I walk/run on main roads (mostly Tusca) very often, I do not enjoy it. I use it because I have to in order to get to other neighborhoods, which are much safer and more interesting places to walk. Finally, if neighborhoods could eventually connect with natural areas with trails (township-owned parks and other lands, Bradys Run),

that would be wonderful. That would allow one to exercise or just go for a relaxing hike without having to get in a car.

- c. Natural Areas within Brighton Township that are special to me are...
 - Bradys Run Park
 - Bradys Run Lake
 - All creek valleys and their river bluffs. Four Mile Run valley is only one of seven forest tracts of 2,000+ acres in Beaver County, it should not be logged or further developed. The river bluffs are highly valuable habitats and character-defining view sheds.
 - I think main natural assets within the Township are Bradys Run Park as well as the property owned along Two Mile Run. Generally, I love being in just about any sort of nature (any trail is a good trail!), but woodlands and especially along creeks hold perhaps the most overall appeal.

Summary of Public Meeting No. 1, November 19, 2014

The purpose of this meeting was to introduce the greenways planning process, discuss what greenways are, solicit input from attendees on their vision for Greenways in Brighton Township, and review & discuss infrastructure analysis. The following are thoughts and ideas shared by attendees:

1. Destinations I would like to connect within Brighton Township include...
 - a. Beaver Borough to Bradys Run Park
 - b. Bridgewater, through Fallston to Bradys Run Park along State Route 51 – currently a death trap
 - c. Beaver Borough and Little Beaver Creek in Ohio
 - d. Hardy Field and Two Mile Run Park
 - e. Cambev Property – undeveloped township park.
 - f. Spring, to Highland to Vanport Reservoir.
 - g. Mason Lane, to Center, to Van Buren/Eaton.
 - h. Mudlick Hollow – more bike-friendly, not a lot of traffic.
 - i. Seabring Road to apple orchard.
2. I would walk and Bike more in Brighton Township if...
 - a. Advertising and marketing to promote awareness.
 - b. Improve safety for walking and biking.
 - c. Share the road signs on appropriate routes.
 - d. Advertise in the Township newsletter.
3. Natural Areas within Brighton Township that are special to me are ...
 - a. Bradys Run Park
 - b. Two Mile Run Park

4. Other thoughts:

- a. How is it possible?
- b. Trails through the woods connecting the township.
- c. Recreational trail connections.
- d. Natural separations from development.
- e. Being able to walk to a destination.
- f. Trails from the community to Bradys Run Park.
- g. Connections to Bradys Run Park, fitness opportunities.
- h. Difficult to bike to a destination in the Township now – it is a challenge/dangerous – I would like to be able to do it without having to worry about my safety.
- i. Being able to walk/bike for health and wellness benefits.

Study Committee Meeting Three, March 18, 2015

The agenda for this meeting was as follows: review and discuss input from public meeting no. 1, review and receive input on Alternative Transportation Greenways – Draft, review and receive input on Natural Resource Greenways - Draft, discuss potential policies, and procedures and tools to implement proposed greenway and trail corridors.

1. Attendees reviewed and provided input on the updated Alternative Transportation Greenways – Draft. All agreed with the proposed routes.
 - a. It was suggested a trail be added connecting CAMBEV to Wishart Drive.
 - b. It was suggested that ways to connect the Tusca and Dutch Ridge Road neighborhoods to Two Mile Run Park and stream corridor.
 - c. An attendee asked whether Galey Boulevard is a public or private right-of-way. Dehart indicated the Brighton Township portion was vacated some time ago. Buerkle indicated that he believes the portion in Beaver is still considered a public right-of-way. Walker indicated that he uses it on occasion and has never had an issue.

Although attendees like the plan, they felt it was overwhelming and asked if the corridors would be priorities. Buerkle indicated they would be prioritized later in this planning process.

2. Next attendees discussed potential policies, procedures and tools to implement proposed greenway and trail corridors. Buerkle indicated that tools are typically categorized as either regulatory or non-regulatory.
 - a. Alternative/Healthy Transportation Implementation Tools - Regulatory
 - Complete Streets policy
 - The Official Map
 - Subdivision and Land Development Ordinances
 - Sidewalks
 - Trails and Trail Connections

- Trail Design Standards
- Complete Streets Ordinance

b. Alternative/Healthy Transportation Implementation Tools - Non-Regulatory

- State Highway Improvements Coordination
- Utility Corridors and Rights-of-way
- Fee Simple Interest
- Trail Easements
- Inter-Agency Coordination
- Public Private Cooperation

c. Natural Resource Implementation Tools - Regulatory

- Regulatory
- Sketch Plan
- Conservation Design
- Existing Resources and Site Analysis Plan
- Floodplain Regulations
- Public Land Dedication & Fee-in-Lieu
- Transfer of Development Rights
- Stormwater Management Best Practices
- The Official Map
- Floodplain Protection Standards
- Steep Slope Protection Standards
- Woodland and Specimen Vegetation Protection Standards
- Timber Harvesting Regulations
- Watercourse and Forested Riparian Buffer Protection Standards
- Wetland and Wetland Margin Protection Standards

d. Natural Resource Implementation Tools - Non-Regulatory

- Conservation easements
- Partnering with/creating Land Trust/Conservancy

Summary of Public Meeting – September 28, 2015

The purpose of this meeting was to: review what Greenways are, review and receive input on our vision for greenways, our goals for greenways, and review and prioritize Implementation strategies.

The following tables are a result of the input received during this meeting:

Natural Systems Greenways Prioritization

Implementation Strategy		Votes	Priorities
5.	Identify and contact willing property owners to discuss potential for Conservation Easements	31	1
a.	Steep slopes facing rivers		
b.	Properties adjacent to Bradys Run Park and Two Mile Run Park		
c.	Priority Watersheds – Bradys Run, Two Mile Run, Four Mile, Six Mile Run and Ohio River Slopes		
2.	Prepare and adopt Natural Resource Protection Ordinance as part of the Township's ordinances	19	2
9.	Educate interested property owners on the value of Native Landscaping and Naturalized Meadows and Pesticide Reduction to reduce labor, equipment, fuel costs and environmental pollutants.	17	3
a.	School District		
b.	Heritage Valley Medical Center		
c.	Friendship Ridge		
d.	Michael Baker, Inc. Property		
e.	Township Residents		
6.	Establish Riparian Buffers along Two Mile Run in Two Mile Run Park	19	4
4.	Partner with the Independence Conservancy as the Township's land conservation organization	15	5
8.	Determine potential for Acquiring/Securing Conservation Easement undevelopable steep slope portion of Michael Baker Corp property facing Two Mile Run	15	5
7.	Discuss potential for Securing Conservation Easement on Brighton Township Municipal Authority property in southwest Brighton Township and northeast Industry Borough	12	6
1.	Update the Official Map to achieve Township's Natural Systems Greenways goals	9	7
3.	Provide Sustainable Agriculture Forum/Demonstrations to members of Township agricultural community	0	8

Recreation and Transportation Greenways Prioritization

Implementation Strategy

18. Secure funding to **Implement Demonstration Projects:**
 - a. **Shared Road - Gypsy Glen Road** between the Beaver Area School District Complex and Two Mile Run Park
 - b. **Bicycle Lanes - Hardy Field to Two Mile Run Park Extension and Brighton Road Bike Lanes**
 - c. **Shared Road - Beacom Drive and Bradys Ridge Road to Bradys Run Park**
17. Establish and lead **Intergovernmental Greenway Committee Discussions**, including PennDOT, on region-wide trail & bikeway improvements
 - a. Ohio River Trail through Beaver Borough, Vanport Borough, Midland Borough, to Ohio State Line
 - b. Bicycle Lanes/Protected Cycle Track along State Route 51 through Bridgewater Borough and Patterson Township to Bradys Run Park Road
3. Meet with PennDOT on annual basis to **Review PennDOT TIP and Maintenance Projects to Ensure Consistency** with Township pedestrian and bicycle goals
15. Revise zoning/subdivision and land development ordinances to include **Trail Development Standards**
2. Prepare and adopt **Complete Streets Policy**
10. Host annual **Pedestrian and Bicycle Safety Awareness Day** to provide education and awareness programs
1. Update the **Official Map** to achieve Township's Recreation and Transportation goals
4. Conduct **Safe Walking and Bicycling Program** in the elementary/middle schools
9. Promote **Bike/Walk to School Days**
14. Revise zoning/subdivision and land development ordinances to require **Bicycle Racks and/or Bicycle Storage** to be installed in commercial, healthcare, education, and multi-unit residential development
16. **Sign Bicycle Routes** throughout the Township
13. Conduct regular **Speed Limit Enforcement Programs** on Gypsy Glenn, Dutch Ridge, Tuscarawas and Brighton Roads
5. Conduct **Safe Walking and Bicycling Program** in the high school
6. Promote **Bicycle Helmet Campaign** throughout the schools
7. Implement a **Walking School Bus Program** in conjunction with the school district
8. Conduct **Safe Walking and Bicycling Education Campaign** with Township Residents
11. Secure and distribute **Safe Walking and Safe Bicycling Educational Brochures**
12. Discuss and evaluate potential to **Reduce Speed Limits** to 25 MPH township-wide for pedestrian and bicycle safety

Votes	Priority
38	1
38	1
38	1
38	1
27	2
27	2
27	2
15	3
12	4
11	5
9	6
7	7
4	8
4	8
4	8
3	9
1	10
0	
0	
2	
0	
0	
0	

Vision for Greenways in Brighton Township

Greenways provide Brighton Township residents & visitors with a system of trails connecting our parks and cultural resources while promoting healthy and active lifestyles. Our greenways promote alternative transportation, sustainable development, conserve sensitive environmental resources, promote alternative stormwater management, and maintain our rural landscape. All greenways will respect private property rights and local community concerns.

Goals for Greenways in Brighton Township

- Our natural system greenways will build and improve upon the legacy established when Beaver County created Bradys Run Park. Bradys Run Park and Two Mile Run Park will be significant features within our greenway.
- Our Greenways will assist in managing stormwater and will biologically filter run-off water before returning it to the our waterways, thereby improving water quality, reducing erosion, and providing ecological benefits;
- Some greenways will be public, others are private, and still others are a combination, all nurtured through cooperative public/private partnerships.
- The Township, adjacent municipalities, conservation and recreation organizations, public agencies, landowners, private sector companies, and dedicated individuals will support the Township's greenway initiatives by developing strong partnerships for mutual benefit.

Defining the Natural Systems Greenway Corridors

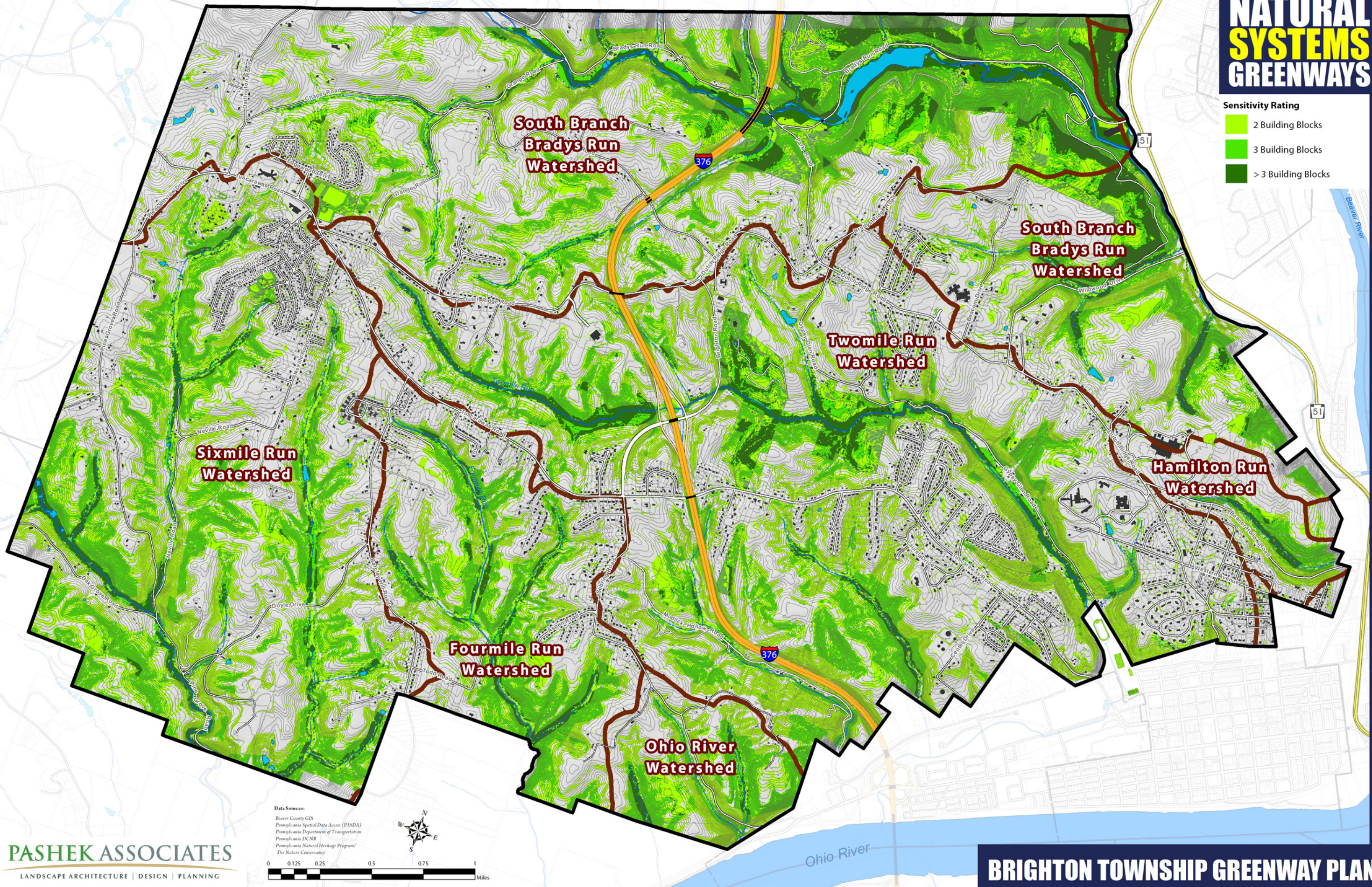
By its very nature Brighton Township is very green due to its rural agricultural past. Therefore, it was the goal of the project steering committee to recommend natural system corridors in those areas of the region that contain a high occurrence of natural, ecological, and hydrologic infrastructure building blocks. Areas which include multiple building blocks generally represent those areas that contain the most sensitive natural systems within the Township.

The mapping that resulted from this analysis identifies the proposed natural systems greenway corridors. The definition for a greenway corridor indicates they are to be contiguous linear corridors and provide connectivity between resources. The natural systems building block analysis also identified individual islands of resource elements. These outlying areas were eliminated as the draft natural system greenway corridors were refined so that the proposed natural systems greenway corridors would truly be linear in nature. The resulting Natural System Greenway Corridors for Brighton Township are identified on the following map.

NATURAL SYSTEMS GREENWAYS

Sensitivity Rating

- 2 Building Blocks
- 3 Building Blocks
- > 3 Building Blocks



Data Sources:
 Beaver County GIS
 Pennsylvania Spatial Data Access (PASDA)
 Pennsylvania Department of Transportation
 Pennsylvania DCMR
 Pennsylvania Natural Heritage Program/
 The Nature Conservancy



PASHEK ASSOCIATES
 LANDSCAPE ARCHITECTURE | DESIGN | PLANNING

BRIGHTON TOWNSHIP GREENWAY PLAN
 Beaver County, Pennsylvania

Defining Recreation and Transportation Greenways

Recreation and transportation greenways were initially identified by reviewing existing and potential trail corridors within Brighton Township. After identifying existing trails, potential trail connections, and feasible connections, a recreation greenway network was developed for the Township. After this trail network was mapped, key destinations and points of interest along this network were analyzed to determine if they should be incorporated as points of interest or destinations along the trails.

The steering committee, with the assistance of Pashek Associates, identified a system of hubs and spokes for recreation and transportation greenways in Brighton Township.

Criteria for identifying hubs and spokes included:

- Connect Destinations
- Connect with the Outdoors
- Promote Active Living
- Promote Economic Development
- Promote Tourism

Hubs

- *Two Mile Run Park*
- *Hardy Fields*
- *Bradys Run Park*
- *Bridgewater Borough Business District*
- *Bridgewater Crossings*
- *Beaver Borough Business District*
- *Beaver Train Station, Log Cabin, Riverfront Park and Fort McIntosh*
- *Rochester Borough Business District*
- *Beaver County YMCA*

Points of Interest within Brighton Township

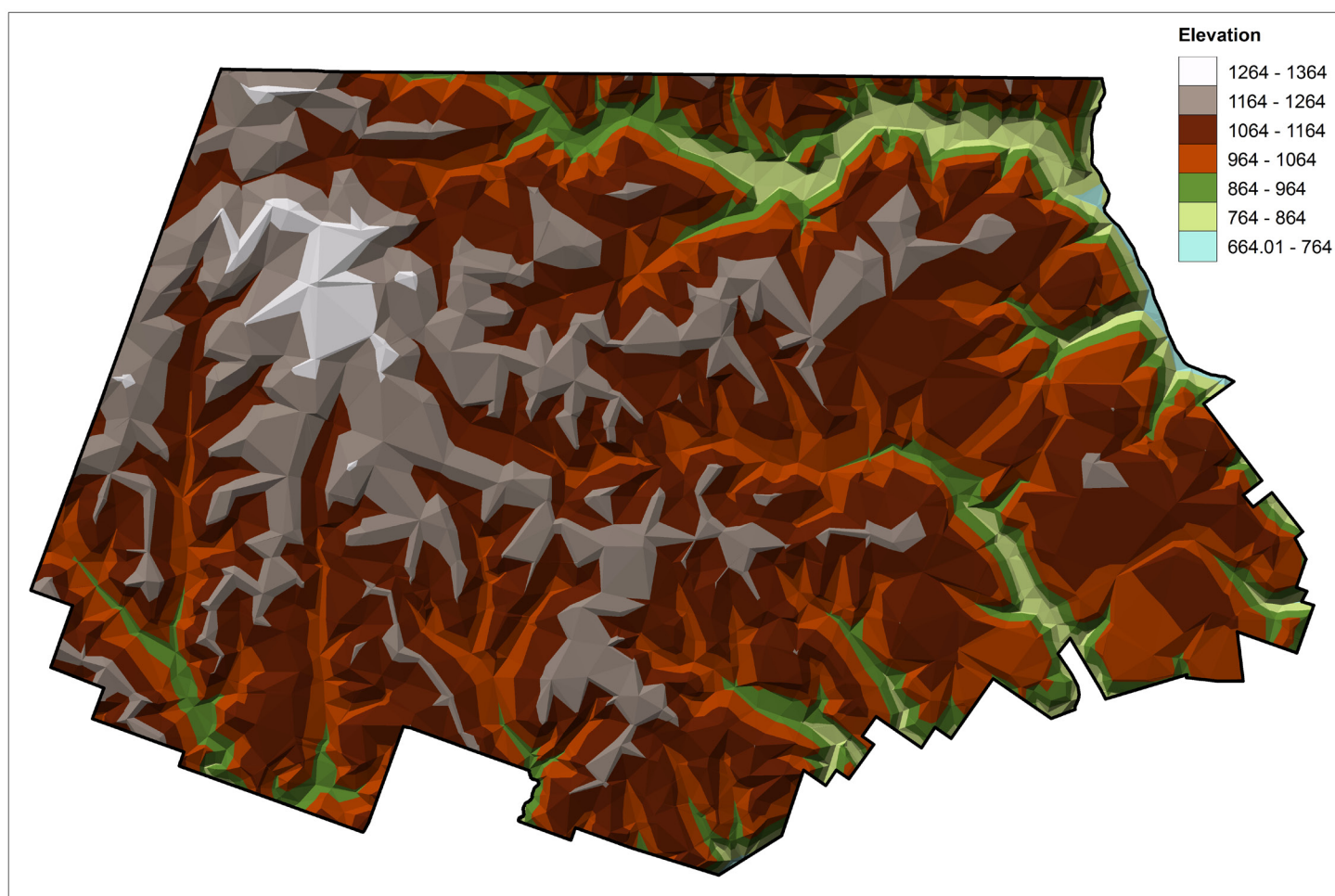
- Dawson Ridge Park
- Ellis Fields
- Dutch Ridge Elementary School
- Cambev Park
- New Horizon School & Beaver County Health & Welfare Complex
- Heritage Valley Health System
- Brighton Township Municipal Building
- Brighton Township Volunteer Fire Department
- Richmond Little Red School House

Points of Interest in Adjacent Municipalities

- Seven Oaks Country Club
- Merrill Lock No. 6

- Beaver County Courthouse
- Fort McIntosh Historical Site
- College Square Elementary School
- Mathew Quay House
- Bridgewater Riverfront Park
- Rochester Riverfront Park
- Beaver Riverfront Park
- Gypsy Glenn Park
- Patterson Township Recreation Area

One of the significant challenges to the recreation and transportation greenways in Brighton Township is the topography. Brighton Township is primarily situated on a plateau, and many of the desired hubs and points of interest are located in the low lying areas along the Beaver and Ohio Rivers. Further, Bradys Run County Park is situated in this lower area along the northern border of the Township. This makes pedestrian and bicycle connections from the hubs on the plateau areas to Bradys Run Park, Beaver Borough, Bridgewater Borough and Rochester Borough hubs and points of interest challenging as they are separated vertically anywhere between 300 feet to 500 feet in elevation.



Potential connections are routes identified by the steering committee include:

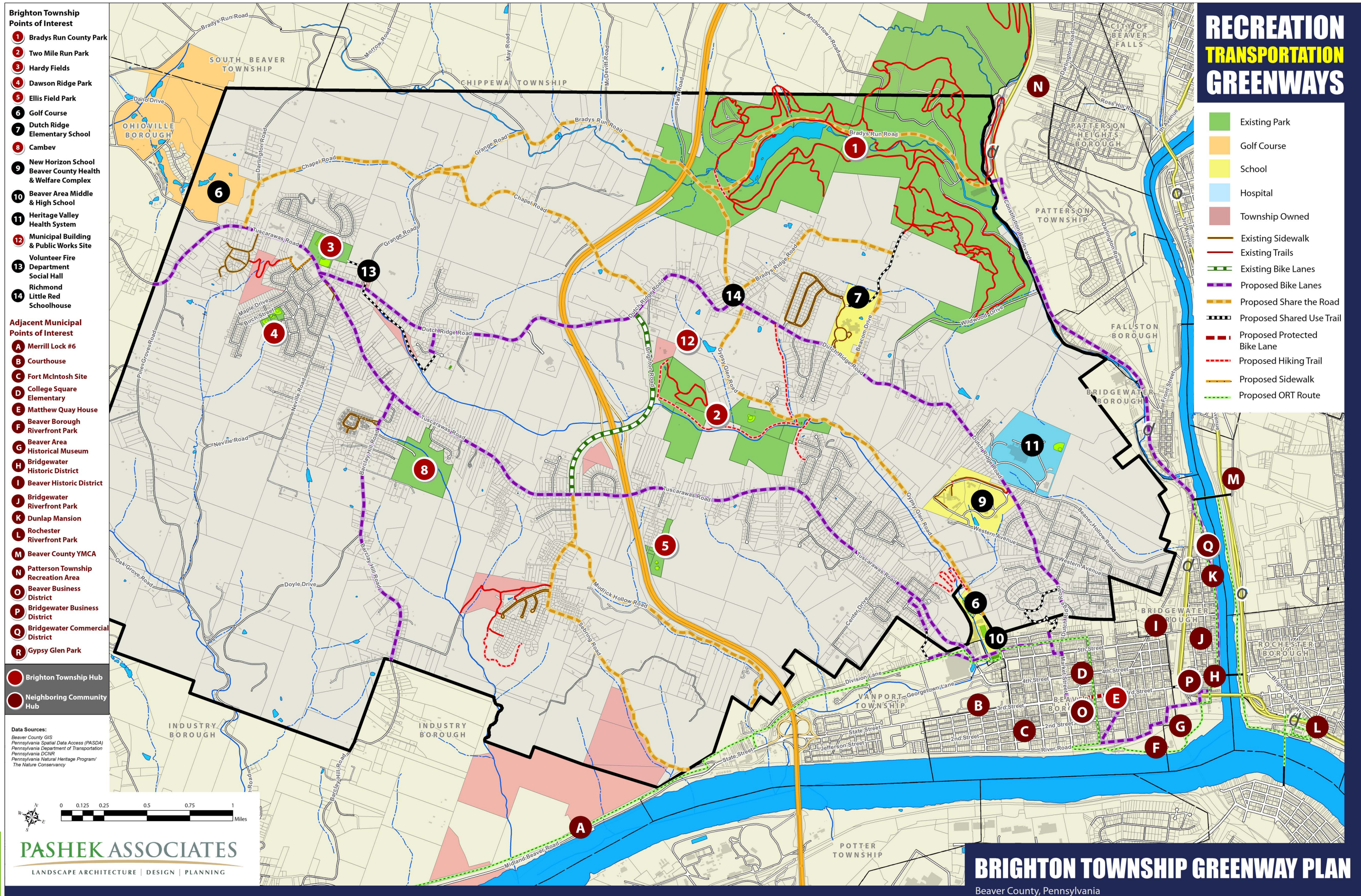
- Gypsy Glen Road - Brighton Township to Beaver Borough, and Bridgewater and Rochester Boroughs
- Galey Boulevard - Brighton Township to Beaver
- Constitution Boulevard (State Route 51) - lower Bradys Run Park to Beaver, Bridgewater, Rochester Boroughs

Internal routes within the Township include:


- Dutch Ridge Road
- Tuscarawas Road
- Brighton Road

The above roads form loop on the plateau, and connect many of the assets within Brighton Township.

The hubs and spokes analysis in the previous chapter resulted in the Recreation and Transportation Greenway Corridors shown on the following page.



HOW DO WE GET THERE?



“The best way to accomplish that which is impossible is to do today what is possible”

- Paolo Friere

Achieving Brighton Township’s vision and goals for greenways within the Township requires a change in philosophy and thinking. Typically decisions are made based on wanting to attract development into the Township which should result in business growth and home ownership. Therefore, decisions are made under the thought that too many restrictions or regulations will cause developers to look elsewhere. This is based on how the Baby Boom Generation views the world, the community where they live, their life goals and what they do in their spare time.

However, beginning with Generation X and especially rooted in the Melennial Generation, their views of the world, the community where they live, and life goals are changing.

A 2016 survey by Forbes Magazine of 30 Under 30, indicates:

- Exercise is the most important health factor in their daily lives
- Participating in outdoor activities is their preferred type of daily exercise
- 75% obtain their news from social media, while just 25% receive it through their tv
- 53% do not pay for cable tv services, rather they obtain their news and entertainment online
- 30% have no need for a car, 36% have a car for personal and business needs, 25% for personal use, 2% for business use, and 6% do not have a car but would like one.
- 65% of their shopping is completed online
- When asked what luxury products they wish to buy, a car and house ranked last and next to last respectively, behind clothes, home electronics, accessories, and a phone.
- Besides home/rental expenses, 66% of their income is spent on travel and eating/drinking out
- 80% expect to live in the city, 18% in the suburbs, and 3% in a rural area within the next five years

Our younger generations place greater value on what they do outside of work. Where they live and how they play. Further, there is going to be more development pressure in the region than has been seen in many years due to the construction of the recently announced Shell Chemical major petrochemicals complex and

anticipated spin off development. Therefore, it is imperative that Brighton Township respond to the needs and desires of those who will live, and will be living, in Brighton Township by maintaining and enhancing the quality of life for living and playing within the Township. By doing so, Brighton Township is more likely to attract and retain young professionals and skilled laborers within the Township.

How is this Accomplished?

This is accomplished by encouraging smart growth within the Township and enhancing the quality of life for its residents. Implementing the recommendations contained in this Greenway Plan will begin to address the needs and desires of those living, and those who will want live, in Brighton Township.

This chapter presents recommendations, defines implementation strategies, and recommends a plan of action to establish the vision for greenways in Brighton Township. The strategies recommended to achieve the vision are organized into the following subsections:

- 1) Management Structure
- 2) Natural Resource Greenway Implementation Strategies and Tools
- 3) Recreation and Transportation Greenway Implementation Strategies and Tools
- 4) Potential Funding Sources

Management Structure

Our recommendation is that the implementation of greenways within Brighton Township be managed directly through the Township. Currently, the Township does not have planning staff. Therefore, we recommend the Township Manager lead the greenway implementation efforts in coordination with outside partners.

Potential Partners

Throughout the course of this study, several potential partners were identified. These potential partners may provide direct or indirect assistance/partnerships in advancing greenways within Brighton Township. They include agencies and organizations from the following sectors:

Potential Partners identified during the course of this study included:

- Allegheny Health Network
- Allegheny Land Trust
- Beaver Area Bicycle Enthusiasts
- Beaver Area School District
- Beaver County 4-H
- Beaver County Conservation District
- Beaver County Recreation & Tourism
- Brighton Township Recreation Board
- Brighton Township Planning Commission
- Brighton Township Police Department
- Community College of Beaver County
- Independence Conservancy
- Ohio River Trail Council
- Penn State Beaver
- Penn State Cooperative Extension – Beaver Office
- Raccoon Creek State Park
- Western Pennsylvania Wheelmen
- Heritage Valley Health System
- UPMC
- Western Pennsylvania Conservancy

These organizations can potentially assist with planning, implementing, developing, managing, operating, maintaining, and marketing greenways and trails in Brighton Township. Specific recommendations regarding these partnerships will follow.

Natural Resource Greenway Vision

Greenways provide Brighton Township residents & visitors with a system of trails connecting our parks and cultural resources while promoting healthy and active lifestyles. Our greenways promote alternative transportation, sustainable development, conserve sensitive environmental resources, promote alternative stormwater management, and maintain our rural landscape. All greenways will respect private property rights and local community concerns.

Building upon the overall vision for greenways in Brighton Township, it is our vision to conserve sensitive natural resources to:

- Prevent erosion of steep slopes and corresponding degradation of water quality within the Township.
- Allow for the natural management of stormwater by preserving floodways, floodplains, wetlands, and riparian buffers that slow and cleanse stormwater before it reaches streams and waterways.
- Conserve interior forests and other significant habitat areas within Brighton Township

To accomplish this Brighton Township needs to institute a process and mechanism which actively seeks and establishes conservation easements with willing property owners in the Township. Further, the Township should adopt resource first policies when it comes to managing and maintaining all property under the control of the Township.

During this planning process the community, through public meetings, key person interviews and study committee input, indicated the priorities for Natural Resource Greenway conservation to be:

- Preparing and adopting a natural resource preservation ordinance that conserves sensitive resources.
- Connecting Two Mile Run Park and Upper Two Mile Run Park by acquiring property to connect the two separate areas.
- Expand Two Mile Run Park to west by acquiring property and/or conservation easements for property along Two Mile Run, west of Interstate 376.
- Conserving steep slopes along the Beaver and Ohio Rivers

The Implementation Strategies and Tools outlined in the following section provide specific steps and action strategies to advance the vision and goals for conservation greenways in Brighton Township.

Natural Resource Greenway Implementation Strategies and Tools

Based on the input received from the public, the steering committee and Township staff, along with the consultant's professional guidance, the following are priorities (listed high to low) for Natural Resource Greenway Implementation:

Priorities	Strategy
1	Identify and contact willing property owners to discuss potential for Conservation Easements
	Steep slopes facing rivers
	Properties adjacent to Bradys Run Park and Two Mile Run Park
	Priority Watersheds – Bradys Run, Two Mile Run, Four Mile Run, Six Mile Run and Ohio River Slopes
2	Prepare and adopt Natural Resource Protection Ordinance as part of the Township's ordinances
3	Educate interested property owners on the value of Native Landscaping and Naturalized Meadows and Pesticide Reduction to reduce labor, equipment, fuel costs and environmental pollutants.
	School District
	Heritage Valley Medical Center
	Friendship Ridge
	Michael Baker, Inc. Property
	Township Residents
4	Establish Riparian Buffers along Two Mile Run in Two Mile Run Park
5	Partner with a land conservation organization to assist with land conservation within Brighton Township
5	Determine potential for Acquiring/Securing Conservation Easement undevelopable steep slope portion of Michael Baker Corp property facing Two Mile Run
6	Discuss potential for Securing Conservation Easement on Brighton Township Municipal Authority property in southwest Brighton Township and northeast Industry Borough
7	Update the Official Map to achieve Township's Natural Systems Greenways goals
8	Provide Sustainable Agriculture Forum/Demonstrations to members of Township agricultural community

Priority 1 Identify and contact willing property owners to discuss potential for Conservation Easements

During the planning process the steering committee utilized the Natural Resource Greenway Plan to identify key areas within the Township to focus its conservation easement efforts. These areas include:

- Steep slopes facing rivers
- Properties adjacent to Bradys Run Park and Two Mile Run Park
- Priority Watersheds – Bradys Run, Two Mile Run, Four Mile Run, Six Mile Run and Ohio River Slopes

Implementation of Conservation Easements

With over 1,100 acres being generally identified for future conservation easement acquisition in Brighton Township and with limited staff, the Township recognizes it needs to follow a slow and methodical process when acquiring conservation easements, and that success should be measured not in months rather in years.

In order to complete the necessary due diligence steps when acquiring easements or property, as discussed earlier, there are costs associated with that work that typically ranges between \$5,000 and \$10,000 per easement/parcel. Therefore, we recommend the Township budget the following amounts for easement acquisition:

- 2017 \$50,000
- 2018 \$50,000
- 2019 \$60,000
- 2020..... \$70,000

Combined with matching grants this will provide between \$40,000 to \$80,000 a year, respectively, to cover due diligence costs and to secure conservation easements on property within the Township.

Approximately 30 parcels, totaling over 1,100 acres, have been identified that meet the above criteria. Since the Township is only interested in working with interested owners, and most of the property owners have not been contacted to determine their level of interest the locations of the specific properties are not being identified in the report.

Given the number of properties and owners involved, this task will be completed on an on-going basis, with the goal of acquiring one or two conservation easements annually.

The Township Manager, with support from the Township Planning Commission, will begin to approach property owners in these areas to determine whether they may be interested in granting conservation easements in these key areas. Conservation easements will only be considered when property owners indicate a willingness to participate in discussions. When necessary the Township Manager will consult with a local land trust organization to assist in the easement acquisition process. Potential land trusts include:

- **Independence Conservancy**
P.O. Box 248
Industry, PA 15052-0248
www.independenceconservancy.org
- **Western Pennsylvania Conservancy**
800 Waterfront Drive
Pittsburgh, PA 15222 US
Phone: (412) 288-2777
Status: Accredited
www.paconserve.org

A land trust has expertise in consulting with land owners and reviewing options for acquiring a conservation interest in properties. Further, they are versed in understanding and presenting options available to land owners to address their specific goals for conservation, access to the property, and tax implementations and benefits of various property conveyance mechanisms.

Depending on the type of assistance required, there may be a fee for service arrangement between the Township and the selected land trust. The Township desires to hold and retain conservation easements that may be granted by willing property owners.

Level of Recommended Conservation

Several of the greenways in Brighton Township are protected within Bradys Run Park - County, or Township Parks, or agricultural security areas. However, the majority of lands found within the greenways are privately owned and unprotected. Acquisition of all lands found within these greenways is not feasible, nor is it necessary. The municipalities associated with the proposed natural system greenway corridors should strive to educate landowners and work with landowners to promote conservation.

While regulatory tools may protect some areas from development in places such as floodplains, wetlands or along steep slopes, they do not protect them from other threats. Furthermore some of these regulatory tools can be heavy handed when attempting to form friendly relationships with landowners. Easements and other agreements with conservation-minded landowners can be customized to meet the needs of both parties and can protect targeted natural infrastructure areas. Acquisition of small tracts of land near vulnerable resources, such as endangered species habitat and wetlands, should be considered when feasible.

Conservation Easements

Source: <http://www.champlainareatrails.com/conservation-easement-faq-sheet/>

A conservation easement is a voluntary legal agreement between a landowner and a land trust or government agency that permanently limits uses of the land in order to protect its conservation values. Landowners retain many of their rights, including the right to own and use the land, sell it and pass it on to their heirs.

Benefits of conservation easements

Conservation easements allow people to protect the land they love. They are the primary tool for protecting privately owned land. All conservation easements must provide public benefits, such as water quality, farm and ranch land preservation, scenic views, wildlife habitat, outdoor recreation, education, and historic preservation.

Do Conservation Easements Restrict the Use of the Land?

It depends on what is being protected and the goals of the grantor and grantee. Conservation easements may be open to the public, or they may restrict public access. This is negotiated in the terms and conditions of the easement.

Tax Planning Benefits of a Conservation Easement

A conservation easement donation can result in significant tax benefits, if it meets the requirements of federal law. It may lower the grantee's federal income tax, because the value of the easement can be claimed as a tax-deductible charitable donation.

Conservation Easements can Assist with Estate Planning

One of the biggest advantages of a conservation easement is that it helps the grantee's preserve the land for the next generation. A conservation easement helps the grantee plan for the future of the land and it can significantly lower the grantee's estate taxes.

Are conservation easements permanent?

Typically yes. Most easements are attached to the land. This means that not only the original owner but all future owners are subject to the easement. A few conservation programs use temporary easements, however only permanent conservation easements qualify for income and estate tax benefits.

Model Easement Agreements

The Pennsylvania Land Trust Association develops and maintains model documents to assist people in achieving conservation efficiently and effectively. The PALTA models are the products of thorough research and analysis of best practices, scrutiny by legal professionals, real world testing and user feedback.

Most of the model documents are accompanied by an expansive commentary. When using a model document, review the associated commentary. The commentary provides optional and alternative provisions, the reasoning behind each of the model's provisions, and guidance in applying the model to particular circumstances.

Each new model edition is posted for everyone to view and use – at no charge. In exchange, users are asked to share their experiences and comments with the model's developers to better inform future editions.

As these models are constantly being updated with best practices, they are not included in the appendix. Rather, the most current version of the respective document can be downloaded as follows:

- Conservation Easements
http://conservationtools.org/library_items/323-Model-Grant-of-Conservation-Easement-and-Commentary
- Public Access Easements
<http://conservationtools.org/model-documents/167-Model-Trail-Other-Public-Access-Easements>
- Model-Instruments-for-Land-Easement-Acquisition
<http://conservationtools.org/model-documents/172-Model-Instruments-for-Land-Easement-Acquisition>

Due Diligence in Conservation Acquisitions

Source: <http://conservationtools.org/guides/85-costs-of-due-diligence-in-conservation-acquisitions>

To responsibly accomplish a conservation easement or land acquisition, due diligence is necessary and there are costs associated with completing the necessary tasks. The Pennsylvania Land Trust Association researched the costs of due diligence steps in acquiring a conservation easement:

- boundary survey
- baseline data
- appraisals
- title search
- phase 1 environmental assessments
- legal fees.

Data was collected in two ways: direct survey of conservation easement and analysis of grant applications. Land trusts and county agricultural land preservation boards were surveyed via phone and email. One hundred land trusts and agricultural land preservation boards were surveyed in 2011. Responses were received from 70. Information was also obtained from the Conservation Easement Assistance Program applications of 26 land trusts. In these applications, land trusts report to the Pennsylvania Land Trust Association the actual costs of each due diligence step they undertake to acquire a new conservation easement.

Survey Costs and Variables

Land trusts and agricultural land preservation boards reported that survey costs could vary greatly from easement to easement. Variations in the size of the property, the exclusion of portions of the property from the easement, the number of minimal and highest protection areas and the time of year (especially for farmland, where the presence of tall crops can make the survey more difficult) are the factors the land trusts and preservation boards cited that cause the variation in survey price.

Many organizations were uncomfortable reporting an average survey cost due to the inherent variations and instead reported a range of costs. The range of costs provided by all these organizations was \$500 to \$80,000. The average low cost was \$3,488 and the average high cost was \$15,665. For those land trusts and agricultural land preservation boards comfortable with reporting an average survey cost, the average cost was \$4,362. The reported average costs ranged from \$1,250 to \$10,000. One agricultural land preservation board reported average costs of \$35-\$40 an acre.

When New Surveys are Required

The Pennsylvania Conservation and Preservation Easements Act has bearing on whether a survey will be necessary for an easement project.

Section 4(b) of the Conservation Easements Act provides as follows:

[A] conservation easement may encompass an entire fee simple interest in a parcel of real property as described in the deed to the property, or any portion thereof or estate therein. Except when referencing an easement's boundary using setback descriptions from existing deed boundaries or natural or artificial features, such as streams, rivers or railroad rights-of-way, a metes and bounds description of the portion of property subject to the easement shall be provided in the easement document.

Paying for Surveys

Thirty percent of land trusts pay for surveys themselves and 15% require landowners to pay for them. Fifty-five percent of land trusts use a mix of land trust funds and funds from landowners. Amongst all the land trusts, 35% stated they ideally use grants that are specifically for the easement to pay for the survey (as opposed to grants that would fund a variety of land trust operations). All but two agricultural land preservation boards use state funds to pay for surveys. Those two require landowners to pay for them. Of the boards that use state funds to pay for surveys, two require landowners to pay if the landowners want to exclude part of their land from the easement.

Appraisals

Land trusts and agricultural land preservation boards were generally more comfortable reporting an average appraisal cost, as these costs do not vary between easements as much as survey costs do. Several organizations contract with a specific appraiser, and pay the same rate for each easement. On average, appraisals cost \$1,729. The highest average appraisal cost reported was \$3,000, the lowest was \$1,000. Three land trusts reported a range of costs for appraisals. The range of costs provided by these land trusts was \$1,000 to \$6,500. The average low cost was \$2,167 and the average high cost was \$4,333.

Baseline Documentation

Land trusts reported an average baseline documentation cost of \$2,436, with the highest average cost reported being \$6,000 and the lowest \$300. Only one land trust reported a range of costs for baseline documentation: "\$5-7,000 to up to double that". Several land trusts used internal staff to complete the baseline documentation and were therefore unable to report a cost for this step. Amongst these land trusts, one reported that it takes about 30 hours of staff time to complete one baseline report, including on-site visits, records research, and report preparation. This land trust occasionally uses outside experts (e.g., botanist, historian, naturalist, etc.) to supplement the work of staff.

Agricultural land preservation boards generally reported not being familiar with the baseline documentation process. Some boards reported informally doing some baseline documentation work. They used county staff to complete the work and did not record the staff costs for each easement.

Who Conducts the Baseline Documentation?

Half of the land trusts reported that staff are responsible for completing the baseline documentation and about another quarter have staff work with consultants to supplement where there is a lack of staff

knowledge, or, in the case of one land trust, when there is not enough staff time. Two reported relying solely on consultants for the work. The rest use a combination of staff, consultants and volunteers.

Phase One Environmental Assessments

Land trusts reported an average phase one environmental assessment cost of \$1,781, with the highest average cost reported being \$2,000, and the lowest \$1,500. No agricultural land preservation boards reported conducting phase one environmental assessments.

When asked if they always perform a phase one environmental assessment for their conservation easements, 24% of land trusts stated they require them for all easements.

Title Searches

Organizations reported an average cost to complete a title search of \$224. The highest average cost reported was \$499 and the lowest was \$100. No organizations reported a range of costs. Many organizations were not able to report title search costs because they paid one fee for title insurance, title search and settlement expenses and were not able to separate that number into separate cost categories.

The majority of organizations (85%) use either a title search company or an attorney who works with a title search company to complete the search. One land trust relies on the volunteer services of a board member for title searches. The remaining organizations complete their title searches using both staff and title search companies.

Title Insurance

In Pennsylvania, title insurance costs are determined according to standard rates, up to an insured value of \$30 million. After \$30 million, the rate can be negotiated. Title insurance rates can be found at the Title Insurance Rating Bureau of Pennsylvania's web page.

If the easement is purchased in a bargain sale, the land trust has two options for how to obtain insurance. Title insurance can be obtained for the purchase price of the easement or insurance can be purchased for the full value of the easement. In the case of a donation, title insurance could also be purchased at the appraised value. In cases where no appraisal is done, one land trust reported assigning a reasonable value to the easement. The reasonable value can be determined by researching other transactions and making an educated estimate of the value of the easement. Another land trust cautioned against this approach and makes it the practice to always have a certified appraisal done.

When is Title Insurance Required

Organizations were asked whether they always, sometimes or never obtain title insurance. Agricultural land preservation boards always require title insurance (as per state rules). Fifty-eight percent of land trusts always require title insurance, 17% never require it, and the remaining 25% sometimes do.

Settlement Costs

Organizations reported average settlement costs of \$125, with the highest average cost reported being \$200, and the lowest \$50. Many organizations were not able to report title search costs because they paid one fee for title insurance, title search and settlement expenses and were not able to separate that number into separate cost categories.

Legal Fees

Legal fees vary greatly depending on the complexity of the project, region, and the attorney. Some law firms or lawyers will charge land trusts a discounted hourly rate or provide their services pro bono. Also factoring in are the personal styles of the landowner and landowner's counsels.

Land trusts and agricultural land preservation boards reported average legal costs of \$1,852. Legal costs ranged from \$50 to \$10,901 with a median cost of \$1,308. (This does not factor in those receiving their legal services entirely pro-bono which would, of course, mean \$0 in legal costs). Organizations with lawyers on staff were not able to report a cost for legal services as staff time invested for each easement was not recorded.

Organizations reported a variety of fee structures for legal services. Fifteen percent have staff attorneys. Of those who use an independent attorney, 27.3% pay a standard rate, 21.2% received a discounted rate, 21.2% received pro bono services, and 15.2% have a mix of standard rate, discounted rate and pro bono services

Purchase Options

Source: <http://conserveland.org/conservation-101/>

Donations

A land trust's preferred method of acquisition is, of course, outright donation by the landowner.

Donations can generate substantial benefits for the landowner. The donor's federal income and estate taxes often can be significantly reduced with a properly structured donation. Some form of conservation donation can be critical in cases where the landowners have an emotional attachment to the land and wish it to stay in the family. Although many donors have a strong philanthropic motive, the tax benefits certainly give an appealing additional impetus for conservation donations. The specific tax benefits and the requirements for receiving these benefits are described at length in other publications.

Landowners may donate almost any property right or interest in their land, including the entire parcel in fee, a conservation easement, or other property rights such as an option or lease. Some donation variations are described below:

- A landowner may leave land, a conservation easement, or other assets to a land trust in his or her will. Donation by bequest can reduce the estate tax for the donor's heirs by removing the value of the donation from the taxable estate. However, because the gift does not vest until the donor dies, there are no income tax benefits.
- *Conservation Easements.* Conservation easements are usually acquired by way of donation. To qualify for a deduction, an easement must first be donated in perpetuity. Second, it must be given to a qualified organization such as a land trust or public agency. Third, it must be given exclusively for conservation

purposes.

- *Remainder Interests.* Landowners may donate their land to a land trust but reserve the right to live on or use the land for their lifetimes. Since this reservation could have considerable value, especially if the donor is relatively young, donations of remainder interests can result in considerably smaller tax benefits than outright donations.
- *Undivided Interests.* An undivided interest is a portion of an entire interest in a property. Landowners may donate undivided interests in property over a period of time. As such, an owner of undivided interests in a property becomes a co-owner of the property, sharing in all ownership rights. While a conservation organization may be uncomfortable with a co-ownership arrangement, even when temporary, a landowner may find the donation of undivided interests over time preferable for tax purposes.

Bargain Sale

In a bargain sale the landowner and land trust negotiate a purchase price below fair market value. Bargain sales can be an attractive option for landowners who wish to preserve their land but who also need income from the transaction. Although a landowner will receive more from a sale at fair market value than from a bargain sale, certain tax benefits can substantially reduce or eliminate the disparity.

Purchase at Fair Market Value

Purchasing land or conservation easements at fair market value is obviously an expensive acquisition method. However, if the land in question is important enough and the landowner has absolutely no philanthropic interest, there may be no other option for the land trust. Fortunately a number of approaches to funding the purchase exist.

- *Private Donations.* Individual people are the largest source of donations in America and are therefore critical to long-term conservation efforts. This cannot be over-stressed. Foundations and businesses are also sources of potentially substantial contributions.
- *Government Grants.* A variety of federal, state and local government agencies fund conservation projects. Land trusts sometimes qualify for these government funds. The Pennsylvania Department of Conservation and Natural Resources supports land trust acquisitions with Keystone Fund and Environmental Stewardship Fund (Growing Greener) grants, which support 50% of the costs of priority acquisitions. The Pennsylvania Bureau of Farmland Protection reimburses land trusts up to \$5,000 for the costs of acquiring agricultural conservation easements. County and local governments vary widely in their commitment to conservation.
- A crisis situation may warrant a land trust buying a property using a loan to finance the purchase. Loans may be obtained from banks, individuals, foundations, other nonprofits or businesses. A loan may be available from the seller or adjacent landowners who would benefit from the transaction. The Conservation Fund and the Trust for Public Land have helped many communities across the United States with interim financing for their conservation projects.
- *Trade Lands.* Land that has no specific conservation value may still be donated to a land trust for its

monetary value. The land trust can then sell the property to finance other land protection projects or possibly trade the land for conservation property.

Right of First Purchase

Should efforts to secure a conservation easement not be palatable to the property owner, and out-right purchase of property be more desirable to the owner, and/or, the Township, then consideration should be given to obtaining the right of first property purchase. A right of first purchase gives a potential purchaser the opportunity to purchase before a property is sold to another. It can be a right of first offer, a right of first negotiation, a right of first refusal or a combination of these rights.

Model Documents

The Pennsylvania Land Trust Association has published, at ConservationTools.org, a number of guides and model documents to help conservation organizations obtain commitments from owners regarding the potential future sale of their property interests. Publications include:

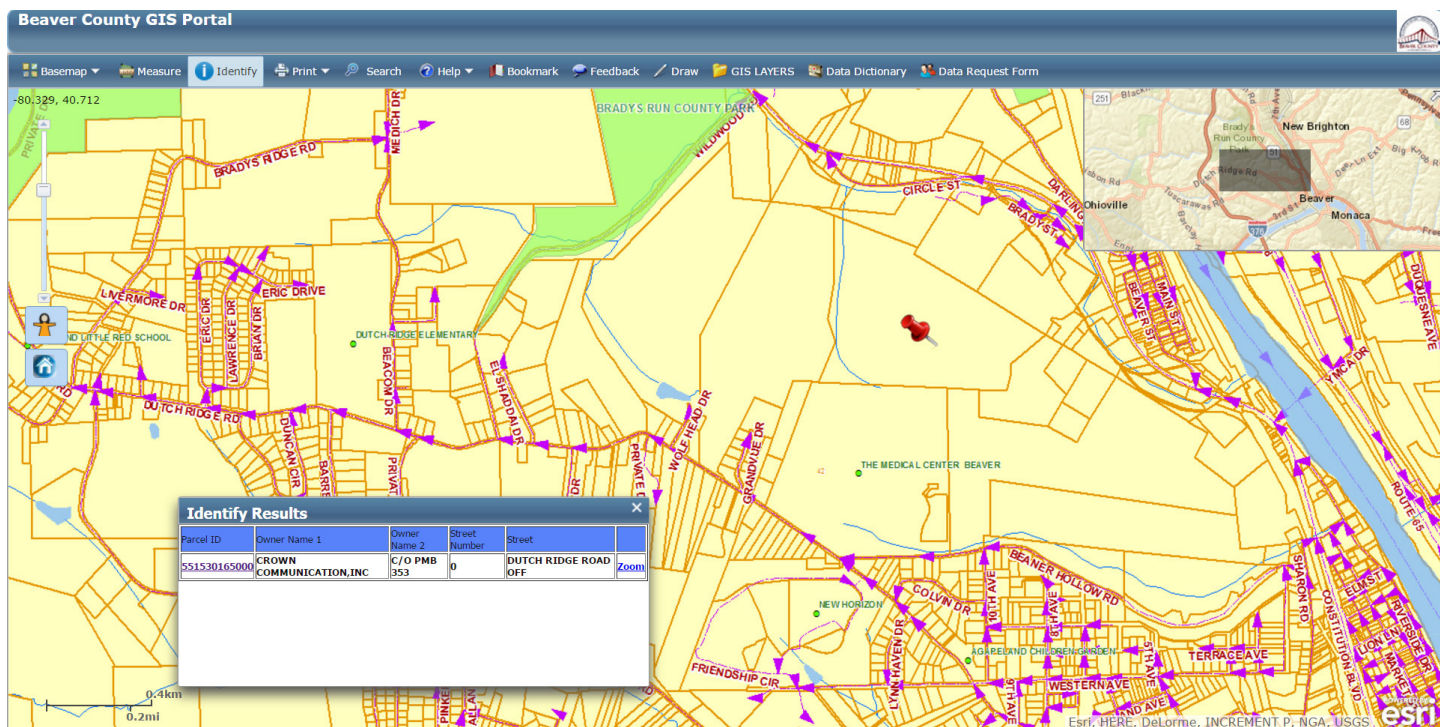
- The Model Grant of Purchase Option with Commentary is used to establish the right of an organization to purchase property for a fixed or ascertainable price at a fixed time. The guide Purchase Options discusses a number of circumstances in which a purchase option can be a useful tool for conservation organizations, whether the subject is a land or conservation easement acquisition.
- The Model Grant of Right of First Offer with Commentary provides a tool for establishing both a right of first offer and a right of first negotiation for the benefit of a conservation organization.
- The Model Grant of Right of First Refusal and Commentary provides a tool for establishing a right of a first refusal for the benefit of a conservation organization.

These documents are available at:

<http://conservationtools.org/model-documents/172-Model-Instruments-for-Land-Easement-Acquisition>

To begin discussions regarding conservation easements in the Township, the township manager approached Crown Communications regarding whether they may be interested in providing a conservation easement on their 88 acres property located behind Heritage Valley Beaver (The Medical Center). The high point of the property contains a cell tower, and the remaining property, the majority of which is steeply sloped, is undeveloped. During the initial conversation Crown representatives indicated they were willing to discuss the Township's interest. Therefore, we recommend Township continue discussions and determine whether an agreement can be reached. The Township should request public access be permitted to the undeveloped portions of the property and allow for the development of natural surface hiking trails. However, if this is not desirable to the property owner, then a private conservation easement should be considered for the property.

We recommend the Township meet with a representative of Crown Communications to further discuss their interest, and assuming they are interested, begin to negotiate the specific terms of the conservation easement, and define the required level of due diligence necessary to complete the transaction.



Priority 2 Prepare and adopt Natural Resource Protection Ordinance as part of the Township's Ordinances

As discussed in the inventor and analysis, described in the Vision for Greenways in Brighton Township, and as expressed by the public during the planning process, there is a desire to conserve and protect our natural resources and systems to allow them to perform their essential functions, to maintain the rural character of the Township, and to conserve and enhance wildlife and habitat.

Currently Brighton Township Subdivision Ordinance contains the following environmental considerations:

§ 195-49 Environmental considerations.

[Amended 10-14-2002 by Ord. No. 125]

- A. The developer shall take every precaution to preserve the natural site amenities and to minimize the disturbance to the natural environment.
- B. The development will be designed and programmed so as to minimize earthmoving activity, erosion, tree clearance and the destruction of natural amenities.
- C. Existing trees shall be preserved where possible. The location of trees must be considered when planning the common open space, location of buildings, underground services, walks, paved areas, playgrounds, parking areas and finished grade levels.
- D. Seeding, sodding and other planting shall be applied to stabilize topsoil.
- E. Erosion control measures such as minimizing the area of exposed soil, mulching, building silt catchment basins and planting temporary ground cover shall be instituted as necessary.
- F. In order to ensure the preservation of the natural characteristics of the land, trees and ground cover, natural bodies of water and other significant natural features, a detailed landscaping plan and an erosion control and sedimentation plan will be required at the time of initial plan submission.
- G. Floodplains.
 - (1) All floodplains, as defined in § 180-9, shall remain as permanent open space in a PRD. Only the following uses shall be permitted in the floodplain:
 - (a) Recreational uses not requiring permanent or temporary structures, such as picnic areas, fishing sites, trails, and similar uses.
 - (b) Most essential road and utility facilities, such as bridges, transmission lines, sewage treatment plant outlets and similar facilities, which cannot be placed elsewhere on the site outside the floodplain, provided all necessary approvals and permits have been obtained from the Pennsylvania Department of Environmental Protection.
 - (2) Any use or facility in a floodplain shall comply with all applicable provisions of

the Township of Brighton.

H. Ponds, wetlands, watercourses.

- (1) These areas shall remain as permanent open space.
- (2) No realignment, development, filling, piping and concentrating, or diverting shall be permitted except for most essential road and utility facilities which cannot be placed elsewhere on the site or as otherwise directed by the Township and the Pennsylvania Department of Environmental Protection.

I. Steep slopes.

- (1) In areas with slopes 15% to 25%, no more than 75% of such areas shall be regraded, stripped of vegetation and/or developed (i.e., construction of dwellings, road, etc.).
- (2) In areas with slopes 25% to 40%, no more than 30% of such areas shall be regraded, stripped of vegetation or developed.
- (3) No dwelling or other structure shall be permitted in areas with slopes 40% or greater. However, the Township may approve limited regrading for the constructing or installation of roads, utilities or similar facilities which cannot be located elsewhere. Such approval shall be upon the recommendation of the Township Engineer.

Based on the vision and goals for greenways in Brighton Township, and to be consistent with the desires of Township residents, we recommend the Township prepare and adopt a Natural Resource Protection Ordinance, that replaces the Environmental Considerations in the Subdivision and Land Development Ordinance, as part of the overall Township zoning ordinance. We recommend the standard for conservation be increased, and that conservation of riparian buffer zones and woodlands also be incorporated into the regulations.

A sample Natural Resource Protection Ordinance is contained in the Appendices and model ordinances can be found at: <http://www.brandywinegreenway.org/files.php>.

This ordinance should be crafted with input from the Township’s Planning Commission. Care should be taken to ensure the goals and objectives of this greenway plan are met when establishing conservation criteria. The following is recommended:

Protected Resource	Maximum Disturbance Allowance
Floodplains/Flood Hazard District	0%
Steep slope margins	25%
Steep slopes: (15 to 25%)	30%
Very steep slopes (> 25%)	15%
Riparian Buffer Zone One	0%
Riparian Buffer Zone Two	20%
Woodlands (Residential)	35%
Woodlands (Non-residential)	50%
Watercourses or streams	0%
Wetlands	0%
Wetlands Margin	20%
TOTAL	

Where resources overlap, the overlapping area shall be included in the more restrictive resource category.

We recommend this ordinance be developed and adopted in 2017.

Priority 3 Educate interested property owners on the value of Native Landscaping and Naturalized Meadows and Pesticide Reduction to reduce labor, equipment, fuel costs and environmental pollutants.

In addition to providing general education information, the following properties have been identified as opportunities for demonstration projects

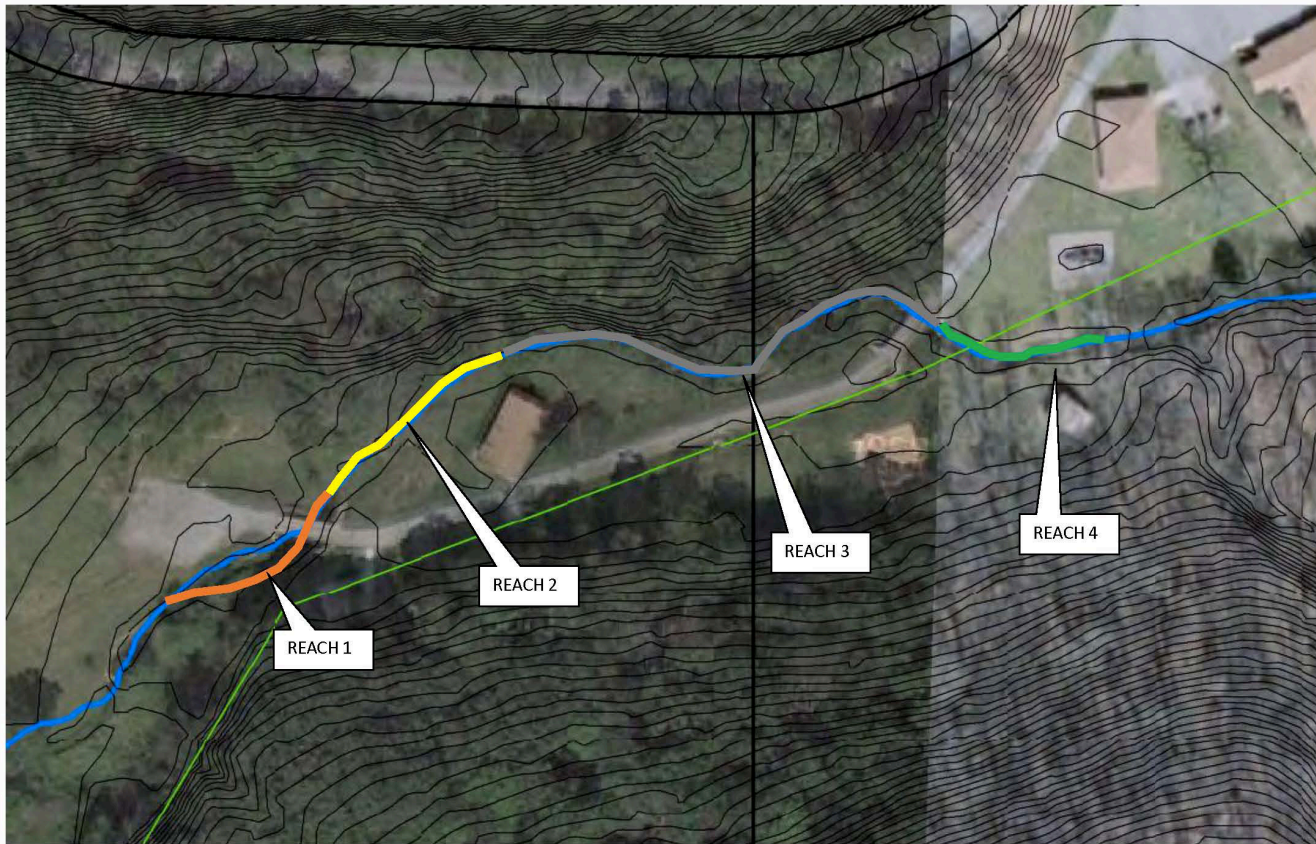
- Beaver Area School District
- Heritage Valley Medical Center
- Michael Baker Corporation Property
- Township Residents

Potential partners in implementing this priority are the Beaver County Conservation District and the Penn State Cooperative Extension as they can provide sustainable agriculture demonstrations, pesticide reduction education, native plant landscaping guidance, green infrastructure planning and recommendations, etc.

Potential funding source includes the PA Department of Environmental Protection Education Grants. Refer to the funding section for a description of this program.

Priority 4..... Establish Riparian Buffers along Two Mile Run in Two Mile Run Park

During the master planning of Two Mile Run Park, recommendations were made to complete a stream restoration and riparian buffer project along Two Mile Run.



Reach 1 – Station 0+00 to 1+10 (orange)

Reach 2 – Station 1+10 to 2+40 (yellow)

Reach 3 – Station 2+40 to 5+10 (gray)

Reach 4 – Station 5+10 to 6+50 (green)

- Reach 1 (110 lf)
Within Reach 1, the stream will be re-aligned to improve the geometry of the stream's flow angle under the existing vehicular bridge. Once re-aligned, the stream bed will be stabilized, the banks will be laid back and planted (Zone 1) and the riparian zone (Zone 2) will be planted.
- Reach 2 (130 lf)
Within Reach 2, the banks will be laid back and planted (Zone 1), and the riparian zone (Zone 2) will be planted.
- Reach 3 (270 lf)
Within Reach 3, in-stream structures will be installed to improve bed stability, the RDB bank will be laid back and planted (Zone 1), and the RDB riparian zone (Zone 2) will be planted.

- Reach 4 (140 lf)
Within Reach 4, the banks will be laid back and planted (Zone 1), and the riparian

Total Estimated Cost (650 lf), 2015 Construction Costs \$ 211,160

Potential funding sources include the PA Department of Conservation and Natural Resources' Riparian Buffer Program and their Community Conservation Partnership Program, the Commonwealth Finance Authority's Greenway, Trails and Recreation Program and Watershed restoration Protection Program. Refer to the funding section for descriptions of these programs.

Priority 5..... Partner with a land conservation organization to assist with land conservation within Brighton Township

Described in Priority No. 1.

Priority 6..... Determine potential for Acquiring/Securing Conservation Easement undevelopable steep slope portion of Michael Baker Corp property facing Two Mile Run

Process described in Priority No. 1.

Priority 7..... Discuss potential for Securing Conservation Easement on Brighton Township Municipal Authority property in southwest Brighton Township and northeast Industry Borough

Process described in Priority No. 1.

Priority 8..... Update the Official Map to achieve Township's Natural Systems Greenways goals

Update the Township's Official Map to include natural system greenway corridors.

Priority 9..... Provide Sustainable Agriculture Forum/Demonstrations to members of Township agricultural community

Potential partners in implementing this priority are the Beaver County Conservation District and the Penn State Cooperative Extension as they can provide sustainable agriculture demonstrations and pesticide reduction education and recommendations, etc.

Potential funding source includes the PA Department of Environmental Protection Education Grants. Refer to the funding section for a description of this program.

Other Recommendations

Regulatory Tools

Source: <http://greenstep.pca.state.mn.us/modelOrdinances.cfm>

Other regulatory options that will assist in implementing the goals and vision of this Greenway Plan include the following. We recommend they be considered, and when appropriate be developed and adopted by the Township. Each of these options are best practices that will assist in implementing the vision and enhancing the quality of life, as desired by Brighton Township's residents.

Environmental Management

Natural Resources Performance Standards The Natural Resource Performance standards provide examples of designing development around priority natural features, treating natural systems with the same attention as transportation or other built infrastructure. The standards show how local governments can integrate development with specific types of natural features or natural systems that are local priorities.

Stormwater and Erosion and Sediment Control Ordinance The stormwater and erosion control ordinance provides detailed language for integrating a stormwater ordinance with the 2009 Minnesota Construction General permit for stormwater management and erosion control. The ordinance links local standards to the Minnesota Pollution Control Agency (MPCA) Urban Stormwater Manual.

Landscaping and Maintenance of Vegetation The landscaping ordinance is modeled on a typical nuisance ordinance, but distinguishes native plantings and other alternatives to turf grass, and defines edible landscaping as a substitute for lawns. The ordinance requires a plan, setbacks, and maintenance of native landscaping to address the nuisance concerns that typically accompany alternatives to turf.

Buildings and Lighting

Energy Efficiency Ordinance The energy efficiency ordinance provides examples of how to incorporate energy efficiency into development regulation and zoning, including setting incentives, setting energy efficiency standards for community participation in private sector development, and using energy efficiency certification programs in development regulation.

Landscaping and Maintenance of Vegetation The landscaping ordinance is modeled on a typical nuisance ordinance, but distinguishes native plantings and other alternatives to turf grass, and defines edible landscaping as a substitute for lawns. The ordinance requires a plan, setbacks, and maintenance of native landscaping to address the nuisance concerns that typically accompany alternatives to turf.

Solar Energy Standards The solar energy standards provide language to ensure that solar energy installations are an allowed accessory land use within the zoning code. The standards provide examples for mitigating aesthetic and safety concerns associated with some solar energy installations, and suggest development regulation incentives for encouraging solar energy development.

Land Use

Agriculture and Forest Protection District The Agriculture and Forest Protection District provides language

to protect the economic value of agricultural and forestry resources as a primary and preferred land use. The district is geared toward county and township areas, although the language can be used for cities that want to permanently protect these economic natural resources rather than simply maintaining an urban reserve.

Model Community Conservation Subdivision District The conservation subdivision language applies the concepts of conservation design to a zoning district or subdivision ordinance. The model discusses how conservation design is a broad category of development ranging from very urban to very rural. This model provides an example of how conservation design principles meet conservation goals in one type of community; an exurban or agricultural area that is under development pressure.

Planned Unit Development Ordinance The PUD ordinance is modeled after a typical suburban PUD ordinance and identifies how to incorporate sustainable development concepts such as protection of natural assets, energy efficiency and renewable energy, green buildings, state-of-the-art stormwater management and selectively increasing density.

Highway Commercial District The Highway Commercial District demonstrates one example of preferred use standards and design concepts for highway commercial development.

Adequate Public Facilities Ordinance The APF Ordinance provides language for ensuring that development at the edge of a city or urban area is appropriately staged, consistent with the city's infrastructure capacity and expansion plans.

Economic and Community Development

Solar Energy Standards The solar energy standards provide language to ensure that solar energy installations are an allowed accessory land use within the zoning code. The standards provide examples for mitigating aesthetic and safety concerns associated with some solar energy installations, and suggest development regulation incentives for encouraging solar energy development.

Local Food Networks The Local Foods ordinance focuses on land use standards that protect food production businesses in agricultural areas under development pressure. The ordinance is geared to suburban and ex-urban communities where residential development and small commercial agriculture occupy the same area.

Model Wind Energy The Wind Energy ordinance provides language allowing capture of local wind energy resources while ensuring nuisances and community-wide risks are addressed. Language and concepts identify issues for large and small wind development in rural and more developed communities.

Recreation and Transportation Greenway Vision

Building upon the overall vision for greenways in Brighton Township, it is our vision to establish recreation and transportation greenway corridors that:

- Establish safe, comfortable and convenient pedestrian and bicycle routes between home, work, and play destinations within Brighton Township.
- Implement the bicycle lanes proposed in the Brighton Township Bicycle/Pedestrian Network Feasibility Study.
- Establish pedestrian and bicycle connections to Dutch Ridge Elementary School, Bradys Run Park, Two Mile Run Park (upper and lower) and Hardy Fields.

Much of the vision relies on coordination and cooperation of PennDOT, as the projects along Dutch Ridge and Tuscarawas Roads are within the PennDOT right-of-way. Therefore, implementation of these projects will likely take longer. That said, PennDOT is implementing Planning & Engineering 360. This program is designed to create better communities and better transportation systems by planning and design transportation projects to incorporate a community's vision values and aspirations for quality of life and livability, sense of place and history, community vitality and land use.

In order to achieve this vision PennDOT has recently launched PennDOT Connects. The goal of PennDOT Connects is to identify the needs of the communities and specific related issues early in project planning. This includes bicycle and pedestrian accommodations, transit access, stormwater management and green infrastructure. The community's needs will be based on an assessment of comprehensive plans and other local planning studies. Local government must demonstrate features are a documented element of the community vision.

Cost is a consideration, but not reason enough to disregard improvements. Costs will be weighed against the range of full benefits to the community, including: improved mobility,, economic competitiveness, access to work and quality of life. PennDOT recognizes that a community may have no other opportunity to realize these improvements in the foreseeable future.

To accomplish this, PennDOT district and planning partner staff will meet with local staff on all new projects as they are added to the Transportation Improvements Plan (TIP). Further, these meetings are required for all projects that had no project phase included on a prior TIP, and it is required for all projects that have not started planning or engineering or started sine July 1, 2016.

Announced in the Fall of 2016, PennDOT Planning & Engineering 360 and PennDOT Connects programs are a welcomed and much needed line of communication between municipalities and PennDOT. As these policies may take time to 'trickle down' to the various PennDOT Districts, Brighton Township must insist that projects along PennDOT right-of-ways in the Township, must take into consideration and implement the Township's vision for recreation and transportation improvements.

Further, there are implementation projects that can be accomplished in the near term. This includes connecting Wishart Drive to CAMBEV Park, connecting the neighborhoods along the northern side of Tusawaras Road to the Beaver Area Middle/High School property via Pleasantview Drive, Dutch Ridge Elementary School to upper Bradys Run Park via Beacom Drive, Shadylane Drive to lower Two Mile Run Park via Shady Lane, and internal trail projects such as natural surface hiking trails in Two Mile Run and Upper Two Mile Run Park and CAMBEV Park.

The Implementation Strategies and Tools outlined in the following section provide specific steps and action strategies to advance the vision and goals for Recreation and Transportation Greenways in Brighton Township.

Recreation and Transportation Greenway Implementation Strategies and Tools

Based on the input received from the public, the steering committee and Township staff, along with the consultant's professional guidance, the following are priorities (listed high to low) for Recreation and Transportation Greenway Implementation:

Priority	Strategy
1	Secure funding to Implement Demonstration Projects:
1	Shared Road - Gypsy Glen Road between the Beaver Area School District Complex and Two Mile Run Park
1	Bicycle Lanes - Hardy Field to Two Mile Run Park Extension and Brighton Road Bike Lanes
1	Shared Road - Beacom Drive and Bradys Ridge Road to Bradys Run Park
2	Establish and lead Intergovernmental Greenway Committee Discussions , including PennDOT, on region-wide trail & bikeway improvements
2	Ohio River Trail through Beaver Borough, Vanport Township, Midland Borough, and Industry to Ohio State Line
2	Bicycle Lanes/Protected Cycle Track along State Route 51 through Bridgewater Borough and Patterson Township to Bradys Run Park Road
3	Meet with PennDOT on annual basis to Review PennDOT TIP and Maintenance Projects to Ensure Consistency with Township pedestrian and bicycle goals
4	Revise zoning/subdivision and land development ordinances to include Trail Development Standards
5	Prepare and adopt Complete Streets Policy
6	Host annual Pedestrian and Bicycle Safety Awareness Day to provide education and awareness programs
7	Update the Official Map to achieve Township's Recreation and Transportation goals
8	Conduct Safe Walking and Bicycling Program in the elementary/middle schools
8	Promote Bike/Walk to School Days
8	Revise zoning/subdivision and land development ordinances to require Bicycle Racks and/or Bicycle Storage to be installed in commercial, healthcare, education, and multi-unit residential development
9	Sign Bicycle Routes throughout the Township
10	Conduct regular Speed Limit Enforcement Programs on Gypsy Glen, Dutch Ridge, Tuscarawas and Brighton Roads
	Conduct Safe Walking and Bicycling Program in the high school
	Promote Bicycle Helmet Campaign throughout the schools
	Implement a Walking School Bus Program in conjunction with the school district
	Conduct Safe Walking and Bicycling Education Campaign with Township Residents
	Secure and distribute Safe Walking and Safe Bicycling Educational Brochures
	Discuss and evaluate potential to Reduce Speed Limits to 25 MPH township-wide for pedestrian and bicycle safety

Priority 1..... Secure funding to Implement Demonstration Projects:

By adopting this plan and budgeting funds to a line item for Recreation and Transportation Greenways Implementation in the Township's annual budget, capital funding can accrue to implement the projects identified herein. Further, local funds can be matched with state grants to maximize the funds available for project implementation.

We recommend the Township establish a Recreation and Transportation Greenways Implementation line item in the Township's annual budget. Further, we recommend the Township budget \$50,000 per year to accrue capital funds to implement Recreation and Transportation Greenways projects.

Potential funding sources include the PA Department of Conservation and Natural Resources' Community Conservation Partnership Program, the Commonwealth Finance Authority's Greenway, Trails and Recreation Program. Refer to the funding section for descriptions of these programs.

Priority 1..... Shared Road - Gypsy Glen Road between the Beaver Area School District Complex and Two Mile Run Park

Gypsy Glen Road is a gentle grade connecting Two Mile Run Park to the Beaver Area School Complex located in Beaver Borough. Further, it is a low speed and low traffic volume route. The road should be evaluated to determine if it is feasible to sign as a Shared Road, in accordance with PennDOT, AASHTO and MUTCD requirements. We recommend this evaluation be completed in 2017, and if feasible the route be signed in 2018.

Priority 1..... Bicycle Lanes - Hardy Field to Two Mile Run Park Extension and Brighton Road Bike Lanes

In 2002, the Brighton Township Pedestrian/Bicycle Feasibility Study - Phase II Estimated the cost of constructing bike lanes along Dutch Ridge Road, between Brighton and Tuscarawas Roads at \$790,000. In today's dollars it is projected to cost approximately \$1,100,000. The connection to Two Mile Run Park would occur by completing this priority and Priority No. 1 above.

We recommend applying for funding through PennDOT in combination with either DCNR or Commonwealth Finance Authority grants. Because of the magnitude of the request, it is imperative that the Township meet with staff from the respective agencies to determine which funding programs to apply to and how to address the matching requirements in order to maximize funding through the available programs.

Although a high priority of the Township, because this project is located within a PennDOT right-of-way the Township must expect it will take three to five years to complete once funding is secured.

A query of PennDOT's MPMS IQ system indicates This section of Tuscarawas Road is planned to be reconstructed through a future project with an anticipated date of 2025. In lieu of completing the bike lane project before PennDOT's reconstruction project, we recommend the both projects be coordinated and constructed at the same time to realize savings in constructing the proposed improvements.

Priority 1..... Shared Road - Beacom Drive and Bradys Ridge Road to Bradys Run Park

Beacom Drive and Bradys Ridge Road connect Dutch Ridge Elementary School to upper Bradys Run Park. Further, it is a low speed and low traffic volume route. Therefore, we recommend the roads be evaluated to determine if it is feasible to sign as a Shared Road, in accordance with PennDOT, AASHTO and MUTCD requirements. We recommend this evaluation be completed in 2017, and if feasible the route be signed in 2018.

Priority 2 Establish and lead Intergovernmental Greenway Committee Discussions, including PennDOT, on region-wide trail & bikeway improvements & Ohio River Trail through Beaver Borough, Vanport Township, Industry Borough, Midland Borough, to Ohio State Line

Given the Township's proximity to the Ohio River Trail and the desire to connect to it, we recommend the Township lead and or participate in intergovernmental discussions and planning meetings to advance the implementation of the Ohio River Trail in and around Brighton Township.

Priority 2 Bicycle Lanes/Protected Cycle Track along State Route 51 through Bridgewater Borough and Patterson Township to Bradys Run Park Road

Between 2012 and 2016 there have been four fatal crashes involving bicycles along State Route 51 between Pittsburgh and Monaca. The bicycling community is advocating for state, county and local officials to address the safety of bicyclists throughout the corridor. We recommend the Township notify all officials having jurisdiction of the Township's interest in having safe bicycle infrastructure constructed along State Route 51 corridor, and in particular between Bridgewater Borough and Bradys Run Park. The road was recently resurfaced by PennDOT and with the resurfacing wide shoulders were installed. We recommend the Township lead an effort among the municipalities the corridor extends through to evaluate and recommend the appropriate bicycle infrastructure for this corridor which provides an important connection between recreation and several business districts.

Priority 3 Meet with PennDOT on annual basis to Review PennDOT TIP and Maintenance Projects to Ensure Consistency with Township pedestrian and bicycle goals

PennDOT is actively improving its pedestrian and bicycle policies, and is committed to assisting communities implement their vision for pedestrian and bicycle improvements along state right-of-ways. The first step is to have a plan for pedestrian and bicycle infrastructure and sharing it with the local PennDOT District's planning section. Therefore, we recommend this plan be forwarded to:

- PennDOT District 11-0 Pedestrian Bicycle Coordinator, Kathryn Power, 412-429-4966, kpower@pa.gov
- PennDOT District 11-0, Assistant District Executive for Design, Cheryl Moon-Sirianni, CSIRIANNI@pa.gov 412-429-5000

Further, we recommend meeting with appropriate PennDOT District 11-0 representatives on an annual basis to discuss upcoming projects within the Township, and how the Township's pedestrian and bicycle goals are being addressed in those projects.

Further, the Township must monitor PennDOT's Multi-Modal Project Management System Interactive Query (MPMS IQ) which will identify planned projects within the Township. MPMS IQ can be reviewed here: http://www.dot7.state.pa.us/MPMS_IQ/Mapping

Priority 4..... Revise zoning/subdivision and land development ordinances to include Trail Development Standards

The of the community development objectives of the Township Zoning Ordinance is to achieve pedestrian-friendly residential development with sidewalks, walkways, and bicycle paths. Further, the Township's Subdivision and Land Development ordinance addresses sidewalks and paths as follows:

§ 180-93 *Pedestrian circulation.*

[Amended 4-11-2016 by Ord. No. 202]

- A. Sidewalks (concrete). All sidewalks shall be constructed in accordance with the following standards and as illustrated in Details RD-20 and SD-08 of the Township Minimum Construction Standards and Details.[1] Ramps for the physically challenged shall be provided at intersections and crosswalks.

[1]Editor's Note: Said details are included as attachments to this chapter.

- B. Walkways.

- 1) Minimum width. Walkways shall be a minimum of four feet wide. In parking lots they shall be an additional 30 inches wide or separated by an additional 30 inches of green space on each side where automobiles or other vehicles may overhang the walkway.
 - (2) Height. Walkways in relation to parking lots and driveways shall be raised to the same height as sidewalks in relation to streets. Refer to Details RD-04 and SD-08 of the Township Minimum Construction Standards and Details.

- C. Multipurpose walking and biking paths.

- (1) Eight feet minimum; 10 feet desirable.
 - (2) Multipurpose walking and biking paths shall be constructed as per Detail RD-21 of the Township Minimum Construction Standards and Details.
 - (3) Material shall be asphalt paving or other material if approved by the Township.

The requirement for providing a walking and biking paths has been met with limited success. This is due to the fact the only requirements are that they be constructed, and that they be constructed in accordance with the Township's specified cross-section for walking and biking paths. This has resulted in paths being constructed in steeply sloped locations that result in paths that are less than desirable for residents due to their running

slope and erosion issues created by conveyance of stormwater runoff along and adjacent to the paths which require more maintenance attention than the Township can provide. Given this, the Township recognizes the need to adopt by ordinance better requirements and standards for the development of walking and biking paths within the Township.

Proposed Trail Development Standards are located in the appendix.

Priority 5 Prepare and adopt Complete Streets Policy

The National Complete Streets Coalition defines Complete Streets as streets for everyone. They are designed and operated to enable safe access for all users. Pedestrians, bicyclists, motorists, and public transportation users of all ages and abilities are able to safely move along and across a complete street. Complete Streets make it easy to cross the street, walk to shops, and bicycle to work.

Creating complete streets means transportation agencies must change their approach to community roads. By adopting a Complete Streets policy, communities direct their transportation planners and engineers to routinely design and operate the entire right of way to enable safe access for all users, regardless of age, ability, or mode of transportation. This means that every transportation project will make the street network better and safer for drivers, transit users, pedestrians, and bicyclists – making communities better places to live.

There is no singular design prescription for Complete Streets; each one is unique and responds to its community context and site location. A complete street may include: sidewalks, bike lanes (or wide paved shoulders), special bus lanes, comfortable and accessible public transportation stops, frequent and safe crossing opportunities, median islands, accessible pedestrian signals, curb extensions, narrower travel lanes, roundabouts, and more.

Elements of a Complete Streets Policy

Regardless of a policy's form, the National Complete Streets Coalition has identified ten elements of a comprehensive Complete Streets policy.

1. Includes a vision for how and why the community wants to complete its streets
2. Specifies that 'all users' includes pedestrians, bicyclists and transit passengers of all ages and abilities, as well as trucks, buses, emergency vehicles, and automobiles.
3. Encourages street connectivity and aims to create a comprehensive, integrated, connected network for all modes.
4. Is understood by all agencies to cover all roads.
5. Applies to both new and retrofit projects, including design, planning, maintenance, and operations, for the entire right of way.
6. Makes any exceptions specific and sets a clear procedure that requires high-level approval of exceptions.
7. Directs the use of the latest and best design criteria and guidelines while recognizing the need for flexibility in balancing user needs.

8. Directs that Complete Streets solutions will complement the context of the community.
9. Establishes performance standards with measurable outcomes.
10. Includes specific next steps for implementation of the policy.

Specifies All Users

A Complete Streets policy applies to everyone traveling along the road. A sidewalk without curb ramps is useless to someone using a wheelchair. A street with an awkwardly placed public transportation stop without safe crossings is dangerous for riders. A fast-moving road with no safe space for cyclists will discourage those who depend on bicycles for transportation. A road with heavy freight traffic must be planned with those vehicles in mind. Older adults and children face particular challenges as they are more likely to be seriously injured or killed along a roadway. Automobiles are an important part of a complete street as well, as any change made to better accommodate other modes will have an effect on personal vehicles too. In some cases, like the installation of curb bulb-outs, these changes can improve traffic flow and the driving experience.

Creates a Network

Complete Streets policies create a complete transportation network for all modes of travel. A network approach balances the needs of all users. Instead of trying to make each street perfect for every traveler, communities create an interwoven array of streets that emphasize different modes and provide quality accessibility for everyone. This can mean creating bicycle boulevards to speed along bicycle travel on certain low-traffic routes; dedicating more travel lanes to bus travel only; or increasing pedestrian accommodations. It is important to provide basic safe access for all users regardless of design strategy and networks should not require some users to take long detours.

All Agencies and All Roads

Creating street networks that are safe and accessible for all users is difficult because many agencies control our streets. They are built and maintained by state, county, and local agencies, and private developers often build new roads. Typical Complete Streets policies cover only one jurisdiction's roadways, which can cause network problems: a bike lane on one side of a bridge disappears on the other because the road is no longer controlled by the agency that built the lane. Policies should address how to work with other agencies and jurisdictions. Another common issue is resolving how elements of your Complete Streets policy are incorporated into subdivision regulations which govern how private developers build new streets.

All Projects

For many years, multi-modal streets have been treated as 'special projects' requiring extra planning, funding, and effort. The Complete Streets approach is different. Its intent is to view all transportation improvements as opportunities to create safer, more accessible streets for all users, including pedestrians, cyclists, and public transportation passengers. Under this approach, even small projects can be an opportunity to make meaningful improvements. In repaving projects, for example, an edge stripe can be shifted to create more room for cyclists. In routine work on traffic lights, the timing can be changed to better accommodate pedestrians walking at a slower speed. A strong Complete Streets policy integrates Complete Streets planning into all types of projects, including new construction, reconstruction, rehabilitation, repair, and maintenance.

Exceptions

Making a policy work in the real world requires developing a process to handle exceptions to providing for all modes in each project. The Federal Highway Administration's guidance on accommodating bicycle and pedestrian travel named three exceptions that have become commonly used in Complete Streets policies: 1) accommodation is not necessary on corridors where non-motorized use is prohibited, such as interstate freeways; 2) cost of accommodation is excessively disproportionate to the need or probable use; 3) a documented absence of current or future need.

Design Criteria

Communities who adopt a Complete Streets policy should review their design policies to ensure their ability to accommodate all modes of travel, while still providing flexibility to allow designers to tailor the project to unique circumstances. Some communities will opt to re-write their design manual. Others will refer to existing design guides, such as AASHTO guides for facility development, state design standards, and the Americans with Disabilities Act Accessibility Guidelines.

Context-Sensitive

Effective Complete Streets policies are sensitive to the community context. Being clear about this in the initial policy statement can allay fears that the policy will require inappropriately wide roads in quiet neighborhoods or miles of little-used sidewalks in rural areas. A strong statement about context can help align transportation and land use planning goals, creating livable, strong neighborhoods.

Performance Measures

Communities with Complete Streets policies can measure success a number of ways: the miles of on-street bicycle routes created; new linear feet of pedestrian accommodation; changes in the number of people using public transportation, bicycling, or walking (mode shift); number of new street trees; and/or the creation or adoption of a new multi-modal Level of Service standard that better measures the quality of travel experience. The AASHTO Highway Capacity Manual 2010 includes this new way of measuring LOS.

Implementation

Taking a Complete Streets policy from paper into practice is not easy, but providing some momentum with specific implementation steps helps. Some policies establish a task force or commission to work toward policy implementation. There are four key steps for successful implementation:

1. Restructure procedures to accommodate all users on every project;
2. Develop new design policies and guides;
3. Offer workshops and other training opportunities to planners and engineers; and
4. Institute better ways to measure performance and collect data on how well the streets are serving all users.

Priority 6.....Host annual Pedestrian and Bicycle Safety Awareness Day to provide education and awareness programs

Pedestrian and bicycle safety and promotion activities can benefit everyone by encouraging and promoting healthy lifestyles;

- strengthening the community and neighborhoods through increased involvement and interaction;
- raising environmental awareness: walking and bicycling results in fewer motor vehicles on the streets, resulting in less air pollution and traffic congestion;
- fostering safer streets by focusing on improvements to sidewalk and street conditions and increasing security;
- learning essential pedestrian and bicycling skills that can be used throughout life.

Who should lead and be involved with this action?

There are a number of people who should be involved in this action. A strong leader such as an administrator, teacher, parent, or local advocate can help implement programs within the school. Important team members could include:

- Principal
- School administrators
- Teachers including Physical Education Teachers
- School staff
- Board of Education members
- Parents/Parent Teacher School Organizations (PTO;PTA)
- Crossing guards
- Local police departments
- Students
- Local advocates and community nonprofit groups
- Neighborhood groups and alliances
- Transportation Management Associations/Safe Routes to School Regional Coordinator

Timeframe

The timeframe for this action can vary dramatically depending on the initiatives undertaken. Safety education programs and walk and bike to school events could take from two to four months to organize and implement, depending upon the content, goals, and structure of the program/event. Implementing active transportation best practices could take a little longer, depending on the research and planning involved. Infrastructure improvements for walking and bicycling safety will take the most time, since they most likely will involve capital expenses and coordination with the municipal, county, or state government units.

Project costs and resource needs

Project costs and resource needs can vary dramatically depending on the initiatives undertaken. Safe Routes to School Regional Coordinators are available to assist schools with undertaking a wide range of initiatives, from implementing safety education programs and walk and bike to school events, to providing technical support for grant applications relating to larger infrastructure projects.

Implementing these programs

1. Identify topics for presentations

Schools may have different needs when promoting pedestrian and bicycle safety. For example, a school located near a train crossing may want to spend more time on railroad crossing safety in addition to general pedestrian safety. Focusing on bicycle safety as a part of the program can encourage children to ride bikes safely to school and around their community. Presentations can be delivered to a large group of students through an assembly or in a classroom setting. Some topics for presentation may include: general pedestrian safety (i.e., crossing the street, traffic signals); bicycle safety (i.e., bicycle handling skills, importance of helmets, safety skills); safety at railroad crossings (i.e., not trespassing on railroad right-of-way); interacting with school and transit buses (i.e., how to cross to bus stops, on-board behavior); personal safety (i.e., strategies for dealing with gangs, what to do if approached by a stranger).

2. Utilize classroom materials

Safe Routes Philly has a comprehensive pedestrian and bicycle safety curriculum intended for elementary school students. They offer materials at no cost to schools, organizations, and individuals interested in promoting pedestrian and bicycle safety. The Safe Routes to School Regional Coordinator in your region may already have developed pedestrian and bicycle safety presentations that can be implemented in your school. There are also pedestrian and bicycle safety lesson plans for students in grades K-8 available on the New Jersey Safe Routes to School website. PennDOT provides a number of pedestrian and bicycle videos geared to elementary and middle school students. They can be found here:

Pedestrian Safety Videos

<http://www.penndot.gov/TravelInPA/Safety/TrafficSafetyAndDriverTopics/Pages/Pedestrian-Safety.aspx>

Bicycle Safety Videos

<http://www.penndot.gov/TravelInPA/RideaBike/Pages/Bicycle-Safety-Videos.aspx>

For additional PennDOT Resources contact:

Chris Metka

Transportation Alternatives and Safe Routes To School Coordinator

Center for Program Development and Management

Pennsylvania Department of Transportation

400 North Street

6th Floor

Harrisburg, PA 17120

(717) 787-8065

cmetka@pa.gov

3. Organize and conduct presentations

Many Safe Routes to School Regional Coordinators are also available to present safety education programs in your school. Contact your Safe Routes to School Regional Coordinator.

4. Tie into curricula

Subjects such as math and geography can include exercises and lessons that build off of bicycle and pedestrian activities. These may include mapmaking, graphing and tracking miles walked or biked.

Walk and Bike to School Events: These are not only fun ways to get students and parents excited about walking and biking, but they also enable students to learn the benefits of walking and biking to school and to begin fostering a culture of active transportation. Some examples of walk and bike events include

Walking School Bus: Adults supervise groups of children as they walk designated routes to school and pick up kids along the way.

- **Walk and Bike to School Day:** This event encourages students and parents to walk or bike to school. It can be annual, seasonal, monthly or weekly depending on community interests and resources.
- **Bike Train:** A group of children bike to school together accompanied by a parent or adult.
- **Bike Rodeo:** A fun event that provides children with a basic understanding of effective bicycling through stations that teach bicycling skills, bike safety, and rules of the road.
- **Campus Walks/Walk at School:** If conditions are unsafe for walking to school, campus walks or a walk at school event like a walk-a-thon can be held. Classes can also walk together to local events and venues (fire department, police, local theaters, etc.) during the school day.
- **Walkability Audits:** Can be conducted with students and community members to determine how safe it is to walk or bike to school.
- **Golden Sneaker Award Program:** Implement a competition to determine which classes walk the most based on the number of days walked, distance, or steps (using pedometers). This program encourages healthy and active lifestyles and fosters teamwork among children while still having fun.

Below are some simple steps to keep in mind when planning walk and bike events:

1. Decide on the type of event. Make sure it is compatible with your community and available resources. Determine whether or not you want to host additional activities during your event or leading up to it.
2. Pick a date. Decide when to hold your event. Begin planning two to four months prior to the event date: check for scheduling conflicts and develop a schedule.
3. Form a team. Determine job functions and how many volunteers will be needed, e.g., will you need crossing guards? Visit Build Your Safe Routes Team for more information on recruiting volunteers to help with your walk and bike to school event.
4. Reach out to local businesses. Determine if they would be interested in sponsoring the event or supplying food/small rewards to the participants at the end of their walk.
5. Identify responsibilities. Assign tasks and get commitments to participate and volunteer.
6. Plan for contingencies. Have backup plans in place: for instance, strategies for inclement weather. Some schools provide promotional ponchos for rainy walks; others postpone to a back-up date; other events occur rain or shine
7. Contact your SRTS Regional Coordinator and local police department for assistance.
8. Publicize, promote and advertise your events. Invite the media, local officials, and school administrators/staff.
9. Document the event and start planning the next one. Record how many people attended, your successes and any improvements or suggestions that are made. Take plenty of photos.

Active Transportation Best Practices: Schools can encourage and promote active transportation (walking, bicycling, scootering, skateboarding, etc.) and Safe Routes to School by implementing best practices at schools such as:

1. **Bicycle Parking and Storage:** Providing adequate bike racks at the schools for children to lock their bikes, and allowing students to store other active transportation modes like scooters, skateboards, and rollerblades in a safe, locked facility during the school day encourages students to use many active forms of transportation to school.
2. **Remote Drop-off/Pick-up Locations:** Designating a location away from and off of the school grounds for parents to park their cars and walk their kids to school alleviates traffic congestion, increases safety, and provides some physical activity for both students and their parents. Here are some steps to establishing remote drop-off locations at your school:
 - Work with teachers, parents, school administrators, the police department, and community partners to identify locations. Possible spots might include a library, park, grocery store, or church.
 - Pick a location that is within walking distance of school, is safe, and is accessible.
 - Ensure that you are not just moving traffic from the school to another location by organizing several different drop-off locations.
 - Check the route to make sure it is safe and accessible; one way to check is to conduct a walk or bike audit.
 - Identify volunteers (parents, teachers, adult chaperones) that will meet the children at the drop-off location and walk them to the school if needed. Ask local law enforcement to assist with training volunteers in pedestrian safety.
 - Notify the school community including parents, teachers, and other adult participants of the new drop-off locations and provide maps.
 - Kick-off the new drop-off location with a fun organized group walk (potentially on a walk or bike to school day).
3. **Staggered Dismissal:** Staggering student dismissal times can help alleviate traffic and increase the safety of the students. Allow students who walk, bike, or use other active transportation modes to be dismissed first, this not only rewards those students who choose active transportation but also allows them to leave the school grounds more safely, before motor vehicles and bus traffic begins. Staggered dismissal times require coordination with administration and may impact teacher contractual stipulations.
4. **Safe Routes to Bus Stops:** Evaluate and map routes that are safe for children to walk to bus stops. A Safe Routes to School Regional Coordinator can help with establishing walking routes to bus stops and to school.
5. **Walking club for staff/rewarding staff that walk or bike to school:** Teachers and staff are obvious role models for their students: those who walk and bike to school not only display healthy habits for students but also contribute to their own health and well-being. Establishing walking and bicycling clubs for staff, and rewarding staff who participate in active travel (through, i.e., acknowledgement or certificate) can encourage more walking and bicycling for teachers, staff, and students.

Priority 7.....Update the Official Map to achieve Township’s Recreation and Transportation goals

We recommend all proposed recreation and transportation greenway corridors be identified and adopted as part of the Township’s Official Map. This will provide the Township with the opportunity to secure corridors extending through private property, should it be desired, for implementation of a connected trail system within the Township.

Priority 8.....Conduct Safe Walking and Bicycling Program in the elementary/middle schools

Many online resources are available to guide the Township in promoting safe walking and bicycling in the community and in the schools. PennDOT’s bicycle and pedestrian videos page provides public service announcements from PennDOT and Safe Routes to School. These videos can be viewed here:

<https://www.youtube.com/playlist?list=PL9ouZRd8oy1MMeocQq2pHEGnoEL5fU66u>

Safe Routes to School (SRTS) helps students walk and bicycle to school more often through infrastructure improvements, education and promotional activities. This plan is complementary to the objectives of SRTS. Like Complete Streets, SRTS is a comprehensive strategy to instill life-long habits that support physical activity and health.

A comprehensive and effective SRTS initiative can help create a healthier community for generations to come.

- *Children are More Active*
SRTS programs help students get more physical activity. Children are recommended to get 60 minutes of physical activity a day. A 15-minute trip one-way helps children to meet that goal.
- *Students Arrive Ready to Learn*
Research has shown that SRTS helps students arrive to school focused and ready to learn. Getting activity through walking and bicycling helps reduce behavior problems and helps children settle in for learning during the school day.
- *Communities Become More Connected and Safer for All*
Because schools are often located at the center of communities, safety improvements benefit people of all ages. Seniors particularly benefit from improvements that slow traffic and make streets safer and can also benefit by volunteering to support educational and promotional activities.
- *Families are More Active, too*
SRTS programs have been found to increase bicycling and walking for not only children, but for the whole family.

Other programs recommended by the steering committee include conduct Safe Walking and Bicycling Program in the high school and promoting a Bicycle Helmet Campaign throughout the schools. Potential funding source includes Lowes Toolbox for Education Grants. Refer to the funding section for descriptions of these programs. Further, because helmet use is an important goal of the healthcare

community, the Township should explore opportunities to partner with Heritage Valley System in securing funding to provide bicycle helmets to school children.

Resources and a how to start a walking school bus program can be found at:
<http://www.walkingschoolbus.org/>

Priority 8..... Promote Bike/Walk to School Days

The Walking School Bus

In the search for ways to make walking to school safer, more fun and more convenient, communities are finding that walking school buses can make a real difference. Safe Routes to School programs, which encourage and enable children to safely walk and bicycle to school, often include walking school buses in their activities.

What is a Walking School Bus?

A walking school bus is a group of children walking to school with one or more adults. That may sound simple, and that is part of the appeal. It can be as informal as two families taking turns walking their children to school or as structured as a planned route with meeting points, a timetable and a schedule of trained volunteers.

A variation on the walking school bus is a bicycle train where a group of children and adult leaders ride together to school.

For More Information

The Walking School Bus Guide - http://guide.saferoutesinfo.org/walking_school_bus/

Priority 8..... Revise zoning/subdivision and land development ordinances to require Bicycle Racks and/or Bicycle Storage to be installed in commercial, healthcare, education, and multi-unit residential development

To truly achieve the vision of implementing alternative transportation choices, the Township's zoning/subdivision and land development ordinances should require Bicycle Racks and/or Bicycle Storage to be installed in commercial, healthcare, education, and multi-unit residential development. Residents who desire to commute to work by bicycle are not likely to do so unless they have 1) safe routes from home to work and 2) bicycle storage opportunities at their work location.

A Model Bicycle Parking Ordinance Ordinance is contained in the Appendices and model ordinances can be found at: <http://www.changelabsolutions.org/publications/bike-parking>.

Expanding upon this local businesses should be encouraged to consider becoming a Bicycle Friendly Business. A Bicycle Friendly Business designation is awarded by the League of American Bicyclists, a national advocacy organization.

Businesses can complete a quick assessment on-line to determine if they may qualify as a Bicycle Friendly Business: <http://www.bikeleague.org/bfa/quick-assessment/business>

Additional Resources on becoming a Bicycle Friendly Business can be found here: bikeleague.org/business.

A prime candidate for a Bicycle Friendly Business in Brighton Township is Heritage Valley Health System. As a healthcare provider within the Township that promotes healthy living and lifestyles, and facilities sufficient to meet the requirements of a Bicycle Friendly Business, the designation should be readily achievable. Once the designation is achieved it should be celebrated and recognized within the community and the County.

Further, achieving this designation can assist in meeting the goals established through Heritage Valley Health System's Community Health Assessment, a requirement of the Affordable Care Act.

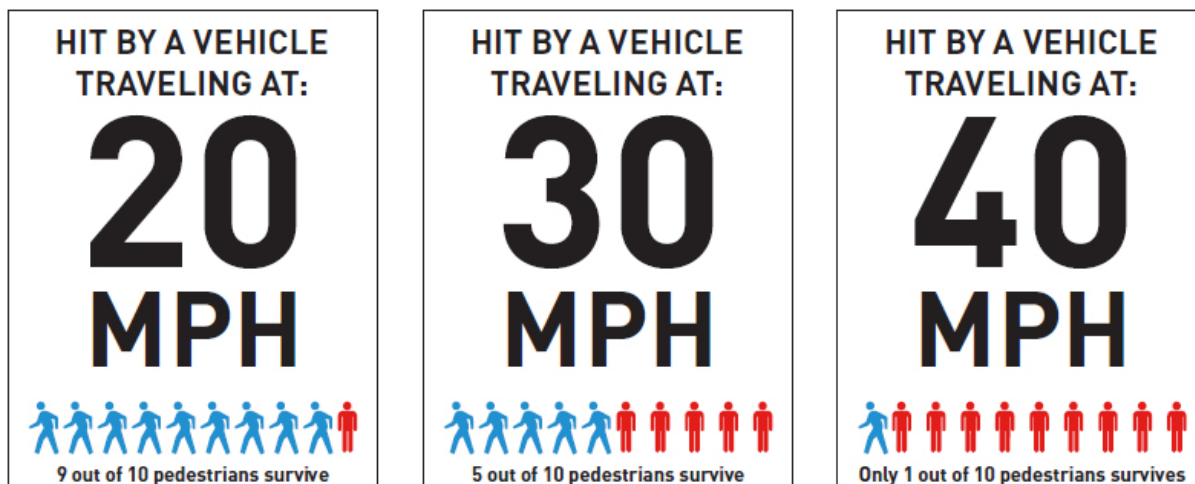
Priority 9..... Sign Bicycle Routes throughout the Township

Although there is a strong desire to sign bicycle routes within the Township, care must be taken to ensure the roadway infrastructure is safe for bicycling. Therefore, Bicycle routes should only be signed as improvements as implemented.

That said, a map of the Township can be prepared identifying the level of bicycle suitability for each road within the Township. Typical Levels of suitability include:

- Above Average for Bicycling
Road segments that are most suitable for cycling
- Average for Cycling
Road segments that are average at best for cycling. Cyclists of lesser skill may find these conditions unfavorable.
- Below Average for Cycling
Road segments that are least suitable for cycling. Cyclists may have to use these segments if they are the most direct route between two other routes.

Priority 10Conduct regular Speed Limit Enforcement Programs on Gypsy Glen, Dutch Ridge, Tuscarawas and Brighton Roads



It is well documented that speed kills. Much research has been done to evaluate correlation between the severity of injury that a pedestrian and/or bicyclist sustains and vehicle speed at the time of impact.

In 2011, the AAAM published a report “Impact Speed and a Pedestrian’s Risk of Severe Injury or Death.” This report, based on U.S. federal crash study data, indicated the severity of injury and risk of death increases as vehicle speed increases.

Vehicle Speed vs Risk of Injury & Death

Vehicle MPH	Risk of Severe Injury
16 MPH	10%
23 MPH	25%
31 MPH	50%
39 MPH	75%
46 MPH	90%

Vehicle MPH	Risk of Death
23 MPH	10%
32 MPH	25%
42 MPH	50%
50 MPH	75%
58 MPH	98%

Source: <https://www.aaafoundation.org/sites/default/files/2011PedestrianRiskVsSpeed.pdf>

This data clearly illustrates that the slower the vehicle speeds, the less likely one is to suffer a severe injury and risk of death. Some municipalities have recognized these facts, and are using it to guide transportation decisions in their locality. Some are establishing ‘slow zones’, reducing speed limits in areas of high pedestrian and bicycle traffic, while others are making a conscious decision to reduce the speed limit on all roads in their respective municipality. Further, others have used the speed limit reduction as part of their overall Vision Zero strategy to reduce pedestrian and bicyclist fatalities to zero over a specified time-frame. Vision Zero initiatives also establish benchmarks for bringing down the death toll through changes to street design and

engineering, stepped up law enforcement, and education for all street users.

Although all of Brighton Township's roads have a posted speed limit of 35 miles per hour or lower, it is not uncommon for drivers to be traveling above the posted speed limit. As noted above the risk of death in a collision increases from 25% to 50% when traveling 32 MPH or 42 MPH respectively. Traveling at 50 MPH increases the risk of death to 75%.

Speed enforcement may not be popular among some Township residents, however, it is an important component towards implementing the vision for greenways within the Township.

Enforcement Options

Education and training provide the basic knowledge of safe pedestrian, bicycle, and motoring activities. Enforcement is often necessary to change unsafe behaviors. A variety of law enforcement methods can help change the unsafe behaviors, making walking, bicycling, and accessible access safer and more attractive. Regardless of the method used, enforcement activities require follow-up to maintain their effectiveness.

To measure the impact of an enforcement activity in a specific situation, make a quick study before and after the enforcement effort. Before-and-after studies do not have to be elaborate and can be as simple as measuring speeds or observing behaviors at facilities. Examine the results and decide on the next steps. If the results are positive, the method used may be enough to improve behavior. If the results indicate little change in unsafe behaviors, perhaps another method should be used. Even with initial success, communities will need to repeat enforcement efforts periodically in order to sustain improvements in drivers' behaviors.

Speed Trailers

Portable speed trailers visually display drivers' real-time speeds compared to the speed limit. These devices may be effective in reducing speeds and increasing awareness of local speed limits. Portable speed trailers are most effective when the trailer flashes SLOW DOWN or flashes a bright white light that mimics a photo speed camera or a blue and red light that mimics a police vehicle when drivers are moving too fast. Some speed trailers have the capability to collect traffic count data and speed data throughout the day, which can be used to identify the most dangerous traffic times when more enforcement is needed.

In some cases, back-up speed enforcement by officers may be needed when radar speed trailers are used. If a driver fails to slow when the sign tells them that they are violating the law, an officer may stop the driver. The officer may choose to use the time to educate the driver with a warning, but a flagrant speeder needs to receive a ticket to reinforce the safety message. Typically, officers do not issue tickets based on the speed on the display unit. Instead, they use certified speed measuring devices if they are monitoring speed at the location.

Speed trailers are best used in residential areas and can be used in conjunction with neighborhood speed watch programs or other safety education programs. Speed trailers need to be placed in locations where they do not block pedestrians, bicyclists, motor vehicle traffic or other vital traffic control signs. Speed trailers are not substitutes for permanent actions, such as traffic calming treatments to address neighborhood speeding issues.

Active Speed Monitors

Active speed monitors are permanent devices to keep drivers aware of their speeds and the need to slow down. They are typically mounted on a speed limit sign and visually display drivers' real-time speeds as they pass. Drivers see how fast they are actually driving compared to the posted speed limit. Some active speed monitors are solar-powered.

Traffic Complaint Hotlines

A traffic complaint hotline allows community members to report traffic problems directly to law enforcement. It is used to identify the worst traffic problem areas and the most frequent traffic complaints. Police follow up with enforcement in the identified area and schedule additional enforcement if needed.

“Pedestrian Decoy” Operations

Another way to bring attention to problems with drivers not yielding to pedestrians is through a “pedestrian decoy” when law enforcement officers in highly visible civilian clothes pose as pedestrians crossing the street while other hidden officers observe their attempts. If a driver violates safe crossing rules by failing to yield to the pedestrian, the hidden officers pursue and apprehend violators. Because it is such a highly visible approach, it often garners media interest and publicizes the need for drivers to be aware of pedestrians.

To execute a successful “pedestrian decoy” operation, law enforcement should complete the following steps:

1. Identify high-risk locations for pedestrians and communicate these locations to law enforcement, traffic engineers, schools and the public.
2. Observe the locations to see the types of violations that are occurring.
3. Calculate a reasonable amount of time for a driver to see and react to the pedestrian, and mark that distance back from the crossing with a cone or sign. One measure would be the “slide-to-stop” formula using a speed 10 mph over the posted limit.
4. Dress the “pedestrian” or law enforcement officer in high-visibility civilian clothes. He or she should not step into the street if the motor vehicle has passed the safe distance cone.
5. Identify violators and apprehend them. Other officers observe the crossing attempts from a hidden location that allows them to pursue and apprehend violators. If a concealed location is not feasible, the decoy officer can carry a radio to alert fellow officers of a violator.

Progressive Ticketing

Progressive ticketing is a method for introducing ticketing through a three-staged process. Issuing tickets is the strongest strategy of an enforcement program and it is usually reserved for changing unsafe behaviors that other strategies failed to change or that pose a real threat to the safety of students.

There are three main steps of an effective progressive ticketing program:

1. Educating
Establish community awareness of the problem. The public needs to understand that drivers are speeding around schools and the consequences of this speeding for children's safety. Raising awareness about the problem will change some behaviors and create public support for the enforcement efforts to follow.

2. Warning

Announce what action will be taken and why. Give the public time to change behaviors before ticketing starts. Fliers, signs, newspaper stories and official warnings from officers can all serve as reminders.

3. Ticketing

Finally, after the warning time expires, hold a press conference announcing when and where the law enforcement operations will occur. If offenders continue their unsafe behaviors, officers issue tickets.

Beginning a ticketing program with education and warnings is important, as it provides time to build support for the program as well as time for offenders to change their behaviors. Communities often find that parents receive many of the warnings and tickets issued by officers with school officials also being occasionally ticketed. When conducting speed enforcement inside neighborhoods, 75 percent to 80 percent of the ticketed drivers live within a mile of the enforcement site. Conducting enforcement at a school results in the percentage typically being on the higher side of this range.

Issuing warnings allows law enforcement to contact up to 20 times as many non-compliant drivers than the writing of citations does. In addition, the high frequency of stops ensures not only that many people directly make contact with law enforcement, but also that many others witness these stops and are prompted to start to obey the rules. Issuing tickets is needed, however, to deal with the drivers who continue the unsafe behaviors. Ticketing also gives the program credibility by showing that law enforcement is doing exactly what they said they would do if unsafe behavior did not change. Unfortunately, for some people receiving a ticket and experiencing the consequences are the only ways to get them to become safer drivers.

Speed Enforcement in School Zone

Strict enforcement of speed laws in school zones is one law enforcement tool that can improve the safety for children walking and bicycling to school as well as drivers. A zero tolerance policy for speeders in school zones and even an increase in fines for drivers who violate the posted school zone speed limit are potential approaches.

A grass roots community effort can also help improve driver, pedestrian, and bicyclist behaviors to improve safety in several ways including:

- **Neighborhood speed watch:** Radar speed units are loaned to residents who are trained by police to collect speed data and vehicle descriptions. The local agency follows up and sends the vehicle owners a letter asking for voluntary compliance. This measure can educate neighbors about the issue (speeders often live in the neighborhood) and help boost support for long-term solutions, such as traffic calming.
- **Adult school crossing guards:** Adult crossing guards can play a key role in promoting safe driver, pedestrian, and bicyclist behavior at crosswalks near schools. Adult school crossing guards can be parent volunteers, school staff, or paid personnel.
- **Annual classroom and field training,** as well as special uniforms or equipment to increase visibility, are recommended.
- **Neighbor outreach and education:** Reach out to neighbors in campaigns to reduce driver speeds and improve safety behaviors of all road users.

Memorandum of Understanding with Non-Profits for Construction/Maintenance of Trails

We recommend the Township partner with a trail or mountain bicycling organization who can help with the implementation of sustainable trail improvements throughout the Township. However, it must be done with an understanding and commitment from each party that the work will only be completed by individuals who have the necessary skills and training. There are many examples of successful partnerships between park agencies and local volunteer trail organizations. One such partnership is between the Allegheny County Parks Department and the TrailPittsburgh, <http://trailpittsburgh.org>, (formerly Pittsburgh Trails Advocacy Group, PTAG). TrailPittsburgh has designed, flagged and constructed trail networks in Moraine State Park in partnership with PA DCNR. Further, they have partnered with Allegheny County to develop and maintain trails in North Park, South Park, Boyce Park, White Oak Park, Deer Lakes Park and Hartwood Acres. During the course of this planning process informal discussions occurred with TrailPittsburgh to determine its interest in partnering with Butler County to establish a high quality, sustainable mountain biking and hiking trail network in Alameda Park. Those discussions have indicated that both TrailPittsburgh and Butler County are interested in further exploring an opportunity to partner in this endeavor. As these discussions progress we recommend that an arrangement between Butler County and TrailPittsburgh be formalized in writing through an agreement/ memorandum of understanding (MOU) which specifies the expectations of each party before any work begins.

An Agreement/MOU defines expectations and establishes quality control for the trail system. Ultimately Brighton Township, as the owner of the land, will be responsible for the trail system and bear the responsibility associated with its development. By following best practices for trail design, construction and maintenance, Brighton Township will put forward a good faith effort to defend any potential liability that arises from trail development within the Township. Allegheny County instituted a similar partnership with the trail community in Allegheny County. Since the partnership has been developed, there have been no liability claims related to mountain biking in the Allegheny County Park's system.

Birghton Township should approach the Beaver Area Bicycling Enthusiasts (B.A.B.E.) and/or TrailPittsburgh to determine their respective level of interest in building and maintaining mountain bike trails in Brighton Township.

A sample memorandum of understanding is located in the Appendix.

Funding Opportunities

Most funding programs and grant opportunities require a match. Matches can typically be cash or through eligible in-kind services. Approved in-kind services cannot be performed towards a project until funding is announced and committed. ‘Banking’ in-kind services from prior efforts is typically not allowed with state grants. Therefore, projects need to be timed with grant writing and funding efforts in order to maximize the ability of securing cash matches to in-kind labor donations.

Several funding sources are available to help municipalities and land trusts fund planning, acquisition, and development of greenways, conservation areas, pedestrian and bicycle improvements and trails. A description of each follows.

Pennsylvania Department of Conservation and Natural Resources Program

Community Recreation and Conservation Program - Community Conservation Partnership Program (C2P2)

<http://www.dcnr.state.pa.us/brc/grants/c2p2programguidance/index.htm>

Eligible Applicants

Municipalities; COGs; Conservation Districts; land trusts; school districts; colleges and universities; non-profit organizations working on rivers, conservation, trails, etc.; for profit entities; housing and redevelopment authorities; and designated heritage areas.

Eligible Activities

- Development
- Land Acquisition
- Planning
- Partnerships
- Trail maintenance

Match Requirement

Match amount varies between 10 and 50%, depending on project type and ultimate funding source.

How to Apply

Through the DCNR website: <http://www.dcnr.state.pa.us/brc/grants/c2p2programguidance/index.htm>

Grant Cycle

Annual, typically grants are due in mid-April.

Riparian Forest Buffer Program

The Department of Conservation and Natural Resources (DCNR) Bureau of Recreation and Conservation (BRC) provides a single point of contact for communities and non-profit entities seeking state assistance to support local recreation and conservation efforts. The DCNR Riparian Forest Buffer Program will provide

financial assistance to identify locations in need of riparian forest buffers and to design, establish, monitor, and provide short-term maintenance for those buffers. This program will also support projects that produce Multifunctional Buffers, a buffer type that provides an opportunity to harvest products such as nuts, berries, woody florals, forbs and potentially woody biomass in addition to the conventional buffer of riparian tree and shrub species.

Eligible Applicants

- Municipality – Any county, city, borough, incorporated town, township or home rule municipality.
- Municipal Agency – Any official agency created by a municipal government under the laws of the Commonwealth such as municipal authorities, Council of Governments and intergovernmental commissions.
- Authorized Organization: An entity involved in research, restoration, rehabilitation, planning, acquisition, development, education or other activities, which furthers the protection, enhancement, conservation, preservation or enjoyment of this Commonwealth's environmental, conservation, recreation or similar resources. The organization must be a tax-exempt institution under section 501(c)(3) of the Internal Revenue Code of 1986 (Public Law 99-514, 26 U.S.C. § 501(c)(3)) and registered with the Bureau of Charitable Organizations or an educational institution involved in these authorized activities or a municipal authority.
- Institute of Higher Education

Eligible Activities

Eligible projects and project activities for the Riparian Forest Buffer Program are those which involve landowner outreach, buffer design, site preparation and buffer installation, plant materials and tree shelters, and short term maintenance of riparian buffers.

Program Requirements

- A. The minimum grant amount awarded is \$50,000.
- B. All projects require a 50% match. Match may be cash or non-cash and must be directly related to the approved scope of work.
- C. To be eligible for reimbursement, project costs must be incurred within the time frame established by the grant agreement and must be approved by the Department.
- D. Eligible costs include those directly related to the scope of work as approved by the Department and include:
 - Contracted professional services to perform all or part of the approved scope of work
 - Construction contracts to perform the approved scope of work.
 - Expenses related to the completion of the approved scope of work such as public meeting advertisements, meeting room rental, printing, etc.
 - Organization's personnel costs to perform all or part of the approved scope of work.
 - Costs related to an independent audit if required.
 - Costs associated with advertising and bidding of a project.

E. Ineligible costs include:

- Costs not consistent with the approved scope of work and budget
- Costs for preparation of the grant application
- Costs for fundraising
- Costs for public relations, outreach not directly related to project implementation, communications, lobbying or litigation.

F. Control of Property: The property on which the riparian buffer will be installed must be owned by the applicant or the applicant must have the permission of the landowner to install and maintain the proposed riparian forest buffer(s). Permission can be given through: (1) a legal landowner agreement between the property owner and the applicant that allows for the installation and long term monitoring and maintenance of the buffer; (2) an easement over the property for a term of at least 25 years; or (3) a property lease for a term of at least 25 years.

G. All construction must be completed in accordance with all the applicable federal, state and local laws, including but not limited to the Uniform Construction Code (UCC) and the Americans with Disabilities Act.

H. Grantees will be required to demonstrate that the project has secured all necessary planning and permit approvals for the project from the federal, state, and local governments and that the project is in compliance with local regulations.

I. Where public access is provided, the grantee shall insure that no person will be denied access to or use of the site on the basis of race, color, religion, ancestry, income, national origin, age or sex.

J. Recipients of grants, as well as landowners of the project sites, may not remove or destroy the riparian buffers installed as part of the grant-funded project without the prior written approval of the agency awarding the grant.

Application Evaluation

All applications for financial assistance will be reviewed by DCNR staff to determine eligibility of the proposed project as well as the competitiveness of the proposal. Applications are evaluated on a competitive basis using the following criteria:

- Project Scope
- Applicant Qualifications
- Project Methodology & Outreach
- Project Maintenance & Management
- Project Acreage
-

Procedures for Accessing Funds

Following approval of an application by the Department, a commitment letter will be issued to the applicant explaining the terms and conditions of the grant. A grant agreement will be sent to the grantee shortly after the award is announced. Upon receipt of an executed grant agreement, the grantee can access 50% of awarded funds by submitting a completed Advanced Payment Form or Partial Payment form to the

Department. Additional funding will be disbursed to the grantee throughout the project as specific project milestones are met and required paperwork is submitted.

DCNR and DEP both offer funding for riparian forest buffers through annual competitive grant programs. DCNR's funding is available as part of the Community Conservation Partnership Program, with applications accepted between January and April every year, while DEP offer funds through their Growing Greener program, which typically receives applications annually in the fall.

Program inquiries should be directed to:

PA Department of Conservation and Natural Resources
Bureau of Recreation and Conservation
Rachel Carson State Office Building 400 Market Street, 5th Floor
Harrisburg, PA 17101-2301
Telephone: (717) 772-3319
Fax (717) 787-9577

Program guidelines can also be accessed online at
<http://www.dcnr.state.pa.us/forestry/yourwoods/streambuffers/riparianbuffergrant/index.htm>

Commonwealth Finance Authority Act 13 Programs

Watershed Restoration and Protection Program (WRPP)

The overall goal of the Watershed Restoration and Protection Program (WRPP) is to restore, and maintain restored stream reaches impaired by the uncontrolled discharge of nonpoint source polluted runoff, and ultimately to remove these streams from the Department of Environmental Protection's (DEP's) Impaired Waters list. This may be accomplished by the implementation of watershed based Best Management Practices (BMPs) for agriculture, stormwater, stream bank and channel restoration, as well as for BMP repair, upgrade or operation and maintenance of existing practices.

Eligible Applicants

- Municipality
- Councils of Governments
- Authorized Organization – tax-exempt institution under section 501(c)
- Institution of Higher Education
- Watershed Organization
- For Profit Businesses

Eligible Projects

1. Watershed restoration/protection projects implementing runoff control or runoff reduction BMPs on agricultural operations negatively impacting local or regional stream quality. A description of BMPs commonly used for agricultural operations is provided in the Pa Soil and Water Conservation Technical Guide administered by the USDA Natural Resources Conservation Service (NRCS).
2. Watershed restoration/protection projects implementing runoff control or runoff reduction BMPs addressing urban or residential areas negatively impacting local or regional stream quality. A listing of potential BMPs is contained in the Pennsylvania Stormwater Best Management Practices Manual, administered by Pa DEP.
3. Watershed projects that refurbish, restore, or create stream bank or stream channel stabilization using bio-engineering techniques.
4. Repair and maintenance of existing watershed protection BMPs addressing agricultural, urban/residential, and degraded stream areas.
5. Monitoring of water quality to track, or continue to track NPS load reductions resulting from watershed protection BMP implementation projects.

Eligible Use of Funds

Funds may be used by the applicant to pay for any of the following project costs:

1. Construction, improvement, expansion, repair, maintenance or rehabilitation of new or existing watershed protection BMPs, and security fencing. Construction contingency limited to 5% of actual construction costs.
2. For construction projects, no more than 10% of the grant award may be used for engineering and construction oversight, inspection and performance monitoring costs. Technical assistance necessary to carry out the project.
3. Technical assistance necessary to carry out the project.
4. Stream channel and stream bank stabilization activities including the establishment of riparian vegetation to allow for long term stability of the stream.
5. In stream monitoring to assess stream restoration status.
6. Trust funds for operations and maintenance costs associated with implemented urban and stream restoration BMPs. (limited to 25% of the grant award.)
7. Administrative costs of the applicant necessary to administer the grant. Administrative costs will include advertising, legal, and audit costs as well as documented staff expenses. Administrative costs shall not exceed 2% of the grant award.

Ineligible costs include but are not limited to public relations, outreach, communications, lobbying, litigation, fees for securing other financing, interest on borrowed funds, application preparation fees and other costs incurred prior to the approval of grant funds.

Applicant Cost Share Requirements

A 15% cash match of the total project cost or cash equivalents for the appraised value of the real estate is required

Grants shall not exceed a total of \$300,000 for any project.

Program inquiries should be directed to:

PA Department of Community and Economic Development
Office of Innovation and Investment – CFA Programs Division
Watershed Restoration and Protection Program
400 North Street, 4th Floor
Commonwealth Keystone Building
Harrisburg, PA 17120-0225
Telephone: (717) 787-6245
ra-dcedsitedvpt@pa.gov

<http://dced.pa.gov/programs/watershed-restoration-protection-program-wrpp/#.V8lWFkrLq4>

Greenways, Trails and Recreation Program (GTRP)

Act 13 of 2012 establishes the Marcellus Legacy Fund and allocates funds to the Commonwealth Financing Authority (the “Authority”) for planning, acquisition, development, rehabilitation and repair of greenways, recreational trails, open space, parks and beautification projects.

Eligible Applicants

- Municipality
- Councils of Governments
- Authorized Organization – tax-exempt institution under section 501(c)
- Institution of Higher Education
- Watershed Organization
- For Profit Businesses

Eligible Projects

1. Public Park and Recreation Areas – These projects involve the rehabilitation and development of public indoor and/or outdoor park, recreation and conservation areas and facilities. Parks and recreation areas are areas of land and/or water, for use as a neighborhood, community or regional public park and recreation site. Property may be acquired for active and/or passive recreation use to create new park and recreation areas and/or expand existing recreational sites.
2. Greenways and Trails – These projects involve the renovation and development of linear public facilities, such as bicycle, walking, equestrian, snowmobile, and nature trails; passive recreation areas; riparian forest buffers; wetland boardwalks; observation decks. Related support facilities including: access roads, parking areas, walks, comfort station, lighting, landscaping, and signage are also eligible. Greenways are areas of land and/or water which provides a linear recreation, conservation, or open space corridor along a natural or man-made feature. Trails are designated land and/or water corridor with public access that provides recreation and/or alternative transportation opportunities to motorized and/or non-motorized user of all ages.
3. Rivers Conservation – These projects enhance rivers, streams, and watersheds for recreational purposes.

Eligible Use of Funds

Funds may be used by the applicant to pay for any of the following project costs:

1. Development, Rehabilitation and Improvement of public parks, indoor and outdoor recreation facilities, trails, greenways, and watershed implementation projects to include:
 - a. Construction activities. Construction contingencies are limited to 5% of actual construction costs.
 - b. Fixed equipment
 - c. The clearing and preparation of land.
 - b. Environmental site assessment.
 - c. Related engineering, design, and inspection costs not to exceed 10% of grant award.
 - d. Professional services including services, such as land surveying, preparation of bid documents, construction inspection, archaeological surveys, land surveys, PNDI surveys, appraisals etc.
 - e. Settlement cost, acquisition projects only.
 - f. Administrative costs of the applicant necessary to administer the grant. Administrative costs will include advertising, legal, and audit costs as well as documented staff expenses. Administrative costs shall not exceed 2% of the grant.
2. Planning Projects that “lay the groundwork” for future land acquisition, development and/or management of parks, recreational facilities, critical habitat, open space, natural areas, greenways, motorized and non-motorized trails and river/watershed corridors. Planning projects also include the development of business plans for expansion or establishment of outdoor recreation businesses.
3. Acquisition of land, easements, or rights of way for park and recreation areas, natural areas, greenways, trails, river/watershed conservation, critical habitat conservation and/or open space. Natural areas are areas of land and/or water, which are important in preserving flora, fauna, native ecological systems, and geological, natural, historical, open space, scenic or similar features of scientific or educational value. Critical habitats are areas of land and/or water which provides habitat for rare, threatened or endangered plant and animal species or ecological or natural communities which are at risk of destruction or substantial degradation.

Ineligible costs include but are not limited to public relations, outreach, communications, lobbying, litigation, fees for securing other financing, interest on borrowed funds, application preparation fees and other costs incurred prior to the approval of grant funds.

Applicant Cost Share Requirements

A 15% cash match of the total project cost or cash equivalents for the appraised value of the real estate is required

Grants shall not exceed a total of \$300,000 for any project.

Program inquiries should be directed to:

PA Department of Community and Economic Development
Office of Innovation and Investment – CFA Programs Division
Watershed Restoration and Protection Program
400 North Street, 4th Floor
Commonwealth Keystone Building
Harrisburg, PA 17120-0225
Telephone: (717) 787-6245
ra-dcedsitedvpt@pa.gov

<http://dced.pa.gov/programs/watershed-restoration-protection-program-wrpp/#.V8lWFfkrLq4>

PA Department of Environmental Protection Programs

Environmental Education Grants Program

The Environmental Education Grants Program (EE Grant Program) was developed to support and strengthen environmental education in Pennsylvania. The EE Grants were established by the Environmental Education Act of 1993 and mandate that five percent of all pollution fines and penalties DEP collects annually be set aside for environmental education. Who is eligible: Public and private schools, colleges and universities, county conservation districts, nonprofit organizations and associations, conservation and education organizations, municipalities, municipal authorities and businesses.

Program Eligibility

- County
- Municipality
- Authority
- School District
- Non-Profit
- Conservation District
- Non-Profit Conservation/Education Organizations/Businesses

Application Availability

Early October

Application Deadline

Mid-December

Average Grant Amount

\$3,000.00

Contact

(717)772-1828, ra-eplearningcenter@pa.gov

PennDOT Funding Programs

PA Infrastructure Bank

The Pennsylvania Infrastructure Bank (PIB) is a PennDOT program that provides low-interest loans to help fund transportation projects within the Commonwealth. The goal of the PIB is to leverage state and federal funds, accelerate priority transportation projects, spur economic development and assist local governments with their transportation needs. The current PIB Interest Rate, in March 2016, is 1.75%.

The PIB provides a low-cost means to fund projects, in whole or in part. The bank can provide the money to accelerate a construction schedule or to complete a funding package. The interest rate on PIB loans is fixed at one-half the prime lending rate with terms up to 10 years.

Borrowers can include cities, townships, boroughs, counties, transportation authorities, economic development agencies, not-for-profit organizations and private corporations.

Most capital projects are eligible, but construction projects receive the highest priority for funding. Examples of eligible projects include, but are not limited, to:

- Road construction and resurfacing
- Bridge rehabilitation and replacements
- Traffic signals and signal upgrades
- Drainage structures
- Stormwater management
- Municipal roadway and bridge maintenance equipment
- Complete streets
- Intermodal facilities

Website:

<http://www.penndot.gov/ProjectAndPrograms/Planning/Pages/PA-Infrastructure-Bank.aspx#.VvpvSOIrLq4>

Multimodal Transportation Fund (MTF)

Act 89 established a dedicated Multimodal Transportation Fund that stabilizes funding for ports and rail freight, increases aviation investments, establishes dedicated funding for bicycle and pedestrian improvements, and allows targeted funding for priority investments in any mode.

The Multimodal Transportation Fund application window is now closed. PennDOT anticipates making award announcements for the 2016-17 funding round in the spring of 2016.

Eligible Projects include:

1. A project which coordinates local land use with transportation assets to enhance existing communities, including but not limited to: bus stops, park and ride facilities, sidewalk/crosswalk safety improvements, bicycle lanes/route designations, in-fill development by assisting with traffic impact mitigation,

development of local highways, and bridges which will benefit state system and local economic development and greenways.

2. A project related to streetscape, lighting, sidewalk enhancement and pedestrian safety, including but not limited to: sidewalk connections, crosswalks, pedestrian and traffic signals, pedestrian signs, and lighting.
3. A project improving connectivity or utilization of existing transportation assets, including but not limited to: improved signage, access roads, developing or supporting an integrated transportation corridor and/or improving the productivity, efficiency and security that support goods movement to and from PA ports, and port upgrades. Also, bicycle/shared lane markings and bicycle parking at transit stops.
4. A project related to transit-oriented development. The term does not refer to a single real estate project, but represents a collection of projects, usually mixed use, at a neighborhood scale that are oriented to a transit node.

Eligible Uses of Funds

Funds may be used for the development, rehabilitation and enhancement of transportation assets to existing communities, streetscape, lighting, sidewalk enhancement, pedestrian safety, connectivity of transportation assets and transit-oriented development to include:

- Acquisition of land and buildings, rights of way and easements
- Construction activities
- Capital equipment
- The clearing and preparation of land
- Demolition of structures
- Environmental site assessment and environmental studies
- Related engineering, design and inspection costs, which shall not exceed 10% of the grant award.
- Professional services including services such as land surveying, preparation of bid documents, construction inspection, archaeological surveys, land survey, appraisals etc.
- Settlement costs of acquisition projects
- Administrative costs of the applicant necessary to administer the grant
- Administrative costs may include advertising, legal and audit costs, as well as documented staff expenses. Administrative costs shall not exceed 2% of the grant award
- Project contingencies which shall not exceed 5% of the grant award

Ineligible costs include, but are not limited to fees for securing other financing, interest on borrowed funds, refinancing of existing debt, lobbying, fines, application preparation fees, reparations and costs incurred prior to the approval of PennDOT.

Matching Funds Requirement

Financial assistance under the Multimodal Transportation Fund shall be matched by local funding in an amount not less than 30% of the amount awarded. Matching funds from a county or a municipality shall only consist of cash contributions provided by one or more counties or municipalities. Liquid fuels tax, Act 13 impact fees, and other statutorily allocated fees/taxes paid directly to a county or municipality may be used as a local match as long as the project is an eligible use of such funds. Matching funds from a council of

governments, business, economic development organization, or public transportation agency shall consist only of cash contributions or cash equivalent for land following appraised value of real estate necessary to construct an eligible project. If using the value of real estate as a cash equivalent, an appraisal not older than one year is required and must be provided with the application submission. The project sponsor is responsible for any costs exceeding the award amount.

Grants

- Grants are available for projects with a total cost of \$100,000 or more.
- Grants shall normally not exceed \$3,000,000 for any project. The PennDOT Office of Multimodal Transportation will consider grant requests over \$3,000,000 for projects that will significantly impact PennDOT's goal to leverage private investment and create jobs in the commonwealth.
- In order to be eligible for a Multimodal Transportation grant, all other funding must be secured and documented for the proposed project by the application deadline.
- Commencement of work prior to receiving PennDOT approval will result in the project being ineligible for funding consideration.
- To be eligible for reimbursement, project costs must be incurred within the time frame established by the grant agreement.
-

PennDOT has \$40 million in grants available for fiscal year 2017-18. Applications are due by December 16, 2016. PennDOT expects to announce grant recipients next year for the funding that becomes available in July 2017. PennDOT on Friday announced the grant recipients for the 2016-17 year.

Website

<http://www.pennidot.gov/ProjectAndPrograms/MultimodalProgram/Pages/default.aspx#.VvpwUOIrlQ5>

Transportation Alternatives Program

MAP-21 established a new program to provide for a variety of non-motorized and non-highway projects, including many that were previously eligible activities under separately funded programs. The Transportation Alternatives Program (TAP) combines and replaces pre-MAP-21 programs including Transportation Enhancements, Recreational Trails, Safe Routes to School, and several other discretionary programs, wrapping them into a single funding source.

The TAP provides funding for programs and projects defined as transportation alternatives, including on- and off-road pedestrian and bicycle facilities, infrastructure projects for improving non-driver access to public transportation and enhanced mobility, community improvement activities, and environmental mitigation, trails that serve a transportation purpose, and safe routes to school projects.

Construction projects must have a construction cost of at least \$50,000, but may not exceed \$1 million, unless the project is of exceptional regional or statewide significance. Key criterion in the review of applications will be readiness for implementation and safety. Other criteria include, but are not limited to, consistency with local regional plans, collaboration with stakeholders, statewide or regional significance, and the sponsor's demonstrated ability to successfully deliver the project. Projects will be selected on the degree to which

the sponsor addresses all selection criteria outlined in the TAP Guidelines, including their ability to deliver projects within the first two years of the 2017 TIP.

- TAP is not a grant program and no money is provided upfront. Applicants pay pre-construction costs on their own (design, environmental, right of way acquisition, utility). No applicant match is required.
- The TAP program funds the construction phase of eligible projects at 100%.
- Project must conform to one of the 10 categories of eligibility.
- There is a minimum award of \$50,000 for construction projects. The maximum award is \$1,000,000, although higher awards can be justified for “exceptional” projects.
- Project sponsors should select consultants that have demonstrated experience in the design and timely delivery of Transportation Enhancements, Safe Routes to School, or Transportation Alternatives Program projects.
- It is highly recommended that project sponsors talk with their Metropolitan Planning Organization (MPO) or Rural Planning Organization (RPO) staff to discuss their project before submitting an application.
- It is highly recommended that project sponsors speak with PennDOT Engineering District staff and other professionals familiar with PennDOT policies and regulations.
- Approximately \$9 million is available for the statewide funding round, although more may be available if additional funding is provided.

The list below describes the 10 general project categories eligible for funding through the statewide application process.

1. Bicycle and Pedestrian Facilities – This category includes projects that allow communities to develop projects that make non-motorized transport safe, convenient, and appealing. Projects may include on-road and off-road trail facilities that serve to meet transportation needs of pedestrians, bicyclists, and users of other nonmotorized forms of transportation. These projects encourage healthful physical activity, keep air clean by decreasing reliance on fossil fuels, and enrich local economies with recreational assets.

Eligible Projects

1. New or reconstructed sidewalks or walkways
2. Pedestrian and bicycle signs or signals
3. Lighting that primarily benefits cyclists and pedestrians (Lighting Plan Requirements)
4. Transportation projects that achieve ADA compliance, such as curb ramps
5. New or reconstructed off-road trails that serve a transportation need, such as trails that provide connections to schools, parks, or other public places
6. Crosswalks, bicycle lanes or shared roadway pavement markings
7. Widening or paving shoulders
8. Bicycle parking facilities, such as bicycle lockers and bicycle racks (including those on buses)
9. Bicycle share programs (including the purchase of bicycles)
10. Shared use paths, side paths, and trails that serve a transportation purpose
11. Bicycle and pedestrian bridges and underpasses

12. Crossing improvements that shorten crossing distance, provide access, and/or primarily improve bicycle and pedestrian safety
 13. Traffic realignments, road diets, or intersection changes that improve bicycle and pedestrian access or safety
 14. Rails with trails projects, which are adjacent to active (not abandoned) lines
2. Bicycle and Pedestrian Education (grades K-8 only) – Non-infrastructure projects that benefit students in kindergarten through the eighth grade are also eligible. Projects and activities that educate children to safely walk or bike to school or encourage them to do so are defined as eligible in Section 1404(f)(2)(A) of SAFETEA-LU.

Eligible Projects

- Public awareness campaigns and outreach to press and community leaders
 - Traffic education and enforcement in the vicinity of schools
 - Student sessions on bicycle and pedestrian safety, health, and environment
 - Funding for training, volunteers, and managers of safe routes to school program
3. Conversion of Abandoned Railway Corridors to Trails – Rail-trails help to expand travel and recreational opportunities within communities. Converted rail corridors make ideal trails because of their flat grade, long length, and intact right-of-way. Rail-trails, as these types of trails are called, help to encourage physical activity and reduce air pollution.

TAP funds can be used only for abandoned, rail banked or currently inactive rail lines; funds cannot be used to move or perform construction on active rail corridors. Funding for this category may also be used solely for purchase of railroad right-of-way or property, as long as future development of a public facility is planned.

Eligible Projects

- Construction of multi-use trails within a railroad right-of-way
 - Major reconstructions of multi-use trails within a railroad right-of-way
 - Developing rail-with-trail projects, where there is an adjacent line that is no longer active
 - Purchasing and converting unused railroad property for reuse as a trail
4. Construction of Turnouts, Overlooks, and Viewing Areas – By developing turnouts, overlooks, and viewing areas, communities can enhance the travel experience and supply an educational element that attracts tourists to local roads that are of scenic, historic, natural, cultural, archeological, and recreational significance.

Under this category, special attention should be considered in those areas that are designated as PA Byways by PennDOT, designated Heritage Areas by the Department of Conservation and Natural Resources (DCNR), as well as those areas that are listed on the National Register of Historic Places and those areas affiliated with the National Park Service.

Eligible Projects

- Construction of turnouts, overlooks, and viewing areas
- Interpretive signage or kiosks explaining site significance
- Right of way acquisition for such facilities may be considered

5. Outdoor Advertising Management — The control and removal of outdoor advertising activity allows communities to preserve the scenic character of their roads by tracking and removing illegal and non-conforming billboards. Non-conforming signs are those signs that were lawfully erected but do not now comply with the Highway Beautification Act of 1965.

Eligible Projects

- Billboard inventories, including those done with GIS/GPS
- Removal of illegal and non-conforming billboards

6. Historic Preservation and Rehab of Historic Transportation Facilities – The Historic Preservation and Rehabilitation of Historic Transportation Facilities category allows communities to rehabilitate and restore transportation facilities of historic significance. These rehabilitated facilities serve to educate the public and to provide communities with a unique sense of character that attracts tourists and generates a vibrant economic life.

Eligible projects must rehabilitate, restore or improve interpretation of a historic transportation facility. The addition of new items to the facility, such as desks, cabinets, furniture or other amenities that would improve building aesthetics or operations, are not eligible. Similarly, improvements that merely enhance operations (such as adding heating or cooling systems) are not eligible; however, in some cases, heating or cooling systems may be added, but only when deemed necessary for preservation of the historic structure; not for the comfort of guests or staff.

Historic transportation facilities must be listed or eligible for listing on the National Register of Historic Places. The Pennsylvania Historical & Museum Commission's Bureau of Historic Preservation (www.phmc.state.pa.us/bhp) can help determine which areas or structures are listed.

Eligible Projects

- Restoration and reuse of historic buildings with strong link to transportation history
- Restoration and reuse of historic buildings for transportation related purposes
- Interpretive displays at historic sites
- Access improvements to historic sites and buildings
- Restoration of railroad depots, bus stations, and lighthouses
- Rehabilitation of rail trestles, tunnels, bridges, and canals
- Increasing building accessibility, in accordance with ADA guidelines

7. Vegetation Management — Through the Vegetation Management activity, communities improve roadway safety, prevent against invasive species, and provide erosion control along transportation corridors.

Eligible Projects

- Clearing of low-hanging branches or other vegetation encroaching on a travel corridor
- Landscaping to improve sight lines or other safety considerations
- Removal of invasive species
- Planting grasses or wildflowers to manage erosion along transportation corridors

8. Archaeological Activities — The Archaeological Activities category allows communities to explore the history in America with archaeological excavations and surveys in conjunction with highway construction projects.

Only projects related to the impacts of implementing a transportation project are eligible for funding under this category.

Eligible Projects

- Research, preservation planning, and interpretation
- Developing interpretive signs, exhibits, and guides
- Inventories and surveys

9. Stormwater Management — Stormwater Management projects allow communities to decrease the negative impact of roads on the natural environment. Storm runoff over road surfaces carries pollutants into water, upsetting the ecological balance of local waterways and degrading water resources for humans and animal populations. Additionally, stormwater runoff may also erode soil, potentially reducing structural stability, augmenting flood events, and stripping soil from sensitive agricultural areas. Projects funded in this category seek to reduce these environmental impacts.

Eligible Projects

- Detention and sediment basins
- Stream channel stabilization
- Storm drain stenciling and river clean-ups
- Water pollution studies

10. Wildlife Mortality Mitigation — Wildlife Mortality Mitigation allows communities to decrease the negative impact of roads on the natural environment. Roads can harm wildlife through habitat fragmentation and vehicle-caused wildlife mortality.

Eligible Projects

- Wetlands acquisition and restoration
- Stream channel stabilization
- Wildlife underpasses or overpasses which may include bridge extensions to provide or improve wildlife passage and wildlife habitat connectivity
- Monitoring and data collection on habitat fragmentation and vehicle-caused wildlife mortality

Sponsor Eligibility

MAP-21 not only changed which project activities are eligible, it established new guidelines for which entities may sponsor a TAP project. Non-profit organizations, State DOTs, and MPOs/RPOs are no longer eligible

project sponsors; however, they're encouraged to work with eligible sponsors to advance projects where there is a shared interest. In MAP-21, eligible TAP sponsors include:

1. local governments;
2. regional transportation authorities;
3. transit agencies;
4. natural resource or public land agencies, including Federal agencies;
5. school districts, local education agencies, or schools;
6. tribal governments; and
7. any other local or regional governmental entity with responsibility for oversight of transportation or recreational trails (other than a metropolitan planning organization or a State agency) that the State determines to be eligible, consistent with the goals of subsection (c) of section 213 of title 23.

Given the effort and expense of delivering federally-funded projects, a construction value of at least \$50,000 is required for all projects applying for statewide TAP funding. This limit does not apply to small, materials only purchases that are installed by local forces. Examples could include bicycle repair stations, simple lighting projects (without trenching), and small trail improvements where all work is performed by local forces.

Additionally, a “soft cap” of \$1 million will apply for all projects selected through the statewide call for applications. A “soft cap” means that projects with a construction value over \$1 million must be of exceptional value and describe – through their application – why additional project expense is justified. “Exceptional value” may describe a project that closes a major transportation gap, addresses a significant safety concern or benefits a substantial amount of users.

Project Funding

The TAP is funded on an 80% federal, 20% state/local cost share basis. As in past TE and TAP rounds, the applicant pays the costs for all pre-construction (design, environmental, right of way, utility) activities, with all construction and construction inspection activities paid from the federal share up to the amount approved for the project. The project sponsor is responsible for any costs exceeding the project application award amount.

The TAP is not a grant program and no money is provided upfront. Approved costs will be reimbursed only after a Federal Form D-4232 is authorized for the project; no activities or construction performed prior to this federal clearance are reimbursable.

Once a project is authorized to advance and begins to incur costs, the project sponsor will receive periodic invoices from the contractor that was selected (through a PennDOT approved process) to construct the project. The project sponsor then reviews and approves these invoices before submitting them to PennDOT for payment. PennDOT processes the payment and provides payment to the sponsor, who in turn pays the contractor. The sponsor will only be reimbursed for actual approved project expenses, up to the amount approved for the project.

Contact:

Karen Franks
Southwestern Pennsylvania Commission
Kfranks@spcregion.org
412--391--5590 ext. 367

Congestion Mitigation Air Quality Program (CMAQ)

The federal Congestion Mitigation and Air Quality Program (CMAQ) provides funds for transportation projects or programs that will contribute to attainment or maintenance of the national ambient air quality standards (NAAQS) for ozone, carbon monoxide (CO), and particulate matter (PM). The CMAQ Program supports two important goals of the U.S. Department of Transportation: improving air quality and relieving congestion.

It is the Southwestern Pennsylvania Commission's (SPC) policy to program projects on the TIP for CMAQ funding that provide the best air quality benefit for the investment, consistent with Federal Highway Administration (FHWA) CMAQ Program Guidance (Final Program Guidance, The Congestion Mitigation and Air Quality [CMAQ] Improvement Program under the Safe, Accountable, Flexible, Efficient Transportation Equity Act: A Legacy for Users, FHWA, October, 2008; and Congestion Mitigation and Air Quality [CMAQ] Program Interim Guidance: MAP-21 – Moving Ahead for Progress in the 21st Century, FHWA, November 12, 2013). Projects selected for CMAQ funding are also expected to be consistent with the policies set forth in SPC's adopted Long-Range Transportation Plan (Mapping the Future: The Southwestern PA Plan, SPC, June 2015 and Pennsylvania's Smart Transportation goals.

Once projects are programmed on the TIP for CMAQ funding, close coordination is necessary between SPC, the Pennsylvania Department of Transportation (PennDOT), and project sponsors, to ensure that CMAQ funds are used appropriately and to maximize their effectiveness in satisfying SPC's CMAQ policy and meeting federal transportation and Clean Air Act (CAA) goals. It is also essential that the CMAQ funds are able to be obligated in the year in which they are programmed to the TIP.

The TIP is a four-year program of projects that is updated every two years. During each two year cycle, projects programmed in the first two TIP years are expected to be funded. The second two years of one TIP become the first two years of the following TIP. Because of this there is very limited room for new projects on a new TIP's first two years. Most of the CMAQ projects selected in this funding cycle will be programmed on TIP years three and four.

FHWA has directed that the CMAQ project selection process should be conducted in accordance with the metropolitan transportation planning process. In addition, the CMAQ project selection process should be transparent, in writing, and publicly available. The process should identify the agencies involved in rating proposed projects, clarify how projects are rated, and name the committee or group responsible for making the final recommendation to the Metropolitan Planning Organization (MPO) board or other approving

body. The selection process should also clearly identify the basis for rating projects, including emissions benefits, cost effectiveness, and any other ancillary selection factors such as congestion relief, greenhouse gas reductions, safety, system preservation, access to opportunity, sustainable development and freight, reduced SOV reliance, multi-modal benefits, and others. At a minimum, projects must be identified by year and proposed funding source.

Website: http://www.spcregion.org/trans_tip_cmaq.shtml

Contact:

Congestion Mitigation and Air Quality Chuck Imbrogno
Southwestern Pennsylvania Commission
Imbrogno@spcregion.org
412--391--5590 ext. 319

Highway Safety Improvement Program (HSIP)

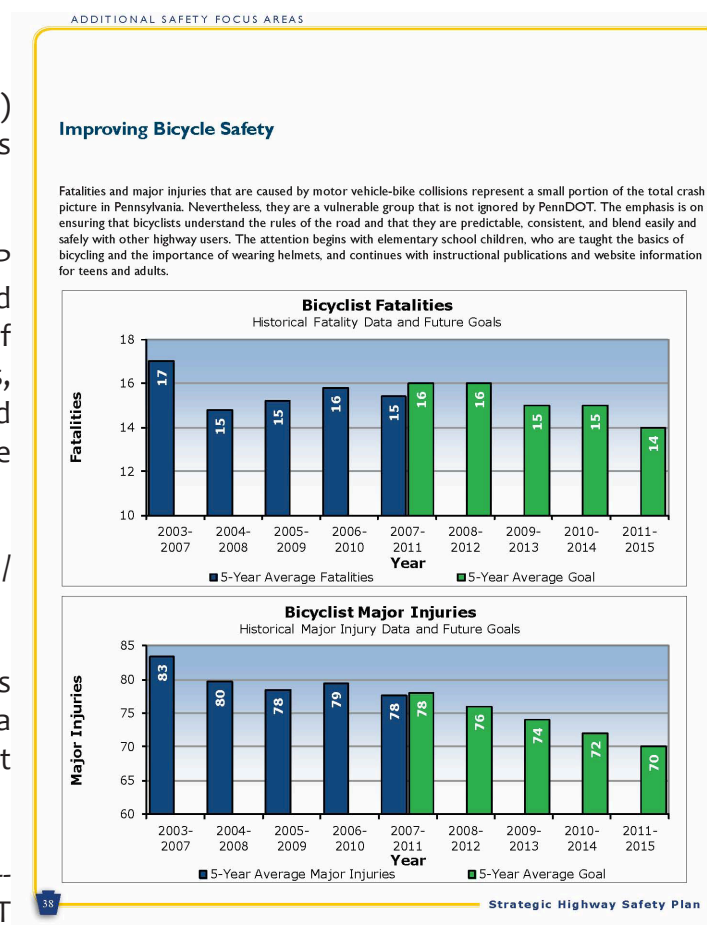
The Highway Safety Improvement Program (HSIP) funds safety projects aimed at reducing traffic fatalities and serious injuries.

Bike and pedestrian safety projects are eligible for HSIP funding. All public roads – including state, county and local roads – are eligible for HSIP funding. Examples of eligible projects include bike lanes, roadway shoulders, crosswalks, other intersection improvements and signage. See the Advocacy Advance report on HSIP case studies:

http://www.advocacyadvance.org/site_images/content/hsip_casestudies_shsp_emphasis.pdf

Improving pedestrian safety was one of Pennsylvania's "Vital Six" Safety Focus Areas in the 2006 Pennsylvania Comprehensive Strategic Highway Safety Improvement Plan.

1. Implement safe---crossing designs for mid---block crossings (responsible parties, PENNDOT --- Districts; Municipalities)
2. Continue to deploy yield---to pedestrian channelizing devices to communities across the commonwealth and measure their effectiveness. (responsible parties, PENNDOT --- Districts, local Police, Municipalities (school districts), State Agencies)
3. Continue to improve pedestrian safety in Transportation Enhancements (TE), Hometown Streets (HS) and Safe Routes to Schools (SR2S) programs (responsible parties, PENNDOT --- Districts;



Municipalities, MPOs, RPOs)

4. Continue to provide education, outreach, and training to motivate a change in specific behaviors that can lead to fewer pedestrian injuries (responsible parties, PENNDOT --- Districts, Municipalities, LTAP, Grantees)
5. Continue to improve signal hardware for pedestrians (pedestrian signals and timing, accessible pedestrian signals, right turn on red restrictions, pedestrian countdown signals) (responsible parties, PENNDOT --- Districts, Municipalities)
6. Promote legislation to establish a Universal Pedestrian Access component to all projects (responsible party, PA State Legislature) In addition to the “vital six” safety goals identified above, the 2006 PA Coordinated Safety Plan also calls for advancement of safety initiatives in fourteen additional goal areas.

All of the strategies to promote bicycle safety on Pennsylvania Highways relate in some way to the education of bicyclists, or the promotion of safer operation of bicycles:

1. Increase public awareness through expanded public education and marketing campaigns
2. Educate community professionals on effective ways to promote safe bicycling
3. Expand school and community programs that teach bicycle safety to children and adult bicyclists
4. Include safe bicycling and sharing the road concepts in driver’s education programs
5. Continue to create tools that can be used at the state and local levels to promote bicycle--- helmet use
6. Continue to assist communities in enforcing bicycle safety laws.

The 2010 Pennsylvania Highway Safety Plan identifies seven priority safety initiatives, but does not include pedestrian safety among them. However, reducing pedestrian fatalities related to motor vehicle crashes remains a Core Performance Measure.

Selection Criteria

The allocation of HSIP funds is the responsibility of the three PennDOT Districts in the region, in accordance with the goals, strategies and performance measures identified in the PA Highway Safety

The project selection criteria are “set” by the goals, strategies and core performance measures of the A Highway Safety Plan. The reduction of the most severe accidents, and those resulting the gravest injury (or fatality) are prioritized.

Section 402 – State and Community Highway Safety Grants

Section 402, the State and Community Highway Safety Grant Program, is a federal program that provides funds for education, enforcement and research programs designed to reduce traffic crashes, deaths, injuries, and property damage.

Under Section 402, bike and pedestrian safety programs are eligible to receive funding for projects such as these:

- Comprehensive school---based pedestrian and bike safety education programs

- Helmet distribution programs
- Pedestrian safety programs for older adults
- Training in use of pedestrian and bicycle design guidelines
- Community information and education programs
- Public information in May, such as “Bike Safety Month”, and in September, “Back to School Safety Month.”
- Public information for school zone and crosswalk safety
- Public information about older adults and impaired pedestrian

Administrator

PennDOT, with applications being made to NHTSA. In the application deadline is typically in September.

There is difficulty in accounting for pedestrian, and especially bicycle, accidents and fatalities at the state level. There are more than 1300 local law enforcement agencies in Pennsylvania. They do not have automated accident reporting systems and bicycle accidents are not treated or recorded in a unique way. They get classed with all other incidents. In Pennsylvania, accidents are considered “reportable” only if a) an operator or occupant is removed from the scene by ambulance; or b) a vehicle involved in the accident requires towing. With a large number of local law enforcement agencies, and no automated system of checking for pedestrian or bicycle incidents, there is no reliable system to track accident data for pedestrians and bicycles.

Contact

Highway Safety Improvement Program
Doug Smith
Southwestern Pennsylvania Commission
Dsmith@spcregion.org
412-319-5590 ext. 327

People For Bikes Community Grant Program

The People For Bikes Community Grant Program supports bicycle infrastructure projects and targeted advocacy initiatives that make it easier and safer for people of all ages and abilities to ride. Please review the following information carefully before submitting a grant application. Proposals that are incomplete or do not fall within our funding priority areas will not be considered. Visit our Grants Awarded database for examples of funded projects.

Who Can Apply

PeopleForBikes accepts grant applications from non-profit organizations with a focus on bicycling, active transportation, or community development, from city or county agencies or departments, and from state or federal agencies working locally. PeopleForBikes only funds projects in the United States. Requests must support a specific project or program; we do not grant funds for general operating costs.

What Can Be Funded

PeopleForBikes focuses most grant funds on bicycle infrastructure projects such as:

- Bike paths, lanes, trails, and bridges
- Mountain bike facilities
- Bike parks and pump tracks
- BMX facilities
- End-of-trip facilities such as bike racks, bike parking, and bike storage

Some advocacy projects are also funded, such as:

- Programs that transform city streets, such as Ciclovías or Open Streets Days
- Initiatives designed to increase ridership or the investment in bicycle infrastructure
- PeopleForBikes will fund engineering and design work, construction costs including materials, labor, and equipment rental, and reasonable volunteer support costs. For advocacy projects, we will fund staffing that is directly related to accomplishing the goals of the initiative.

PeopleForBikes accepts requests for funding of up to \$10,000. We do not require a specific percentage match, but we do look at leverage and funding partnerships very carefully. We will not consider grant requests in which our funding would amount to 50% or more of the project budget.

People For Bikes does not fund:

- Feasibility studies, master plans, policy documents, or litigation
- Signs, maps, and travel
- Trailheads, information kiosks, benches, and restroom facilities
- Parking lots for motorized vehicles
- Bicycles, helmets, tools, and other accessories or equipment
- Events, races, clinics/classes, or bicycle rodeos
- Bike recycling, repair, or earn-a-bike programs
- Education programs
- General operating costs
- Staff salaries, except where used to support a specific advocacy initiative
- Rides and event sponsorships
- Planning and retreats
- Projects in which PeopleForBikes is the sole or primary funder
- Projects outside the U.S.

Schedules and Deadlines

PeopleForBikes generally holds 1-2 open grant cycles every year. In an effort to green our grants process, we have moved to an online grant application system. Please see the Apply Now page for more information on the application process.

Fall 2017 Grant Cycle

Online application opens June 12, 2017
Online Letter of Interest due July 21, 2017
Notification of LOI status September 1, 2017
Full Applications due: October 13, 2017
Grant award notifications: by December 1, 2017

Evaluation Process

All Letter of Interest and Full Application submissions will receive a confirmation email acknowledging receipt. If you have not received a confirmation email within two business days of submitting your application, please contact the Grant Manager.

The PeopleForBike (PFB) Community Grant Program application has two parts:

1. **Letter of Interest:** Interested applicants should submit an online letter of interest (LOI) through the PFB website. LOIs will include basic information about the applying organization and contact person, as well as an overview of the project proposed for funding.
2. **Full Application:** PFB will request a full project application from a short list of qualified applicants. Invited organizations will receive access to the online application.

3. Please note that the PeopleForBikes application and review process is fairly competitive and we are only able to fund 10-15% of the proposals we receive.

Evaluation Criteria

- Project quality - project scope, applicant's ability to complete project successfully, resources available, alignment between community need and project response, thoughtfulness in location and purpose
- Benefits to the community - population(s) reached, reason and methods for picking this project at this time, potential to increase ridership
- Measurement and evaluation - measurement methodology, applicant's ability to conduct measurement
- Community support and partnerships - reasons for project prioritization, capacity to make the project a success, community, business, and leadership engagement
- Role of PeopleForBikes funding - ability of our funds to make a difference, match or leverage of PFB funds
- Diversity - geographic, project type, size of community

Reporting Requirements

PeopleForBikes requests that all grant recipients keep us updated on the progress of their projects. Articles, photos, or other information is always welcome; additionally, we would like a brief letter or email every six months that includes:

- An update on the current status of your project
- An overview of upcoming project components or efforts
- A list of partners or supporters participating in your project

A final report upon completion of your project is required. The final report should be three pages or less and include the following:

- Outcome: what did your project build, improve, develop or accomplish?
- Who participated: identify volunteers, supporters, businesses, other groups who helped make your project a reality, including any political support received

- Benefits to the community, including economic impact if information is available
- Impact on ridership
- Keys to success and lessons learned: help us help others with what worked and what did not
- Summary of media coverage
- How PeopleForBikes support was recognized

Reapplying for Support

If your proposal is denied, it is not likely to be funded in a future cycle. Please do not resubmit a rejected proposal unless asked to do so.

PeopleForBikes does not consider additional funding requests from grantees for at least three years from the time of the original grant. This policy is designed to promote geographic and project diversity among our grant recipients.

Contact

Zoe Kircos

Director of Grants and Partnerships

303-449-4893 x106

zoe@peopleforbikes.org

Lowes Toolbox for Education Grants

Now in its 11th year of helping build better schools and communities, the Lowe's Toolbox for Education program has provided over \$49 million to more than 11,000 schools across the country. Lowe's will donate up to \$5 million to K-12 public/charter schools and to parent teacher groups - at as many as 1,000 different public schools per school year. Raise up to \$5,000 for your school.

Eligibility

Any individual public/charter K-12 school or non-profit parent group associated with that public/charter K-12 school. Parent groups that are applying (PTO, PTA, etc.) must have an independent EIN and official 501c(3) status from the IRS.

How do I submit an application for my school or parent group?

Applications are submitted online via this website. In order to submit an application your school must be registered in our database.

Project Funding

There is a preference for funding requests that have a permanent impact such as facility enhancement (both indoor and outdoor) as well as landscaping/clean up type projects. Projects that encourage parent involvement and build stronger community spirit will be favored.

Grant Amount

Between \$2,000 and \$5,000 per school is available. Larger grants, typically range from \$5,000 to \$25,000, are available through the The Lowe's Charitable and Educational Foundation.

Application Deadlines

There are typically two Lowe's Toolbox for Education grant cycles in a school year. The fall 2016 deadline is 11:59pm EST on September 26, 2016. The spring 2017 deadline has not yet been announced. Lowe's reserves the right to close the application process if 1500 applications are received.

Contact Information

Lowe's Toolbox for Education

c/o PTO Today

100 Stonewall Boulevard, Suite 3

<http://www.toolboxforeducation.com/>

APPENDIX A

SAMPLE NATURAL RESOURCE PROTECTION ORDINANCE

Sample Natural Resource Protection Ordinance

Adapted from: Pocopson Township, Chester County, Ordinance 250-87

250-87. Conservation of natural features.

[Amended 3-4-2002 by Ord. No. 1-2002; 5-14-2007 by Ord. No. 3-2007]

- A. Purpose. The following natural resource conservation standards are established to protect the public health, safety, and welfare by minimizing adverse environmental impacts. These standards are intended to meet the following purposes:
- - (1) Define and delineate selected natural resources within the Township and establish resource conservation standards to assist the Township in reducing the impact proposed uses will have on the environment.
 - (2) Conserve valuable natural resources within the Township in accordance with the Pocopson Township Comprehensive Plan (2001) and the Pocopson Township Parks, Recreation, and Open Space Plan (1993).
 - (3) Conserve and protect natural resources within the Township and the Kennett Area Region in accordance with the following policies of the Kennett Area Region Comprehensive Plan (2000), as amended:
 - - a. Preserve and protect areas which are naturally unsuitable for development or which provide valuable wildlife habitat, including stream valleys, riparian zones, steep slopes, floodplains, woodlands, wetlands, and seasonal high water table soils.
 - b. Continue to preserve sensitive natural areas and wildlife habitats from development by strengthening natural resource conservation standards contained in each municipality's Zoning and Subdivision and Land Development Ordinances.
 - c. Protect regional watersheds and the quality of groundwater and streams within the region, and pursue measures to maintain and, where possible, improve water quality.
- B. General applicability of conservation standards.
- - (1) In the event that the provisions of this section and any other provisions of the Township Code are in conflict, the more restrictive provisions shall apply.
 - (2) In the event that two or more natural resource areas identified in this section occur on the same lot or tract, disturbance limitations shall be measured separately. Where such resource areas overlap, the most restrictive standard (the least amount of permitted alteration, regrading, clearing, or building) shall apply to the area of overlap.
 - (3) It shall be a violation of this chapter to regrade, fill, pipe, divert, channel, build upon, or otherwise alter or disturb a natural resource protected by this section prior to the submission, review, and approval of any applicable application for zoning or building permit(s), conditional use or special exception approval, zoning variance, or subdivision or land development plan(s).
 - (4) Limitations to the disturbance of resources shall apply before, during, and after construction on a site.
 - (5) Disturbance limitations, established as a maximum percentage of permitted disturbance, shall be applied concurrently as a percentage of each applicable resource area to the extent that it is present on the entirety of any tract or any lot and as a percentage of the area within each discrete resource area measuring one acre or more. A "discrete resource area" is the entirety of any single contiguous area comprising any one resource regulated by the provisions of this Section. Any area of resource overlap shall be measured as part of the contiguous resource area with the most restrictive disturbance limitation. For example, if disturbance of 25% of a particular resource area is permitted, then it shall apply as 25% of the total area of that resource on the applicable lot or tract. In addition, the twenty-five-percent limitation shall apply individually to each discrete

resource area measuring one acre or more, regardless of whether, collectively, such areas comprise 25% of all areas of such resource on the applicable lot or tract.

- (6) Disturbance limitations shall be applied based on the occurrence of identified resource areas at the time of adoption of this section. Disturbance permitted over time in multiple applications on the same lot or tract shall be measured against the same overall limitations established at the time of the first application after the adoption of this section. For example, if applicable disturbance limitations for a particular resource permit two acres of disturbance, and one acre of disturbance is permitted upon the first application after the adoption of this section, then only one acre shall remain to be permitted for future disturbance of the applicable resource regardless of the total number of applications over the years.
- (7) Information submitted to demonstrate compliance with this section shall be verified as correct by the Township Engineer or other qualified professional as determined by the Township.
- (8) Regulations and disturbance limits for each specific resource area set forth below shall be complied with as applicable. The following summary table is provided as an overview of disturbance limitations. In certain cases as provided herein, exceptions or modifications may apply.

Resource Area	Maximum Disturbance
Floodplain Conservation District	0%
Very steep slopes	10%
Moderately steep slopes	25%
Steep slope margins	25%
Wetlands	0%
Zone One: Inner Riparian Buffer	0%
Zone Two: Outer Riparian Buffer	15%
Seasonal high water table soils	20%
Heritage trees	0%
Rare species sites	0%
Exceptional natural areas	10%
Forest interior habitat	10%
Class I woodlands located on very steep slopes	5%
Class I woodlands outside very steep slopes	15%
Class II woodlands	15%
Class III woodlands in greenway corridors	15%
Class III woodlands outside greenway corridors	25%

C. Floodplain conservation. Areas identified as being within the boundaries of the Floodplain Conservation District shall not be regraded, filled, built upon, channeled, or otherwise altered or disturbed except in conformance with Article VI of this chapter.

D. Steep slope conservation.

- (1) Steep slope areas shall be preserved in their natural state whenever possible. Where construction of roads, buildings, driveways, or infrastructure cannot be avoided, disturbance shall be kept to the minimum necessary and in no case shall it exceed the following permitted disturbance limits:
 - (a) Moderately steep slopes. No more than 25% of moderately steep slopes shall be regraded, cleared, built upon, or otherwise altered or disturbed.
 - (b) Steep slope margins. No more than 25% of steep slope margins shall be regraded, cleared, built upon, or otherwise altered or disturbed.
 - (c) Very steep slopes. No more than 10% of very steep slopes shall be regraded, cleared, built upon, or otherwise altered or disturbed. In addition, disturbance permitted on very steep slopes shall be limited to the following activities:
 - [1] Timber harvesting, when conducted in compliance with the required timber harvesting plan. Clearcutting or grubbing of trees is prohibited on very steep slopes.
 - [2] Grading for the minimum portion of a driveway necessary for access to the principal use and sewer, water, and other utility lines when it can be demonstrated to the satisfaction of the Township that no other routing is practicable, but excluding sewage disposal systems.
 - [3] Hiking and riding trail(s) of minimum adequate width(s), where developed so as to minimize potential erosion, follow existing topographic contours to the greatest degree practicable and, where using unpaved surfaces, to the maximum practicable extent.
- (2) All permitted buildings or structures shall be constructed in such a manner as to provide for the least alteration necessary of the existing grade, vegetation, and natural soils condition.
- (3) A grading plan shall be provided identifying the existing contours of the site, proposed finished grades, and the proposed location of all buildings and structures. Locations for all stockpiled earth, stone, and other materials shall be shown on the plan and shall not be located within the dripline of any trees intended to remain post permitted disturbance.
- (4) Excessive cut and fill shall be avoided. New roads and improvements to existing roads should be designed within the existing contours of the land to the extent possible and strive for compatibility with the character of rural roads.
- (5) Finished slopes of permitted cut and fill shall not exceed thirty-three-percent slope unless the applicant can demonstrate the method by which steeper slopes will be stabilized and maintained adequately.
- (6) Any stockpile(s) of earth intended to be stored for more than 21 days shall be seeded or otherwise stabilized to the satisfaction of the Township Engineer. Any disturbed areas of very steep slope and any cut and fill resulting in slopes of greater than 20% shall be protected with an erosion control blanket.
- (7) Any disturbance of land shall be in compliance with the erosion and sedimentation control standards of Chapter 190, Subdivision and Land Development, and PADEP Title 25, Chapter 102. All applicants shall refer to the PADEP Erosion and Sediment Pollution Control Program Manual dated March 2000, or latest edition, for applicable erosion and sediment control standards. Where applicable, in the context of any application before the Township, any applicant shall permit inspection of erosion and sedimentation controls by designated personnel of both the Township and the Chester County Conservation District.
 - (a) An erosion and sedimentation control plan and soil stabilization plan shall be submitted consistent with the requirements of Chapter 190, Subdivision and Land Development.

(b) The plan shall demonstrate how soil will be protected from erosion during construction and how soil will be stabilized upon the completion of construction.

(8) Where the following information has not been previously submitted as part of a subdivision or land development plan application, such information shall be submitted to the Township with building permit, conditional use, special exception, or zoning applications, when applicable:

(a) The adequacy of access to the site for emergency vehicles shall be subject to review by the Fire Marshal or his designee. The necessary information shall be submitted by the applicant to the Fire Marshal or his designee for his review.

(b) Grading plan and erosion and sedimentation control plans.

E. Wetlands conservation.

(1) Wetlands shall not be regraded, filled, piped, diverted, channeled, built upon, or otherwise altered or disturbed, including for purposes of access or utility crossings, except where all applicable permits have been obtained and copy thereof submitted to the Township.

(2) Any applicant proposing a use, activity, or improvement which would entail the regrading or placement of fill in wetlands shall provide the Township with proof that the Pennsylvania Department of Environmental Protection (Bureau of Dams and Waterway Safety and Bureau of Water Quality Management) and the U.S. Army Corps of Engineers have been contacted to determine the applicability of state and federal wetland regulations. Any applicant contacted by the Pennsylvania Department of Environmental Protection or the U.S. Army Corps of Engineers in regard to wetlands also shall concurrently provide to the Township a copy of such correspondence.

(3) Where permitted subject to applicable regulation and as otherwise provided herein, sewers or other liquid transport pipelines shall only be permitted to cross wetlands on the minimum traversal distance and where every precaution shall be taken to prevent leaks and to prevent any possible draining of the wetland (e.g., water flowing through or along any pipe or trench). At the expense of the applicant, the Township may require inspection of applicable systems and facilities, including but not limited to x-ray of steel welds and pressure testing of pipelines.

(4) Where wetland disturbance is permitted subject to applicable regulation on any lot or tract, no more than 10% nor more than one acre of any wetland area, whichever is less, shall be disturbed for any purpose. To the maximum extent feasible, any disturbance to or loss of natural wetlands shall be mitigated at the rate of three times the lost or disturbed wetland area in a manner approved by the Township. Mitigation may include creation of wetlands which shall be hydrologically fed with stormwater discharged from an approved stormwater management facility. Created wetlands may be located at a site approved by the Township for such mitigation, whether on or off the property that contains the wetland subject to disturbance. Where approved by the Township, some or a portion of any required wetlands mitigation, in lieu of wetland creation, may be accounted for through permanent conservation of other existing unprotected wetlands or by restoration of former wetlands (e.g., through removal of tilefields or other drainage facilities) by means satisfactory to the Township.

(5) Where required to comply with state or federal regulation, any applicant also shall provide the Township with a full wetland delineation report conducted by a qualified wetland biologist, soil scientist, or environmental professional of demonstrated qualifications, subject to the following:

(a) Where there is any question as to the accuracy of the wetland delineation report, the Township may hire a qualified consultant to review the delineation and recommend revisions at the applicant's expense.

(b) Such a professional shall certify that the methods used correctly reflect the currently accepted technical concepts, including identification and analysis of wetland vegetation, hydric soils, and hydrologic indicators. Methods used in the delineation report shall be acceptable to the Township Engineer or other qualified consultant hired by the Township.

- (c) The wetland report submitted to the Township shall include a determination of whether wetlands are present on the site and a full delineation, area measurement (in square feet), and description of any wetlands determined to be present.

F. Watercourse and riparian buffer protection standards.

- (1) Zone One: Inner Riparian Buffer. With the exception of those uses or activities listed below, no land disturbance shall be permitted within the Zone One riparian buffer:
 - (a) Regulated activities permitted by the commonwealth (i.e., permitted stream or wetland crossing).
 - (b) Provision for trail and trail access where approved by the Township with minimum disturbance to existing woodland vegetation.
 - (c) Selective removal of hazardous or invasive vegetation; or
 - (d) Vegetation management in accordance with an approved landscape plan or open space management plan.
- (2) Zone Two: Outer Riparian Buffer. Except for the following activities, no more than 15% of a Zone Two riparian buffer shall be regraded, filled, built upon, or otherwise altered or disturbed:
 - (a) Activities permitted in the Zone One riparian buffer.
 - (b) Timber harvesting, when conducted in compliance with a timber harvesting plan approved by the Township. Clearcutting of timber shall not be permitted within the riparian buffer.

G. Conservation of seasonal high water table soils.

- (1) With the exception of those uses or activities listed below, and where not otherwise regulated more restrictively under the provisions of this chapter, no more than 20% of any seasonal high water table soil shall be regraded, filled, built upon, or otherwise altered or disturbed:
 - (a) Regulated activities permitted by the commonwealth (i.e., permitted stream or wetland crossing);
 - (b) Provision for trail and trail access where approved by the Township;
 - (c) Selective removal of hazardous or invasive vegetation; or
 - (d) Vegetation management in accordance with an approved landscape plan or open space management plan.
- (2) Notwithstanding the twenty-percent disturbance limitation set forth above, the following regulations shall apply to seasonal high water table soils:
 - (a) No structures for human use or habitation or for regular animal occupancy shall be constructed in any area of soil where the seasonal high water table is within one foot of the surface;
 - (b) No subsurface sewage system shall be constructed within any area of seasonal high water table soil.
 - (c) No road, driveway, or emergency access shall cross any area of seasonal high water table soil except where providing necessary access which clearly is otherwise impracticable and only where drainage, adequate base preparation, and paving approved by the Township Engineer shall be provided.

H. Heritage trees.

- (1) No heritage trees shall be removed from any lot or tract except where undertaken in accordance with an approved timber harvesting plan or where the applicant demonstrates to the satisfaction of the Township that such removal is essential to eliminate hazardous condition(s). In consideration of any need for tree removal, the Township may engage the services of an arborist, reasonable costs therefor to be borne by the applicant.
- (2) To the minimum extent necessary to permit retention of heritage trees while providing for lawful use, modification to otherwise applicable area and bulk requirements may be approved in the following situations:

- (a) Where approved by the Board of Supervisors as part of any applicable subdivision or land development application; or
- (b) Where approved by the Zoning Officer upon approval of any applicable building permit; and
- (c) Provided that no applicable yard area setback shall be reduced more than 50% except where approved as a variance by the Zoning Hearing Board.

- (3) Where any applicant for building, zoning, subdivision or land development approval establishes conservation restrictions acceptable to the Township which shall result in the conservation of heritage trees, all such heritage trees to be retained shall be credited toward any tree replacement required under § 250-87K(5) below, at the ratio of four trees credited for each heritage tree retained.

I. Rare species sites.

- (1) With the exception of selective removal of hazardous or invasive vegetation, no rare species site shall be regraded, filled, built upon, or otherwise altered or disturbed.
- (2) A buffer area with a minimum dimension of 25 feet shall be provided around the entire perimeter of any rare species site within which no land disturbance shall be permitted.
- (3) To the minimum extent necessary to avoid disturbance to rare species site(s) or to provide for required buffer(s), while providing for lawful use, modification to otherwise applicable area and bulk requirements may be approved in the following situations:
 - (a) Where approved by the Board of Supervisors as part of any applicable subdivision or land development application; or
 - (b) Where approved by the Zoning Officer upon approval of any applicable building permit; and
 - (c) Provided that no applicable yard area setback shall be reduced more than 50% except where approved as a variance by the Zoning Hearing Board.

J. Exceptional natural areas.

- (1) With the exception of those uses or activities listed below, and where not otherwise regulated more restrictively under the provisions of this chapter, no more than 10% of any exceptional natural area, where not otherwise classified as woodland, shall be regraded, filled, built upon, or otherwise altered or disturbed:
 - (a) Regulated activities permitted by the commonwealth (i.e., permitted stream or wetland crossing);
 - (b) Provision for trails;
 - (c) Selective removal of hazardous or invasive vegetation; or
 - (d) Vegetation management in accordance with an approved landscape plan or open space management plan.
- (2) Exceptional natural areas which are classified as woodland on the Woodland Classification Map shall be regulated as provided in § 250-87K, without further limitation under this subsection.

K. Woodlands and hedgerows.

- (1) Disturbance limitations for woodlands and hedgerows. Notwithstanding the provisions of this section, selective harvesting of timber shall be permitted where undertaken in compliance with the provisions set forth in § 250-87K(10) below. Clearcutting of any woodland area shall be prohibited except to the minimum extent necessary to permit the implementation of an approved land development or building permit in conformance with this section. Except for an approved timber harvesting operation, all woodland disturbance shall be subject to the following total disturbance limitations:

- (a) Permitted woodland disturbance on any lot or tract shall not exceed 5% of any area designated Class I woodland on the Pocopson Township Woodland Classification Map,^[1] where such woodland is coextensive with any area of very steep slope.
[1]: Editor's Note: The Woodland Classification Map is on file in the Township offices.
 - (b) Except where § 250-87K(1)(a) applies, permitted woodland disturbance on any lot or tract shall not exceed 15% of any area designated Class I or Class II woodland on the Pocopson Township Woodland Classification Map, nor any woodland within a designated greenway corridor.
 - (c) Outside of areas designated as greenway corridors, permitted woodland disturbance on any lot or tract shall not exceed 25% of any Class III woodland.
 - (d) Permitted woodland disturbance on any lot or tract shall not exceed 10% of any area designated as «forest interior habitat» on the Pocopson Township Woodland Classification Map.^[2]
[2]: Editor's Note: The Woodland Classification Map is on file in the Township offices.
 - (e) Disturbance limitations shall be measured based on the extent of the subject woodland classification at the time of first submission of applicable application(s) after the adoption of this section and shall be indicated on applicable plan(s). The extent of any area of woodland disturbance shall be measured to include the entire area within the dripline of any tree where any part of the area within the dripline of said tree is subject to woodland disturbance. Any disturbance limitation shall run with the land, once established. Subsequent applications shall be subject to the initial determination of disturbance limitations, regardless of intervening disturbance which may have occurred. If, at any time within three years prior to an applicable application, there had existed a greater extent of woodland, such greater area shall be utilized to calculate the extent of woodland disturbance and the limitations set forth herein.
- (2) Woodland replacement. Where permitted, any woodland disturbance exceeding any of the following standards shall require provision for vegetation replacement as set forth in § 250-87K(5) below. Each of the following standards shall be applied independently, and the corresponding replacement requirements shall be cumulative.
- (a) Any woodland disturbance in any of the following areas:
 - [1] Any area designated as Class I or Class II woodland on the Pocopson Township Woodland Classification Map.
[3]: Editor's Note: The Woodland Classification Map is one file in the Township offices.
 - [2] Any area designated as a greenway corridor.
 - [3] Any area within the drip line of any Heritage Tree.
 - [4] Any area within any riparian buffer.
 - (b) Woodland disturbance in excess of 10,000 square feet of existing area of Class III woodland or hedgerow(s) for each principal use permitted on any lot or tract. As an example, where two principal uses are permitted, woodland disturbance may involve up to 20,000 square feet (10,000 x 2) before replacement is required, except as otherwise provided herein.
- (3) In determining where necessary woodland disturbance shall occur in the context of any subdivision or land development, the applicant shall consider the following:
- (a) The location(s) and benefit of conservation of healthy mature woodland stands.
 - (b) The impacts, in terms of functions and values to wildlife, of separating, dividing and/or encroaching on wildlife travel corridors and/or extensive habitat areas. Such impacts must be explicitly assessed in any area designated as one or more of the following:
 - [1] Greenway corridor.
 - [2] Forest interior habitat.

- [3] Rare species site(s).
- [4] Exceptional natural areas.
- [5] Riparian buffers.
- [6] Class I or Class II woodlands.

(4) In areas of permitted woodland disturbance and areas adjacent to permitted woodland disturbance, remaining trees shall be protected from damage. The following procedures shall be utilized during construction in order to protect remaining trees:

- (a) Where existing trees are to remain, no change in existing grade shall be permitted within the dripline of the trees. Appropriate fencing four feet in height shall be placed at the dripline of trees to remain, wherever adjacent to proposed construction. Such fencing shall be maintained in place throughout the duration of construction activity. Roots shall not be cut within the dripline of any trees to remain.
- (b) Trees within 25 feet of a building, or bordering entrances or exits to building sites, shall be protected by a temporary harrier to be maintained in place throughout the duration of construction activity.
- (c) No boards or other material shall be nailed or otherwise attached to trees during construction.
- (d) Construction materials, equipment, soil and/or debris shall not be stored nor disposed of within the driplines of trees to remain.
- (e) Tree trunks, limbs, and exposed roots damaged during construction shall be protected from further damage by being treated immediately in accordance with accepted professional landscape procedures.

(5) Calculation of required vegetation replacement. Where woodland disturbance exceeds any of the standards set forth in § 250-87K(2) above, applied independently and cumulatively, replacement plantings shall be installed in accordance with the standards set forth below. A sample list of acceptable replacement plantings is found in § 250-87N.

(a) Required replacement trees shall be determined using the calculation set forth below which results in the greatest number of replacement trees:

- [1] Replacement tree calculation based on area of woodland disturbance. At a minimum, for each 500 square feet of woodland disturbance area, or fraction thereof, in excess of the applicable standard set forth in § 250-87K(2) and regardless of the character and sizes of the disturbed vegetation, one tree at least two inches to 2 1/2 inches caliper shall be planted.
- [2] Replacement tree calculation based on specific tree removal. Regardless of any disturbance allowances, for each tree greater than 12 inches dbh to be removed, required replacement trees also shall be calculated in accordance with the following schedule. For purposes of this section, it shall be assumed that any tree greater than 12 inches dbh shall be removed if located within 25 feet of any proposed land disturbance.

For Each Tree to Be Removed (inches dbh)	Minimum Number and Caliper of Replacement Trees (inches)
One, 12 to 18	Two 2 to 2 1/2
One, 18 to 24	Three 2 to 2 1/2
One, 24 to 36	Four 2 to 2 1/2
One, greater than 36	Six 2 to 2 1/2

(b) Required replacement shrubs. At a minimum, for each 100 square feet of woodland disturbance area,

- or fraction thereof, in excess of the applicable standard set forth in § 250-87K(2) and regardless of the character and sizes of the disturbed vegetation, one shrub at least 24 inches to 30 inches in height shall be planted in addition to any required tree replacement. Shrubs planted in accordance with this requirement may be of restoration quality and not necessarily landscaping quality.
- (c) Required replacement plantings shall be in addition to any required street trees or any other landscape material required under applicable provisions of this chapter or Chapter 190, Subdivision and Land Development.
 - (d) Where approved by the Township as a condition of any building, zoning, subdivision or land development approval or as a condition of grant of modification under § 250-87M(3), required replacement trees may be substituted for greater numbers of trees of smaller caliper than otherwise required or by vegetation other than trees (e.g., for purposes of reforestation).
 - (e) Where approved by the Township as a condition of any building, zoning, subdivision or land development approval or as a condition of grant of modification under § 250-87M(3), some or all of the required replacement plantings may be installed at a site other than that subject to required replacement planting.
 - (f) In lieu of actual installation of replacement plantings, the Township may permit any applicant to place the equivalent cash value, as agreed upon by the Township and the applicant, for some or all of the required replacement plantings into a special fund established for that purpose. Such fund shall be utilized at the discretion of the Township for the purchase and installation of plantings elsewhere in the Township. Installation of such plantings on private lands shall be dependent upon the establishment of conservation easement(s) or other restriction(s) acceptable to the Township that will reasonably guarantee the permanent protection of such plantings. Where the provisions of this section are otherwise applicable, any grant of approval of modifications requested pursuant to § 250-87M(3) also may be conditioned upon the placement of equivalent cash value for otherwise required replacement plantings into such a fund.
 - (g) The locations, selected species, and sizes of all replacement plantings, along with a planting schedule tied to the timing and/or phasing of the development, shall be indicated on the final subdivision/land development plan(s) or building permit application, as applicable.
- (6) Required replacement vegetation and their measurement shall conform to the standards of the publications «American or U.S.A. Standard for Nursery Stock,» ANSI or USAS Z60.1 of the American Association of Nurserymen, as amended. All plant material used on the site shall have been grown so as to have a high likelihood of survival on the site (e.g., grown specifically for planting in the applicable USDA hardiness zone) and shall be nursery grown, unless it is determined by the Township that the transplanting of trees partially fulfills the requirements of this section.
- (7) Species of replacement plantings selected and planting locations shall reflect careful site evaluation and in particular the following considerations:
- (a) Existing and proposed site conditions and their suitability for the plant materials, based upon the site's geology, hydrology, soils, and microclimate.
 - (b) Specific functional and design objectives of the plantings, which may include but not necessarily be limited to replacement of woodland area removed, enhancement of existing woodland or oldfield area(s), reforestation of riparian buffer areas, mitigation of new woodland edge conditions as a result of land disturbance, provision for landscape buffer, visual screening, noise abatement, energy conservation, wildlife habitats, and aesthetic values.
 - (c) Maintenance considerations such as hardiness, resistance to insects and disease, longevity, and availability.
 - (d) Because of the many benefits of native plants (ease of maintenance, longevity, wildlife habitat, etc.), the use of nursery-grown free-fruited native trees and shrubs is strongly encouraged. Species selection should reflect species diversity characteristic of the native deciduous woodland.
- (8) All replacement plantings shall be guaranteed and maintained in a healthy and/or sound condition for at least 24 months or shall be replaced. In addition, the applicant may be required to escrow sufficient additional funds for

the maintenance and/or replacement of the proposed vegetation during the twenty-four-month replacement period and to provide for the removal and replacement of vegetation damaged during construction, based upon the recommendation of the Township Engineer.

- (9) All applicants shall include, as part of preliminary and final plan submission, where applicable, a plan for the long-term management of any woodland area not subject to woodland disturbance and any area selected for introduction of replacement plantings in accordance with this section. Such plan shall include a statement of woodland management objectives and shall demonstrate to the satisfaction of the Board of Supervisors the feasibility of intended management practices, aiming to ensure the success of stated objectives, including the viability of introduced plantings, deterrence of invasive vegetation, and means to minimize any future woodland disturbance. Applicants are strongly encouraged to seek woodland management assistance from a qualified professional.

(10) Timber harvesting operations.

- (a) Any timber harvesting operation shall be undertaken in accordance with a timber harvesting plan approved by the Township. All timber harvesting plans shall be submitted to the Township for review for compliance with the standards for timber harvesting operations set forth herein not less than 45 days prior to commencement of the timber harvesting operation. Within 30 days of submission to the Township, a timber harvesting plan shall be approved, denied, or approved subject to reasonable conditions and the applicant so notified in writing.

- (b) Any timber harvesting plan submitted to the Township for review and approval shall be consistent with the Timber Harvesting Guidelines of the Pennsylvania Model Forestry Regulations of the Penn State School of Forest Resources, as applicable, and shall include a plan or plans indicating the following information:

- [1] Site location and boundaries of both the entirety of the property upon which the timber harvesting operation shall occur and the specific area proposed for timber harvesting;
- [2] Significant natural features on the property including steep slopes, wetlands, riparian buffer zones, heritage trees, rare species sites, and exceptional natural areas;
- [3] Identification of the classification of the woodland or woodland(s) where the timber harvesting operation is proposed to occur, as indicated on the Pocopson Township Woodland Classification Map[4];
- [4]: Editor's Note: The Woodland Classification Map is on file in the Township offices.
- [4] Identification of areas of forest interior habitat where timber harvesting is proposed to occur;
- [5] Identification of greenway corridors where timber harvesting is proposed to occur, as indicated on the Pocopson Township Greenway Corridors Map[5];
- [5]: Editor's Note: The Greenway Corridors Map is on file in the Township Offices.
- [6] The general location of the proposed operation in relation to municipal and state highways and any proposed accesses to those highways;
- [7] Design, construction, maintenance, and retirement of the access system, including haul roads, skid roads, skid trails, and landings;
- [8] Design, construction, and maintenance of water control measures and structures such as culverts, broad-based dips, filter strips, and water bars;
- [9] Design, construction, and maintenance of proposed stream and wetland crossings; and
- [10] Identification of forest canopy to remain as provided under § 250-87K(10)(f).

- (c) Any permits required by any other agency under any applicable regulation shall be the responsibility of the landowner or timber harvesting operator as applicable. A copy of all required permits shall be submitted to Pocopson Township at least 20 days prior to commencement of the timber harvesting operation.

(d) The following management practices shall apply to all timber harvesting operations:

- [1] Felling and skidding of trees shall be undertaken in a manner which minimizes damage to trees or other vegetation not intended to be harvested (e.g., successive limbing up the tree rather than felling in its entirety).
- [2] Felling or skidding across any public thoroughfare is prohibited without the express written consent of the Township or Penn DOT, whichever is responsible for the maintenance of said thoroughfare.
- [3] No timber loads weighing more than 60,000 pounds shall be permitted on Township roads. The applicant shall review with the Township Roadmaster the condition of any Township road that will be used to transport log loads or that may otherwise be impacted by the timbering operation. The Township shall require the posting of a bond or other approved security of no less than \$50,000 to cover any damage to Township roads.
- [4] Slash, tops or litter resulting from a timber harvesting operation shall either be cut to a height of three feet or less and left on site or chipped and recycled on site. The burning of slash shall be prohibited.
- [5] No tops, slash or litter shall be left within 25 feet of any public thoroughfare or private roadway.
- [6] Litter resulting from a timber harvesting operation shall be removed from the site or otherwise dealt with as approved by the Township (e.g., chipped and recycled on site).
- [7] The operation shall not cause harm to the environment or any other property.

- (e) No timber harvesting operation shall be permitted within any Zone One riparian buffer or any rare species site, nor within 25 feet of any rare species site. No clearcutting of timber shall be permitted within any Zone Two riparian buffer or any exceptional natural area.
- (f) In all woodlands, a minimum percentage of the forest canopy trees shall remain in good condition after the completion of any timber harvesting operation, as set forth in the table below. Remaining forest canopy trees shall be well distributed throughout the area subject to the timber harvesting operation.

**Percentage Forest Canopy Trees to
Remain by Location**

Woodland Class	Zone One	Zone Two	All
	Riparian Buffer	Riparian Buffer	Other
Class III	100%	60%	30%
Class II	100%	70%	40%
Class I	100%	80%	50%
Forest interior habitat or exceptional natural area	100%	90%	60%

- (g) At least 50% of the required remaining forest canopy trees, as provided above, shall be comprised of higher value species. Where the number of trees comprising higher value species that exist prior to the approval of any timber harvesting operation is less than the number which would be required to comply with this provision, no higher value species may be harvested.
- (h) Township representative(s) shall be permitted access to the site of any timber harvesting operation before, during, or after active timber harvesting to review, inspect and ascertain compliance with the provisions set forth herein.
- (i) Upon determination that a timber harvesting operation is in violation of these regulations, each day where any violation occurs shall constitute a separate violation subject to the provisions of this chapter.

L. Greenway corridor conservation.

- (1) Use regulations. Within any designated greenway corridor, a building may be erected, altered, or used and a lot may be used as provided in the underlying base zoning district, except that all uses within a greenway corridor shall be subject to conditional use approval.
- (2) Area and bulk regulations. Within any designated greenway corridor, and subject to conditional use approval, the area and bulk regulations of the underlying base zoning district shall apply.
- (3) Special criteria for development within greenway corridors. Except as otherwise noted herein, the following special criteria are applicable within any designated greenway corridor to any new principal use and to the expansion, alteration, modification, or reconstruction of any existing use or structure for which a building permit is required:
 - (a) Under any development option, on properties subject to subdivision or land development, building locations shall be selected outside of designated greenway corridors where feasible and, where not feasible, shall be located as near to the edge of the designated corridor as practicable, in order to conserve the largest possible breadth and extent of the greenway corridor.
 - (b) The conventional development option shall not be utilized except where approved as a conditional use upon determination by the Board of Supervisors that no other development option is practicable.
 - (c) Open space resulting from subdivision shall be located so as to maximize the degree to which lands within designated greenway corridors shall be so preserved.
 - (d) Where applicable under any development option, the Board of Supervisors may grant conditional use approval subject to modification of any otherwise applicable area, bulk or design standard, where such modification is deemed as promoting the conservation of any designated greenway corridor.
 - (e) Where applicable and where not undertaken voluntarily by the affected landowner(s), as condition(s) of conditional use approval, the Board of Supervisors may require establishment of formal conservation easements and/or public trail easements, in order to permanently secure the benefits of the greenway corridor subject to application.
- (4) Woodlands, riparian buffers and identified natural areas or exceptional natural area within designated greenway corridors shall be preserved to the greatest extent feasible. Where feasible, more than one type of habitat area on a single tract shall be preserved in order to promote maintenance of habitat diversity.
- (5) In the context of an application for approval of a conditional use, subdivision or land development plan, special exception, variance, or building permit, the Township may require reforestation within designated greenway corridors. A landscape plan shall accompany the application and adequately illustrate proposed reforestation plans, including a list of native trees and shrubs to be provided, and defining the long-term management provisions. All plantings shall be established prior to final occupancy permit approval.
- (6) Alteration of natural ridgelines within any designated greenway corridor through grading or earthmoving shall be avoided or, if not feasible, shall be minimized to the greatest extent feasible.

M. Application of natural resource conservation standards.

- (1) Plan information and delineation of natural resources. To ensure compliance with the natural resource conservation standards of this section, the following information shall be submitted by the applicant when applying for a zoning or building permit, conditional use or special exception approval, zoning variance, or subdivision and land development approval where land disturbance is contemplated. In those cases where only a limited amount of the site will be subject to disturbance, the Board of Supervisors may allow a smaller area of land to be shown on the plan, based upon a review and recommendation from either the Zoning Officer or the Township Engineer, where the information submitted will adequately demonstrate compliance with the natural resource conservation standards of this section. Where less than the entire site is to be shown on the plan, the application shall be accompanied by a written explanation from the applicant as to why it is not necessary to include the entire site with the plan information.
 - (a) A site plan which identifies the limits of all natural resources on the site, including areas of woodlands or

- other vegetation to be preserved, and the proposed use of the site, including any existing or proposed structures.
- (b) The limits of all encroachments and disturbances necessary to establish the proposed use on the site, including a grading plan showing existing and proposed contours.
 - (c) Calculations indicating the area of the site comprising each of any regulated natural resources and the area of each of such natural resources that would be disturbed or encroached upon. The calculations shall be shown on submitted plan sheet(s).
 - (d) Deed restrictions, conservation easements, or other mechanisms proposed to ensure continued resource protection where applicable and subject to Township approval.
- (2) Continued protection of identified natural resources. To ensure the continued protection of identified natural resources, the following requirements shall apply:
- (a) Natural resource areas on individual lots.
 - [1] For natural resource areas protected under the terms of this section located on individual lots, deed restrictions, conservation easements, or other permanent mechanisms acceptable to the Township shall be recorded for each lot that has such natural resource areas within its boundaries.
 - [2] The mechanism(s) approved by the Township for permanent protection of natural resources shall clearly state that the maintenance responsibility lies with the individual property owner and shall provide for the continuance of natural resource protection in accordance with the provisions of this chapter.
 - (b) Natural resource areas held in common.
 - [1] For natural resource areas held in common, the provisions of § 250-98, Open space standards, and § 250-99, Homeowners associations, shall apply.
 - [2] The party or organization responsible for the maintenance of any natural resource area(s) shall be clearly identified in applicable deed(s).
 - (c) Changes to approved plans. All applicable plans and deeds shall include the following wording: “Any structures, infrastructure, utilities, sewage disposal systems, or other proposed land disturbance indicated on the approved final plan shall only occur at the locations shown on the plan. Changes to such locations shall be subject to additional review and reapproval in accordance with the provisions of § 250-87, Chapter 250, Zoning, of the Pocopson Township Code.”
- (3) Modifications to natural resource conservation standards.
- (a) For any use or activity subject to subdivision or land development review, as part of applicable plan submission, modification(s) may be requested to the provisions of this § 250-87. Requested modification(s) may be granted at the discretion of the Board of Supervisors pursuant to the provisions of Chapter 190, Subdivision and Land Development.
 - (b) For any use or activity not subject to Subdivision or Land Development review but where the use or activity is subject to application for approval of a conditional use, special exception, or zoning variance, modification(s) to the provisions of this § 250-87 may be requested as part of such application.
 - (c) For any use or activity not otherwise subject to permit or approval as provided in M(3)(a) or (b), modification(s) to the provisions of this § 250-87 may be requested in the form of an application for grant of a special exception by the Zoning Hearing Board. Such applications shall be submitted to the Township Planning Commission for review and comment prior to formal special exception application to the Zoning Hearing Board.
 - (d) In consideration of approval of any request for modification(s) under this § 250-87, it shall be determined that the specific nature of the lawful use or activity, existing site conditions, and/or safety considerations warrant such modification(s) and that the resource protection purposes of this § 250-87 shall be adhered

to, to the maximum extent practicable.

- (4) Agricultural exception to natural resource conservation standards. Disturbance or removal of woodland, hedgerow, or oldfield vegetation may be excepted from the definitions of «land disturbance» and «woodland disturbance,» and from otherwise applicable regulation, for purposes of expanding or continuing agricultural use on an existing agricultural property or on adjacent property into which an existing agricultural operation may be expanded, only in compliance with the following: [Added 12-10-2007 by Ord. No. 10-2007]

- (a) Agricultural operations on the subject property shall be conducted in accordance with a conservation plan filed with and acceptable to the Township and the Chester County Conservation District.
- (b) The landowner intending to disturb or remove woodland, hedgerow, or oldfield vegetation under this exception shall, prior to initiation of such disturbance or removal, submit a signed and dated statement to the Township that, at a minimum, indicates commitment to comply with the following standards; where thereafter any of the following standards are violated, the Township shall notify the affected landowner that the exception has been violated and that the subject lands shall be regulated as if the exception never had been utilized:

- [1] Should the property be proposed for development of more than an average of one dwelling per 20 acres within seven years of the disturbance subject to this exception, the landowner shall be required to replant the disturbed area with a mix of trees and shrubs of sufficient size and number to provide a visual screen and to provide for the re-creation of the preexisting woodland, hedgerow or oldfield conditions to the satisfaction of the Township.
- [2] Should the Chester County Conservation District determine that the conservation plan in effect for the subject property has been repeatedly and/or grossly violated and that such violation(s) have not been corrected in a timely fashion after proper notice by the District or the Township, the landowner shall be required to replant the disturbed area as set forth in Subsection M(4)(b)[1] above.
- [3] This exception shall not apply to disturbance or removal of vegetation within any wetland, exceptional natural area, Zone One Inner Riparian Buffer or on very steep slopes.

- N. Suggested plant list. The following list includes species acceptable for woodland replacement plantings. Examples of species appropriate for use where screening or buffering is desirable or required are indicated with an asterisk (*). Appropriate species for street tree plantings are indicated by the notation «ST.» Specific species selection and planting locations shall reflect careful site evaluation as further set forth herein.

Tree Common Name	Botanical Name of Tree
Evergreen trees	
Eastern red cedar*	Juniperus virginiana
Canadian hemlock	Tsuga canadensis
Red (eastern or yellow) spruce*	Picea rubens
Norway spruce*	Picea abies
Eastern white pine	Pinus strobes
Shade trees	
Red maple, ST	Acer rubrum
Sugar maple, ST	Acer saccharum
White ash, ST	Fraxinus americana
Green ash, ST	Fraxinus pennsylvanica

Tree Common Name	Botanical Name of Tree
Sycamore	Platanus occidentalis
White oak, ST	Quercus alba
Northern red oak, ST	Quercus rubra
Tulip poplar	Liriodendron tulipifera
Scarlet oak, ST	Quercus coccinea
Pin oak, ST	Quercus palustris
Shagbark hickory	Carya ovata
American basswood	Tilia americana
American beech	Fagus grandifolia
Black cherry	Prunus serotina
London plane tree	Platanus acerifolia
Small trees and shrubs	
Rhododendron	Rhododendron sp.
Black chokecherry	Aronia melanocarpa
Shadbush/serviceberry*	Amelanchier canadensis
Redbud	Cercis canadensis
Flowering dogwood*	Cornus florida white
Winterberry	Ilex verticillata
Washington hawthorn*	Crataegus phaemopyrum
New Jersey tea	Ceanothus americanus
Sourwood	Oxydendrum arboreum
Ironwood	Ostrya virginiana
Arrowwood	Viburnum dentatum
Black haw	Viburnum prunifolium
Maple leaf viburnum	Viburnum acerifolium
Mountain laurel	Kalmia latifolia
Highbush blueberry	Vaccinium corybosum
Lowbush blueberry	Vaccinium vacillans
Common juniper	Juniperus communis

APPENDIX B

MODEL RIPARIAN BUFFER

OVERLAY DISTRICT ORDINANCE

Model Riparian Buffer Protection Overlay District

Section 100. Purpose and Intent. The specific purposes and intent of this article are to:

- A. Conserve, protect, and restore natural riparian resources through scientifically supported processes.
- B. Maintain and improve surface water quality by reducing the entry of detrimental substances, including nutrients, sediment, organic matter, pesticides, and other harmful substances that reach watercourses, wetlands, and surface and subsurface water bodies.
- C. Reduce the entry of detrimental substances by restricting development and uses in riparian areas that intercept surface water runoff, wastewater, subsurface flow and deep groundwater flows from upland sources and where the processes of filtration, deposition, absorption, adsorption, plant uptake, sediment and phosphorus attenuation, denitrification and infiltration may occur; encouraging sheet flow and minimizing, mitigating and preventing concentrated flows of storm water runoff across riparian areas, and securing increased channel and bank stabilization that avoids stream bank erosion and associated water quality, quantity and flow harms.
- D. Attenuate flooding and reduce soil loss.
- E. Reduce adverse aquatic health impacts due to changes in the temperature of receiving waters (both temperature increases and temperature decreases) as a result of storm water runoff, loss of vegetative shading and direct discharges to water bodies.
- F. Enhance in-stream processing of nutrients and pollutants such as pesticides and reduce the downstream movement of pollutants.
- G. Improve and maintain the safety, reliability and adequacy of the water supply for domestic, agricultural, commercial, industrial and recreational uses along with sustaining diverse populations of aquatic flora and fauna.
- H. Provide wildlife habitat, protect native plant species, and provide opportunities for passive recreation.
- I. Conserve headwater areas, groundwater recharge zones, floodway, floodplain, springs, seeps, streams, wetlands, woodlands, prime wildlife habitats and other features that provide recreational value or contain natural amenities, whether on developed or undeveloped land.
- J. Integrate with floodplain, steep slope, woodland protection and other ordinance requirements contained herein that regulate environmentally sensitive areas to minimize hazards to life, property and riparian features.
- K. Conserve scenic and recreation areas within and adjacent to riparian areas.

L. Protect the watercourses and wetlands otherwise not regulated or superseded by Section 102 of the Pennsylvania State Code.

M. Regulate the use, siting, engineering and maintenance of all development to be consistent with the purposes and intent of this article and accepted conservation practices and to work with the carrying capacity of existing natural resources.

N. (When applicable) Further the Chesapeake Bay Tributary Strategy goals and objectives by implementing best management practices (BMPs) to address point and non-point pollution sources.

Section 200. Definitions. *(in addition to other definitions typically found within the zoning ordinance)*

APPLICANT – a landowner or developer who has filed an application for subdivision or land development or for any zoning or building permit that will result in land disturbance, including his heirs, successors and assigns or the equitable owner of property with the owner's permission. Applicants must either be the legal or beneficial owner or owners of land subject to the application, including the holder of an option or contract to purchase (whether or not such option or contract is subject to any condition), a lessee if he is authorized under the lease to exercise the rights of the landowner, or other person having a proprietary interest in land.

BANKFULL FLOW OR LEVEL – The discharge that just fills the water channel to the top of its banks and at a point where the water begins to overflow onto a floodplain.

BEST MANAGEMENT PRACTICE (BMP) – A structural or non-structural device designed to temporarily store or treat stormwater runoff in order to mitigate flooding and pollution, and reduce soil loss and water quality degradation caused by runoff containing nutrients, animal wastes, toxins, and sediments.

FORESTED RIPARIAN BUFFER – A riparian buffer that consists predominantly of native trees, shrubs and/or herbaceous plants that provide a minimum of sixty (60) percent uniform canopy coverage.

IMPACTED RIPARIAN BUFFER – A riparian buffer that, as a result of land use or land development activity, contains impervious cover or landscape use or management activity such that it no longer meets the definition of “forested riparian buffer”.

IMPERVIOUS COVER – Those surfaces that do not readily absorb precipitation and surface water. The term includes but is not limited to buildings, parking areas, driveways, roads, sidewalks, swimming pools, and any areas in concrete, asphalt, packed stone, or other equivalent surfaces, including those with a coefficient of runoff of 0.7 or higher. Impervious surfaces also include disturbed soils with a bulk density of ninety-five (95) percent of the value at which plant growth limitation is expected for average plant material.

LAND DISTURBANCE – Any activity that exposes soils, alters topography, and/or alters vegetation.

NORMAL POOL ELEVATION –

- For water bodies which have no structural measures to regulate the height of water, the height of

water at ordinary stages of low water unaffected by drought.

- For structurally regulated water bodies, the elevation of the spillway, outlet control, or dam crest which maintains the water body at a specified height.
- The term does not apply to wetlands.

RIPARIAN – Belonging or related to the bank of a water body, river, stream, wetland, lake, pond, or impoundment.

RIPARIAN BUFFER – A vegetated area, including trees, shrubs, and herbaceous vegetation, adjacent to a water body.

TOP OF BANK – The elevation at which rising waters begin to inundate the floodplain. In case of ambiguous, indefinite, or non-existent floodplain or question regarding the location, the Top of Bank shall be the bankfull water elevation as delineated by a person trained in fluvial geomorphology and utilizing the most recent edition of *Applied River Morphology* by Dave Rosgen, or comparable reference book. “Top of Bank” shall be synonymous with “edge of water.”

WATER BODY – Any natural or manmade pond, lake, wetland, impoundment, or watercourse. This shall not include any pond or facility designed and constructed solely to contain stormwater, or a swimming pool.

WATERCOURSE – Any channel of conveyance of surface water having a defined bed and banks, such as a stream, river, brook, or creek, whether natural or artificial, with perennial, intermittent or seasonal flow. This shall not include any channel or ditch designed and constructed solely to carry stormwater.

WETLAND OR WETLANDS – Those areas inundated or saturated by surface water or groundwater at a frequency and duration sufficient to support, and that under normal circumstances, do support, a prevalence of vegetation typically adapted for life in saturated soil conditions, including swamps, marshes, bogs, ponds, lakes, and similar areas. Wetlands shall include any area so delineated by the National Wetlands Inventory of the U.S. Fish and Wildlife Service and all lands regulated as wetlands by the Pennsylvania Department of Environmental Protection (PADEP) or the U.S. Army Corps of Engineers (ACE). In the event there is a conflict between the definitions of these agencies, the more restrictive definition that defines the wetlands most expansively shall apply.

Section 300. Applicability.

A. The provisions of this article shall apply to any water body as defined herein, except as further clarified in subsection D. below.

B. The provisions of this article shall apply in accordance with subsection A. above where any application for special exception, conditional use, variance, subdivision, land development, or building or zoning permit is required, or when a violation of the provisions of this article require an enforcement action.

C. The provisions of this article shall not apply to the footprints of existing primary and accessory uses, including but not limited to all agricultural uses and research related thereto, buildings, transportation facilities, fences, lawns, gardens, utility lines, roads, driveways, sidewalks, bikeways, decks, piers, water, septic and sewage supply facilities and their related appurtenances (well houses, utility pump and lift stations, manholes, etc.).

D. For lands lying within a PADEP-designated Special Protection Watershed, the riparian buffer requirements of Section 102.14 of Chapter 102 (Erosion and Sedimentation Pollution Control Rules and Regulations) of the Commonwealth of Pennsylvania, shall apply when more restrictive than the regulations provided herein. Pursuant to Section 102.14, earth disturbance activities subject to post-construction stormwater management (PCSM) permits cannot be located within one hundred fifty (150) feet of a watercourse in an exceptional value (EV) or high quality (HQ) watershed. At the time of plan and/or permit approval under this Zoning Ordinance, applicants are responsible for demonstrating compliance with Section 102.14 of Chapter 102, when applicable, including providing copies of all related correspondence and relevant PADEP approvals to the Zoning Officer.

Section 400. Riparian Buffer Delineation. The riparian buffer area shall extend a minimum total width of one hundred (100) feet from the edge of a water body, or shall equal the extent of the 100-year floodplain, whichever is greater.

A. The riparian buffer area will consist of two distinct zones designated as:

1. Zone One: Zone One begins at each edge of a water body and shall extend landward a minimum width of fifty (50) feet, measured horizontally on a line perpendicular to the nearest edge of the water body, as reviewed and approved by the municipal engineer.

- a. Where steep slopes (15% to 25% or more) are located within fifty (50) feet of the edge of a water body, Zone One shall extend the entire distance of this steep sloped area, including any steep sloped area that begins within fifty (50) feet and extends beyond one hundred (100) feet. If the sloped area extends beyond one hundred (100) feet, there will be no requirement for the establishment of Zone Two. If the distance is less than one hundred (100) feet, but greater than fifty (50) feet, the width of Zone Two will be adjusted so that the total riparian buffer width (Zone One and Zone Two) is one hundred (100) feet.

2. Zone Two: Zone Two begins at the outer edge and on each side of any area delineated within Zone One and extends further landward to a minimum total width of one hundred (100) feet including Zone One, and where the floodplain extends greater than one hundred (100) feet from the water body, shall extend to the outer edge of the defined 100-year floodplain.

B. Isolated wetlands and water bodies. Wetlands and water bodies not located along a watercourse, where the wetland or water body is greater than 5,000 square feet in area, shall have a minimum

buffer width consistent with Zone One, as defined above, from the edge of the wetland or water body around the entire perimeter.

C. Buffer increase for impaired water bodies. In the case of a water body that has been listed by PADEP as impaired (see PADEP's "Integrated Water Quality Report, 2012", or if applicable, a later revision thereof, for a listing of impaired water bodies), Zone Two begins at the outer edge of any area delineated within Zone One and extends further landward to a minimum total width of a one hundred fifty (150) feet including Zone One.

D. Applicant to initially delineate. The applicant shall delineate, for the property as a whole, any riparian buffer areas as specified in subsections 400.A through 400.C above on any plan that is submitted for the following approvals:

1. Conditional use, special exception, or variance.
2. Subdivision or land development.
3. Any other improvements that require a zoning or building permit for the activities within the Riparian Buffer Overlay Zoning District.

Section 500. Uses Permitted.

A. The following uses or activities are permitted by right in Zone One:

1. Wildlife sanctuaries, nature preserves, forest preserves, fishing areas, passive areas of public and private parklands.
2. Temporary stream restoration projects, stream bank restoration projects and vegetation restoration projects to restore the stream or riparian zone to an ecologically healthy stage utilizing natural channel design practices to the greatest degree possible. The project duration and timing shall be subject to Zoning Officer approval.
3. Stream crossings for farm vehicles and/or livestock if part of a federal, state, and/or county conservation district and/or local nonprofit riparian buffer improvement project.
4. Provision for stone-dust or natural trail and related trail access when determined by the Zoning Officer to result in minimum disturbance to existing trees and shrubs.
5. Research and monitoring devices, such as staff gages, water recording, water quality testing, cross vanes, weirs and related demonstration facilities.

B. The following uses or activities are permitted by right in Zone Two:

1. Uses or activities permitted in Zone One.
2. Timber harvesting operations, when conducted in compliance with a timber harvesting plan

prepared, submitted, and approved in accordance with Section ____ of the Zoning Ordinance. Clear-cutting of timber, or high-grading of forests, as defined therein, shall not be permitted within the regulated riparian buffer.

3. Any other use or activity permitted in the underlying (base) district, provided that:

- a. no more than twenty (20) percent of Zone Two shall be re-graded, filled, or otherwise altered or subject to land disturbance; and
- b. with the exception of paved trails approved by the Zoning Officer, no new impervious surfaces shall be created as a result of any permitted uses or activities except as permitted in paragraph 500.D, below.

C. The following uses or activities are permitted by Special Exception (or *Conditional Use*, if so desired) approval in Zone One:

1. Structures that, by their nature, cannot be located anywhere except within the riparian buffer. These structures shall include docks, boat launches, public water supply intake structures, facilities for natural water quality treatment and purification and public wastewater treatment plant sewer lines and outfalls. The structures shall provide for the minimum practicable disturbance of the riparian buffer by minimizing size and location and by taking advantage of collocation, if possible.
2. Road crossings (when perpendicular to the stream or buffer), bridges, culverts, utilities, and impoundments.
3. Provision for paved trail and related trail access when determined by the Zoning Hearing Board to result in minimum disturbance to existing trees and shrubs.

D. The following uses or activities are permitted by Special Exception (or *Conditional Use*, if so desired) approval in Zone Two:

1. Uses permitted by Special Exception in Zone One.
2. Stormwater conveyance structures and outfalls.
3. The grazing of livestock or growing of agricultural crops provided existing forested riparian buffers in either zone are not removed or otherwise impacted.
4. Any other use or activity permitted in the underlying (base) district, provided that no more than twenty (20) percent of Zone Two shall be regraded, filled, altered, subject to land disturbance, or covered with impervious surfaces.

E. The following activities or practices are expressly prohibited in Zone One and Zone Two:

1. Removal or disturbance of vegetation in a manner that is inconsistent with erosion and sedimentation control and riparian buffer protection.
2. Storage or discharge of any hazardous or noxious materials, except those used during emergencies for the treatment and/or maintenance of any public sewer and public water treatment facilities (i.e., generator sets or alternative drive units).
3. Use of fertilizers, pesticides, herbicides, and/or other chemicals, except:
 - a. where permitted by a valid conservation plan, forest management plan, or approved planting and maintenance plan (see Section 600.E. below);
 - b. for selective herbicide application by a qualified professional to control noxious weeds and invasive species of plants in riparian buffers.
4. Motor or wheeled vehicle traffic in any area not designed to accommodate adequately the type and volume of vehicular movement.

Section 600. Buffer Restoration and Planting Requirements.

A. All riparian buffer areas shall be continually maintained with a dominant mix of native trees, shrubs, and/or herbaceous plants so as to constitute a forested riparian buffer where not otherwise occupied by any existing use excepted in accordance with Section 300.C., or any authorized use permitted in Section 500.

B. Impacted riparian buffer areas shall be restored by an applicant to a forested riparian buffer, as a condition of approval of any final subdivision plan, final land development plan, or building or zoning permit approval, except as provided in subsection G., through invasive removal and planting of a diverse mix of native tree and shrub species as follows:

1. For water bodies identified as impaired by PADEP, the applicant shall restore the first one hundred (100) feet of the impacted buffer area.
2. For all other water bodies, the applicant shall only restore Zone One.

C. Restoration of the impacted riparian buffer shall occur as follows:

1. Zone 1. Undisturbed native trees must occupy Zone 1 in its entirety. Predominant vegetation must be composed of a variety of native tree species planted in accordance with subsection D. below.
2. Zone 2. For restoration adjacent to impaired water bodies, in addition to the planting requirements for Zone 1, managed native trees and shrubs must occupy at least the first fifty (50) feet of Zone 2, beginning at the outer edge of Zone 1. Predominant vegetation must be composed of a variety of native riparian tree and shrub species planted in accordance with

subsection D. below.

D. Restoration plantings shall be planted at a density sufficient to provide three hundred (300) trees per acre at maturity. To achieve this density, no less than three hundred fifty (350) (@ approximately 10 x 10 feet spacing) trees per acre should be planted initially. The following guide is recommended for tree spacing and density based on plant size at installation:

1. Seedlings – 6-10 feet spacing (approx. 700 seedlings/acre)
2. Bare root stock – 14-16 feet spacing (approx. 200 plants/acre)
3. Larger and container – 16-18 feet spacing (approx. 150 plants/acre)

Additional planting guidance may be obtained from PADEP's Bureau of Watershed Management Document Number 394-5600-001, entitled "Riparian Forest Buffer Guidance, November 27, 2010.

E. Applicants shall submit, and as a condition of approval of any final subdivision plan, final land development plan, or permit, implement a planting and maintenance plan for the impacted riparian buffer. The plan shall be prepared by a registered landscape architect or professional plant ecologist. The plan shall identify the number, density and species of native trees and shrubs appropriate to the geographic location that will achieve a minimum of sixty (60) percent uniform canopy coverage and describe the maintenance program to be conducted by the buffer owner for a minimum of five (5) years, include measures to initially remove, and thereafter control, invasive species, control deer and rodent damage, and require replacement of deceased trees for a minimum of the first three (3) years.

F. Any riparian buffer that is included within a lot created after the effective date of this ordinance shall include as a condition of approval of the subdivision creating the lot, a restrictive covenant approved by the municipal solicitor, and recorded with the final subdivision or land development plan and the deed for the lot. The restrictive covenant shall clearly define the riparian buffer area, shall include binding provisions for the adequate long-term functioning and integrity of the riparian buffer, and shall include a requirement for notification of all subsequent lot owners of its restrictive nature.

G. Restoration to a forested riparian buffer shall not be required for issuance of a building permit for a single-family residence or addition thereto.

Section 700. Modifications to Riparian Buffer Standards.

A. For any use or activity subject to Subdivision or Land Development review, as part of applicable Plan submission, modification(s) may be requested to the provisions of Sections 400 or 600 of this Article. Requested modification(s) may be granted at the discretion of the Board of Supervisors pursuant to the provisions of the Subdivision and Land Development Ordinance.

B. For any use or activity not subject to Subdivision or Land Development review, but subject to

application for approval of a Conditional Use, Special Exception, or Zoning Variance under the provisions of this Ordinance, the applicant may request modification(s) to the provisions of Sections 400 or 600 of this Article.

C. For any use or activity not falling within the scope of subsections A or B, the applicant may request modification(s) to the provisions of Sections 400 or 600 of this Article in the form of an application for grant of a Special Exception by the Zoning Hearing Board. (Optional: Such applications shall be submitted to the Planning Commission for review and comment prior to formal Special Exception application to the Zoning Hearing Board.)

D. Applicants shall provide appropriate documentation in support of their modification request, and the Board of Supervisors or Zoning Hearing Board (as applicable) may request additional documentation of an applicant, or of its municipal consultants, to help reach its decision.

E. In consideration of approval of any applicant request for modification(s) under this Article, the following standards shall serve as the basis for a decision:

1. That there are unique physical circumstances or conditions, including but not limited to irregularity, narrowness, or shallowness of lot size or shape, excessive frontage along a water body, presence of existing buildings or structures, or exceptional topographical or other physical conditions peculiar to the particular property. That because of such physical circumstances or conditions, it is impracticable for the property to be developed in strict conformity with the buffer requirements of this Article and that the approval of the modification is therefore necessary to enable the reasonable use of the property under base zoning provisions.
2. That the modification, if approved, will result in the minimum reduction in performance of the riparian buffer, pursuant to the purposes set forth in Section 100, as needed to provide for the lawful intended use.

F. No alteration of the Use Regulations set forth in Section 500 shall be authorized as modification pursuant to this Section 700. Any such requested alteration shall constitute an application for a variance, meeting all applicable requirements for same, to be submitted to the Zoning Hearing Board.

APPENDIX C

MODEL FLOOD PLAIN ORDINANCE

Model Flood Plan Ordinance

ARTICLE 1. STATUTORY AUTHORIZATION

The Legislature of the Commonwealth of Pennsylvania has, by the passage of the Pennsylvania Floodplain Management Act of 1978, delegated the responsibility to local governmental units to adopt floodplain management regulations to promote public health, safety, and the general welfare of its citizenry. Therefore, the [Municipal Elected Body] of [Name of Municipality], does hereby order as follows:

Article 2. General Provisions

Section 2.1 Intent

A. The intent of this Ordinance is to:

1. Protect areas of the floodplain necessary to contain floodwaters.
2. To permit only those uses in the floodplain that are compatible with preserving natural conditions and stream flow.
3. Promote the general health, welfare, and safety of the community by preventing development in areas prone to flooding.
4. Encourage the utilization of appropriate construction practices in order to prevent or minimize flood damage in the future.
5. Minimize public and private losses due to flood conditions in areas prone to flooding.
6. Minimize danger to public health by protecting water supply and natural drainage.
7. Reduce financial burdens imposed on the community, its governmental units, and its residents, by preventing excessive development in areas subject to flooding.
8. Comply with federal and state floodplain management requirements.

Section 2.2 Applicability

- A. The Flood Hazard District is established as a district as defined in Section 4.1 of this Ordinance.
- B. It shall be unlawful for any person, partnership, business or corporation to undertake, or cause to be undertaken, any construction or development anywhere within the Flood Hazard District unless a permit has been obtained from the Floodplain Administrator.
- C.. A permit shall not be required for minor repairs to existing buildings or structures.

Section 2.3 Abrogation and Greater Restrictions

- A. This Ordinance supersedes any other conflicting provisions which may be in effect in the Flood Hazard District. However, any other Ordinance provisions shall remain in full force and effect to the extent that those provisions are more restrictive. If there is any conflict between any of the provisions of this Ordinance, the more restrictive shall apply.

Section 2.4 Severability

- A. If any section, subsection, paragraph, sentence, clause, or phrase of this Ordinance shall be declared invalid for any reason whatsoever, such a decision shall not affect the remaining portions of the Ordinance, which shall remain in full force and effect, and for this purpose the provisions of this Ordinance are hereby declared to be severable.

Section 2.5 Warning and Disclaimer of Liability

- A. The degree of flood protection sought by the provisions of this Ordinance is considered reasonable for regulatory purposes and is based on acceptable engineering methods of study. Larger floods may occur or flood heights may be increased by man-made or natural causes, such as ice jams and bridge openings restricted by debris. This Ordinance does not imply that areas outside the Flood Hazard District or that land uses permitted within such areas will be free from flooding or flood damages.
- B. This Ordinance shall not create liability on the part of [Name of Municipality] or any officer or employee thereof for any flood damages that result from reliance on this Ordinance or any administrative decision lawfully made thereunder.

Section 2.6 Discrepancy between Mapped Floodplain and Actual Ground Elevations

- A. In cases where there is a discrepancy between the mapped floodplain on the FIRM and the actual ground elevations, the elevation provided on the profiles shall govern.
- B. If the elevation of the site in question is below the base flood elevation, that site shall be included in the 100-year floodplain and regulated accordingly.
- C. If the elevation of the site in question is above the base flood elevation and not located within the floodway, that site shall be considered outside the 100-year floodplain and the floodplain regulations will not apply. The property owner shall be advised to apply for a Letter of Map Amendment through FEMA.

Article 3. Definitions

Section 3.1 Terms Defined

- A. When used in this Ordinance, the words, terms and phrases in Section 3.2 shall have the following meanings, unless expressly stated otherwise or unless the context clearly indicates otherwise.

Section 3.2 Definitions

Accessory use or structure. A use or structure on the same lot with, and of a nature customarily incidental

and subordinate to, the principal use or structure.

Base flood. A flood which has a one percent chance of being equaled or exceeded in any given year (also called the “100-year flood” or one-percent (1%) annual chance flood).

Base flood elevation (BFE). The elevation shown on the Flood Insurance Rate Map (FIRM) for Zones AE, AH, A1-30 that indicates the water surface elevation resulting from a flood that has a one-percent (1%) or greater chance of being equaled or exceeded in any given year.

Basement. Any area of the building having its floor below ground level on all sides.

Building. A combination of materials to form a permanent structure having walls and a roof. Included shall be all manufactured homes and trailers to be used for human habitation.

Conditional Letter of Map Revision (CLOMR). A letter outlining FEMA comment on a proposed project that would, upon construction, affect the hydrologic or hydraulic characteristics of a flooding source and thus result in the modification of the existing regulatory floodway, the effective Base Flood Elevations (BFEs), or the floodplain. The letter does not revise an NFIP map.

Cost of improvement. Cost that includes both the structural and finish or labor and materials, minus those required to meet floodproofing and flood elevation regulations and the cost of permits. This includes lighting fixtures, built-in appliances, interior moldings, paneling, tiling, wall-to-wall carpet over sub-flooring, built-in cabinets, etc. The cost to demolish undamaged building components must be established and included.

Cost of reconstruction. Cost that includes both the structural and finish or labor and materials, minus those required to meet floodproofing and flood elevation regulations and the cost of permits, to reproduce by new construction the exact form and detail of a structure or a part thereof, as it appeared at a specific period of time.

Critical facilities. Any structure or facility that is 1) identified in the current Hazard Mitigation Plan as a “critical facility”; 2) that produce, use, or store highly volatile, flammable, explosive, toxic and/or water-reactive materials; 3) hospitals, nursing homes, and housing likely to contain occupants who may not be sufficiently mobile to avoid death or injury during a flood; or 4) police stations, fire stations, vehicle equipment storage facilities and emergency operations centers that are needed for flood response activities before, during, and after a flood; or 5) public and private utility facilities that are vital to maintaining or restoring normal services to flooded areas before, during, and after a flood.

Current cost. A basis of valuation which values an asset at the amount which it would currently cost to obtain.

Development. Any man-made change to improved or unimproved real estate, including but not limited to

the construction, reconstruction, renovation, repair, expansion, or alteration of buildings or other structures; the placement of manufactured homes, streets, and other paving; utilities; filling, grading and excavation; mining; dredging; drilling operations; storage of equipment or materials; and the subdivision of land.

Encroachment. Construction, placement of fill, or similar alteration of topography in the floodplain that reduces the area available to convey floodwaters.

Existing manufactured home park or subdivision. A manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including, at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed before the effective date of this Ordinance.

Expansion to an existing manufactured home park or subdivision. The preparation of additional sites by the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads).

FEMA. Federal Emergency Management Agency.

Fill. Man-made deposits of natural soil or rock product.

Flood. A temporary inundation of normally dry land areas.

Flood Insurance Rate Map (FIRM). The official map on which the Federal Emergency Management Agency has delineated both the areas of special flood hazards and the risk premium zones applicable to the community.

Flood Insurance Study (FIS). The official report provided by the Federal Emergency Management Agency that includes flood profiles, the FIRM, the Flood Boundary and Floodway Map, and the water surface elevation of the base flood.

Floodplain administrator. The municipal official responsible for implementing and enforcing this Ordinance and monitoring floodplain development in [Name of Municipality].

Floodplain area. The relatively flat or low land area which is subject to partial or complete inundation from an adjoining or nearby stream, river or watercourse; and/or any area subject to the unusual and rapid accumulation of surface waters from any source.

Floodproofing. Any combination of structural and nonstructural additions, changes, or adjustments to structures which reduce or eliminate flood damage to real estate or improved real property, water and sanitary facilities, structures and their contents.

Floodway. The channel of a river or other watercourse and the adjacent land areas that must be reserved

in order to discharge the base flood without cumulatively increasing the water surface elevation more than one foot.

Freeboard. A factor of safety usually expressed in feet above a flood level for purposes of floodplain management.

Highest adjacent grade. The highest natural elevation of the ground surface prior to construction next to the proposed walls of a structure.

Historic structure. Any structure that is a) listed individually in the National Register of Historic Places (a listing maintained by the Department of Interior) or preliminarily determined by the Pennsylvania Historical and Museum Commission (PHMC) as meeting the criteria for individual listing on the National Register; b) certified or preliminarily determined by the PHMC as contributing to the historical significance of a National Register historic district or a district preliminarily determined by the PHMC to be eligible to qualify for listing in the National Register; or c) designated as historic by a municipal Ordinance where it is identified individually or as part of a local historic district by a zoning Ordinance under the authority of the Pennsylvania Municipalities Planning Code or located in a local historic district that has been certified by the PHMC as meeting the requirements of the Pennsylvania Historic District Act.

Intact structure. A structure that is undamaged in any way; whole.

Letter of Map Amendment. The official amendment, by letter, to an effective National Flood Insurance Program (NFIP) map by FEMA.

Letter of Map Revision. The official revision, by letter, to an effective National Flood Insurance Program (NFIP) map by FEMA.

Lowest floor. The lowest floor of the lowest fully enclosed area (including basement). An unfinished, flood resistant partially enclosed area, used solely for parking of vehicles, building access, and incidental storage, in an area other than a basement area is not considered the lowest floor of a building, provided that such space is not designed and built so that the structure is in violation of the applicable non-elevation design requirements of this Ordinance.

Manufactured home. A structure, transportable in one or more sections, which is built on a permanent chassis and is designed for use with or without a permanent foundation when attached to the required utilities. The term includes park trailers, travel trailers, recreational and other similar vehicles which are placed on a site for more than 180 consecutive days.

Manufactured home park or subdivision. A parcel (or contiguous parcels) of land divided into two or more manufactured home lots for rent or sale.

Manure. The animal excrement, including poultry litter, which is produced at an agricultural operation. It includes materials such as bedding and raw materials which are commingled with that excrement.

Manure stockpile. A storage pile of manure accumulated for future use that is not confined within a manure storage facility.

Manure storage facility. A permanent structure or pond, a portion of a structure or pond, or a group of structures or ponds at one agricultural operation, utilized for the purpose of containing manure or agricultural process wastewater. This includes concrete, metal or other fabricated tanks and underground structures, as well as earthen and synthetically-lined manure storage ponds.

Market value. The most probable price which a property should bring in a competitive and open market under all conditions requisite to a fair sale; the buyer and seller, each acting prudently, knowledgeably and assuming the price is not affected by undue stimulus.

Minimize. To reduce to the smallest amount or extent possible. “Minimize” shall not mean complete elimination but shall require that the most substantial efforts possible under the circumstances have been taken to reduce the adverse effect(s) of the action required to be minimized. “Minimize” shall include but not be limited to the requirement that the placement of dwellings and other structures and the locations of roads, stormwater management facilities, and other land disturbance shall be planned and designed to reduce the adverse effect(s) of the activity in question to the smallest amount possible under the circumstances consistent with otherwise permitted development.

Minor repair. The replacement of existing work with equivalent materials for the purpose of its routine maintenance and upkeep, but not including the cutting away of any wall, partition or portion thereof, the removal or cutting of any structural beam or bearing support, or the removal or change of any required means of egress, or rearrangement of parts of a structure affecting the exitway requirements; nor shall minor repairs include addition to, alteration of, replacement or relocation of any standpipe, water supply, sewer, drainage, drain leader, gas, oil, waste, vent, or similar piping, electric wiring or mechanical or other work affecting public health or general safety.

[Name of Municipality] Building Code. The administration and enforcement of the provisions of the Pennsylvania Construction Code Act, Act 45 of 1999 and The Uniform Construction Code, contained in 34 Pa. Code, Chapters 401 through 405, as amended from time to time, was adopted and incorporated herein by reference as the municipal building code of [Name of Municipality].

National Flood Insurance Program (NFIP). A Federal program created by Congress in 1968 to mitigate future flood losses through sound, community-enforced building and zoning Ordinances and to provide access to affordable, federally backed flood insurance protection for property owners.

New construction. Structures for which the start of construction commenced on or after the effective start

date of this Ordinance and includes any subsequent improvements to such structures. Any construction started after [effective date of community's first floodplain management Ordinance adopted by the community] and before the effective start date of this floodplain management Ordinance is subject to the Ordinance in effect at the time the permit was issued, provided the start of construction was within 180 days of permit issuance.

New manufactured home park or subdivision. A manufactured home park or subdivision for which the construction of facilities for servicing the lots on which the manufactured homes are to be affixed (including at a minimum, the installation of utilities, the construction of streets, and either final site grading or the pouring of concrete pads) is completed on or after the effective date of this Ordinance.

One hundred-year flood. A flood that has a 1% chance of being equaled or exceeded in any given year.

PA DCED. Pennsylvania Department of Economic Development.

PA DEP. Pennsylvania Department of Environmental Protection.

Partially damaged structure. A structure that has sustained damage from any cause whereby the cost of restoring the structure to its before-damaged condition is less than fifty (50) percent of the market value of the structure before the damage occurred.

Person. An individual, partnership, public or private association or corporation, firm, trust, estate, municipality, governmental unit, public utility or any other legal entity whatsoever, which is recognized by law as the subject of rights and duties.

Post-FIRM structure. A structure for which construction or substantial improvement occurred after 12/31/1974, or on or after the community's initial FIRM dated (MM/DD/YYYY), whichever is later, and as such, would be required to be compliant with the regulations of the NFIP.

Pre-FIRM structure. A structure for which construction or substantial improvement occurred on or before 12/31/1974, or before the community's initial FIRM dated (MM/DD/YYYY), whichever is later, and as such, would not be required to be compliant with the regulations of the NFIP.

Recreational vehicle. A vehicle which is built on a single chassis not more than 400 square feet, measured at the largest horizontal projections, designed to be self-propelled or permanently towable by a light-duty truck and not designed for use as a permanent dwelling but as temporary living quarters for recreational, camping, travel, or seasonal use.

Reconstruction. The act or process of reproducing by new construction the exact form and detail of a structure or a part thereof, as it appeared at a specific period of time.

Redevelopment. The removal and replacement, rehabilitation, or adaptive reuse of an existing structure or structures, or of vacant but formerly developed land.

Regulatory flood elevation (RFE). The regulatory flood elevation is the elevation to which development is regulated for purposes of elevation and/or dry floodproofing. It is equal to the base flood elevation (BFE) plus a freeboard of 1.5 feet.

Repetitive loss. Flood related damages sustained by a structure on two separate occasions during a 10-year period for which the cost of repairs at the time of each such flood event, on average, equals or exceeds 25 percent of the market value of the structure before the damages occurred.

Residential storage facility. An enclosed storage facility containing independent, fully enclosed bays that are leased to individuals exclusively for storage of their household goods or personal property.

Severe repetitive loss structure. As determined by FEMA, a residential structure that is covered under flood insurance by the NFIP and has incurred flood-related damage for which four or more separate claim payments have been paid under flood insurance coverage with the amount of each claim payment exceeding \$5,000 and with cumulative amount of such claim payments exceeding \$20,000.

Special Flood Hazard Area. An area in the floodplain subject to a one percent or greater chance of flooding in any given year. It is shown on FIRM maps as Zone A, AO, A1-A30, AE, A99 or AH.

Start of construction. Includes substantial improvement and other proposed new development and means the date the permit was issued, provided the actual start of construction, repair, reconstruction, rehabilitation, addition, placement, or other improvement was within 180 days from the date of the permit and shall be completed within 12 months after the date of issuance of the permit unless a time extension is granted, in writing, by the Floodplain Administrator. The actual start means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading, and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.

Storage. Depository, stockpiling or safekeeping of materials, products or items.

Structure. A walled and roofed building, including a gas or liquid storage tank that is principally above ground, as well as a manufactured home.

Subdivision. The division of a lot, tract, or parcel of land by any means into two or more lots, tracts, parcels or other divisions of land including changes in existing lot lines for the purpose, whether immediate or future, of lease, partition by the court for distribution to heirs, or devisees, transfer of ownership or building or lot development; provided, however, that the subdivision by lease of land for agricultural purposes into parcels of more than ten acres, not involving any new street or easement of access or any residential dwelling, shall be exempted.

Substantial damage. Damage from any cause sustained by a structure whereby the cost of restoring the structure to its before-damaged condition would equal or exceed fifty (50) percent or more of the market value of the structure before the damage occurred.

Substantially damaged structure. A structure that has sustained damage from any cause whereby the cost of restoring the structure to its before-damaged condition would equal or exceed fifty (50) percent or more of the market value of the structure before the damage occurred.

Substantial improvement. Any reconstruction, rehabilitation, addition, or other improvement of a structure, the cost of which equals or exceeds fifty (50) percent of the market value of the structure before the “start of construction” of the improvement. This term includes structures which have incurred “substantial damage” or “repetitive loss” regardless of the actual repair work performed. The term does not, however, include any project for improvement of a structure to correct existing violations of state or local health, sanitary, or safety code specifications which have been identified by the local code enforcement official and which are the minimum necessary to assure safe living conditions.

Uniform Construction Code (UCC). The statewide building code adopted by The Pennsylvania General Assembly in 1999 applicable to new construction in all municipalities whether administered by the municipality, a third party or the Department of Labor and Industry.

Vacant but formerly developed land. Land from which previous improvements have been removed.

Violation. The failure of a structure or other development to be fully compliant with the community’s flood plain management regulations. A structure or other development without the elevation certificate, other certifications, or other evidence of compliance required in 44 CFR §60.3(b) (5), (c) (4), (c)(10), (d) (3), (e)(2), (e)(4), or (e)(5) is presumed to be in violation until such time as that documentation is provided.

Warehouse. A structure used primarily for the storage and distribution of goods, merchandise, supplies, and equipment.

Watercourse. A watercourse is a channel or conveyance of surface water having defined bed and banks, whether natural or artificial, with perennial or intermittent flow. Man-made swales, constructed specifically for stormwater management purposes, are excluded from this definition.

Article 4. Identification of Floodplain Areas

Section 4.1 Identification

- A. The identified floodplain area shall be any areas of [Name of Municipality] classified as special flood hazard areas (SFHAs) in the Flood Insurance Study (FIS) and the accompanying Flood Insurance Rate Maps (FIRMs) dated [effective map date] and issued by the Federal Emergency Management Agency (FEMA), or the most recent revision thereof, including all digital data developed as part of the FIS, and any community identified flood hazard areas. The above referenced FIS and FIRMs, and any subsequent revisions and amendments are hereby adopted by [Name of Municipality] and declared to be a part of this Ordinance.
- B. The Flood Hazard District may consist, more specifically, of the following areas:
1. **The Floodway Area (FW)** shall be those areas identified in the FIS and the FIRM as floodway and which represent the channel of a watercourse and the adjacent land areas that must be reserved in order to discharge the base flood without increasing the water surface elevation by more than one (1) foot at any point. This term shall also include floodway areas which have been identified in other available studies or sources of information for those special flood hazard areas where no floodway has been identified in the FIS and FIRM. Such studies, analyses, computations, etc., shall be submitted in sufficient detail to allow a thorough technical review by [Name of Municipality].
 2. **The AE Area/District** shall be those areas identified as an AE Zone on the FIRM included in the FIS prepared by FEMA for which base flood elevations have been provided.
The AE Area adjacent to the floodway shall be those areas identified as an AE Zone on the FIRM included in the FIS prepared by FEMA for which base flood elevations have been provided and a floodway has been delineated.
The AE Area without a floodway shall be those areas identified as an AE Zone on the FIRM included in the FIS prepared by FEMA for which base flood elevations have been provided but no floodway has been determined.
 3. **The A Area/District** shall be those areas identified as an A Zone on the FIRM included in the FIS prepared by FEMA and for which no base flood elevations have been provided. For these areas, elevation and floodway information from other federal, state, or other acceptable sources shall be used when available. Where other acceptable information is not available, the base flood elevation shall be determined by using the elevation of a point on the boundary of the identified floodplain area which is nearest the construction site.
 4. **The AO and AH Area/District** shall be those areas identified as Zones AO and AH on the FIRM and in the FIS. These areas are subject to inundation by one percent (1%) annual chance shallow flooding where average depths are between one and three feet. In Zones AO and AH, drainage paths shall be established to guide floodwaters around and away from structures on slopes.
 5. **Community Identified Flood Hazard Areas** shall be those areas where [Name of Municipality] has identified local flood hazard or ponding areas, as delineated and adopted on a “Local Flood Hazard Map” using best available topographic data and locally derived information such as flood of record, historic high water marks, soils or approximate study methodologies.
- C. An initial determination shall be made by the Zoning Officer should a dispute concerning any district boundary arise. Any party aggrieved by this decision may appeal to the Zoning Hearing Board under the

provisions of Article 7 of this Ordinance. The burden of proof is on the appellant.

Section 4.2 Changes in Identification of Area

- A. The Flood Hazard District may be revised or modified by the [Name of Municipality] where studies or information provided by a qualified agency or person documents the need for such revision. However, prior to any such change, approval must be obtained from FEMA.

Article 5. General Provisions

- A. No encroachment, land development, improvement or reconstruction of any kind shall be made to any watercourse until all adjacent municipalities which may be affected by such action have been notified by [Name of Municipality], and until all required permits or approvals have been first obtained from the Pennsylvania DEP Regional Office. In addition, FEMA and PA DCED shall be notified prior to any alteration or relocation of any watercourse.
- B. Any new construction, uses, activities or land development occurring within the Flood Hazard District shall be undertaken only in strict compliance with the provisions of this Ordinance and with all other applicable codes, Ordinances and regulations including the [Name of Municipality] Building Code, as amended and [Name of Municipality] Subdivision and Land Development Ordinance.
- C. A permit shall be required before any construction or development is undertaken within the Flood Hazard District.
- D. Under no circumstances shall any new construction, use, activity and/or land development adversely affect the capacity of the channels or floodways of any watercourse, drainage ditch or any other drainage facility or system.
- E. Any new construction and/or land development, with the exception of redevelopment projects, that would cause any increase in the base flood elevation shall be prohibited.
- F. New construction, development, encroachment or redevelopment in the FW area is prohibited.
- G. All subdivision and land development proposals containing at least fifty (50) lots or a minimum of five (5) acres in the Flood Hazard District where base flood elevation data is not available shall be supported by hydrologic and hydraulic engineering analyses that determine base flood elevations and floodway information. The analyses shall be prepared by a licensed professional engineer in a format required by FEMA for a Conditional Letter of Map Revision (CLOMR) or Letter of Map Revision (LOMR).

Article 6. Uses Permitted in the Flood Hazard District

Section 6.1 Uses Permitted by Right

A. In the Flood Hazard District, the following uses and activities are permitted in the AE Area/District or A Area/District areas provided they are in compliance with the provisions of the underlying district and are not prohibited by any other Ordinance:

1. Agriculture, horticulture, and forestry that:
 - a. Do not include any structures.
 - b. Do not require grading which would cause any increase in flood heights or frequency.
 - c. Are conducted in accord with recognized soil conservation and water quality practices.
2. Public and private recreational uses and activities, limited to parks, day camps, picnic grounds, boat launching and swimming areas, hiking and horseback riding trails, wildlife and nature preserves, game farms, fish hatcheries, and hunting and fishing areas.
3. Uses accessory to those permitted in the underlying zoning district, including yard areas, gardens, play areas and parking areas, provided that no structures are erected, and no impervious surfaces are created.
4. Redevelopment projects that:
 - a. Do not include residential structures or critical facilities;
 - b. Do not include prohibited uses listed in Section 6.2;
 - c. Are consistent with the goals and objectives of the [Name of Municipality] Comprehensive Plan;
 - d. Are permitted in the applicable underlying zoning district;
 - e. Are elevated to regulatory flood elevation (RFE) and in full compliance with the floodproofing requirements in the [Name of Municipality] Building Code as amended;
 - f. Include a document, certified by a registered professional engineer who states that the proposed construction or development has been adequately designed to withstand the pressures, velocities, impact and uplift forces associated with the 100-year flood. Such statement shall include the lowest floor elevation of all proposed structures, the elevation of the 100-year flood, and the type and extent of floodproofing measures which have been incorporated into the design of all proposed structures and/or the development.
5. The repair or expansion of riparian buffers.
6. Floodproofing to protect only lawfully existing non-conforming structures and lawfully existing non-conforming uses within structures.
7. Fences and temporary protective fencing that do not impede floodwaters.
8. Dams, culverts, bridges, and altered or relocated watercourses with permits and/or approvals from the PA DEP, PA Public Utility Commission, and/or US Army Corps of Engineers. Furthermore, notification of such actions shall be provided to all affected adjoining municipalities, FEMA and the Pennsylvania PA DCED. The approval of a permit by any of the preceding state or federal agencies for one of the uses allowed in the Flood Hazard District shall in no way affect or conflict with the requirements imposed upon the use under the regulations of the Flood Hazard District.
9. Public utility facilities under the exclusive jurisdiction of the Pennsylvania Public Utility Commission.

Section 6.2 Uses Prohibited in the Flood Hazard District

A. The following uses are prohibited from locating within the Flood Hazard District:

1. All uses prohibited in the underlying zoning district.
2. New construction, development or redevelopment in the FW area.
3. All structures, with the exception of those specifically allowed in Section 6.1.
4. Warehousing and residential storage warehouses.
5. The production, storage, or use of any amount of radioactive substances.
6. The production, storage or use of a substance or material, underground or above ground, that is buoyant, flammable, explosive, or injurious to property, water quality or human, animal, plant, fish or aquatic life including but not limited to the following:
 - a. Acetone
 - b. Ammonia
 - c. Benzene
 - d. Calcium carbide
 - e. Carbon disulfide
 - f. Celluloid
 - g. Chlorine
 - h. Hydrochloric acid
 - i. Hydrocyanic acid
 - j. Magnesium
 - k. Nitric acid and oxides of nitrogen
 - l. Petroleum products (gasoline, fuel oil, etc.)
 - m. Phosphorus
 - n. Potassium
 - o. Sodium
 - p. Sulphur and sulphur products
 - q. Pesticides (including insecticides, fungicides, and rodenticides)
 - r. Radioactive substances, insofar as such substances are not otherwise regulated.
7. Storage of material or equipment that, in time of flooding, could become buoyant and pose an obstruction to flow in identified floodway areas.
8. The production, storage or use of explosives.
9. The storage or disposal of materials used for snow and ice control including sand, salt and other deicing chemicals.
10. Sanitary landfills, dumps, junk and salvage yards, and outdoor storage of vehicles and/or materials.
11. The storage or disposal of any soil, loam, peat, sand, gravel, rock, or other mineral substance, refuse, trash, rubbish, debris, or dredged/excavated spoil.
12. Draining, excavation, or dredging, or removal or relocation of loam, peat, sand, gravel, soil, rock, or other mineral substance, except as accessory to work permitted as of right or by special permit.
13. Manure storage facilities and manure stockpiles.
14. Improvements to existing manufactured home parks and subdivisions.
15. Sewage disposal facilities.
16. Other than required to meet the requirements of Section 6.1(A)(8) and 6.1(A)(9), fill is prohibited in the Flood Hazard District.

Section 6.3 Nonconforming Structures and Uses in the Flood Hazard District

- A. The provisions of this Ordinance do not require any changes or improvements to be made to lawfully existing structures. However, when an improvement is made to any existing structure, the provisions of Section 6.4 of this Ordinance, and (reference Municipal Ordinance Non-conforming Use standards here) shall apply.

Section 6.4 Improvements to Existing Structures in the Flood Hazard District

- A. No improvement or reconstruction of an existing structure shall be allowed within any FW area as identified by the Flood Insurance Study prepared by FEMA or other available studies or sources of information found acceptable by [Name of Municipality] and approved by FEMA.
- B. No improvement of an existing structure shall be allowed within any AE Area/District or A Area/District that would, together with all other existing and anticipated development, increase the base flood elevation more than one (1) foot at any point.
- C. The improvement or reconstruction of existing structures that store materials that are buoyant, flammable, explosive, or injurious to property, water quality or human, animal, plant, fish or aquatic life shall be prohibited in the Flood Hazard District.
- D. Existing structures in the AE Area/District and A Area/District are defined and regulated as follows:
1. **INTACT STRUCTURES**
Any improvement to an existing intact structure, to an extent ten (10) percent or more of its market value, shall be undertaken only in full compliance with the floodproofing requirements in the [Name of Municipality] Building Code, as amended.
 2. **PARTIALLY DAMAGED STRUCTURES**
Any improvement or reconstruction to an existing partially damaged structure shall be undertaken only in full compliance with the floodproofing requirements in the [Name of Municipality] Building Code, as amended.
 3. **SUBSTANTIALLY DAMAGED STRUCTURES**
Any improvement or reconstruction to a substantially damaged structure shall be in full compliance with the floodproofing requirements in the [Name of Municipality] Building Code, as amended, and shall have the lowest floor, including basement, elevated to regulatory flood elevation.
 4. **REPETITIVE LOSS STRUCTURES**
 - a. An improvement to a repetitive loss structure to an extent ten (10) percent or more of its market value of the intact structure shall be prohibited. Any permitted improvement to a repetitive loss structure shall be in full compliance with the floodproofing requirements of the [Name of Municipality] Building Code, as amended, and shall have the lowest floor, including basement, elevated to regulatory flood elevation.
 - b. The reconstruction of a repetitive loss structure shall be in full compliance with the [Name of Municipality] Building Code, as amended, and shall have the lowest floor, including basement, elevated to regulatory flood elevation.

5. **SEVERE REPETITIVE LOSS STRUCTURES**

- a. An improvement to a severe repetitive loss structure to an extent five (5) percent or more of its market value as an intact structure shall be prohibited. Any permitted improvement to a severe repetitive loss structure shall be in full compliance with the floodproofing requirements of the [Name of Municipality] Building Code, as amended, and shall have the lowest floor, including basement, elevated to regulatory flood elevation.
- b. The reconstruction of a severe repetitive loss structure shall a) be in full compliance with the [Name of Municipality] Building Code, as amended; b) have the lowest floor, including basement, elevated to regulatory flood elevation; and c) the applicant shall provide documentation from [Name of Municipality], the state of Pennsylvania and FEMA that states [Name of Municipality], the state of Pennsylvania or FEMA will not acquire the property for the purposes of flood mitigation prior to the reconstruction of the structure.
- c. The cost of improvements or reconstruction commenced since the adoption of this Ordinance must be calculated at current cost.
- d. It is the responsibility of the applicant to supply the information necessary (e.g. appraisals, construction costs, estimates, etc. to make the determination that the market value is reasonably accurate and that the cost estimate reasonably reflects the actual costs of the improvements to the structure.
- e. Acceptable estimates of market value shall be determined from one of the following methods:
 1. Independent appraisals by a state licensed real estate appraiser.
 2. The value of the building taken from NFIP claims data.
- f. Acceptable estimates of cost of improvement shall be determined from one of the following methods:
 1. Itemized estimates made by contractors licensed to work in [Name of Municipality].
 2. Building code valuation tables.
- g. No expansion or enlargement of an existing structure shall be undertaken in the direction of a watercourse.
- h. Historic structures undergoing repair or rehabilitation that would constitute a substantial improvement as defined in this Ordinance must comply with the [Name of Municipality] Building Code and all Ordinance requirements that do not preclude the structure's continued designation as a historic structure. Documentation that a specific Ordinance requirement will cause removal of the structure from the National Register of Historic Places or the State Inventory of Historic Places must be obtained from the Secretary of the Interior or the State Historic Preservation Officer. Any exemption from the Ordinance requirements will be the minimum necessary to preserve the historic character and design of the structure.
- i. The Zoning Hearing Board shall have the right to waive, as a special exception, any of the requirements of this Section for any structure listed on a National, State or Local Register of Historic Places; provided, however, that the provisions of Article 7 shall be applied in such a case.

Article 7. Variances and Special Requirements for Certain Variances

Section 7.1 General

- A. If compliance with any of the requirements of this Ordinance would result in an exceptional hardship to the applicant, the [Name of Municipality] may, upon request, grant relief from the strict application of the requirements.

Section 7.2 Variance Procedures and Conditions

- A. For a use other than those permitted in Section 6.1, an application seeking approval by variance shall be forwarded to the Zoning Hearing Board along with required studies or information and the findings of the Zoning Officer.
- B. No variance shall be granted for any construction, development, use, or activity within any floodway area.
- C. No variance shall be granted for any construction, development, use, or activity within any AE Area/District or A Area/District that would, together with all other existing and anticipated development, increase the BFE more than one (1) foot at any point.
- D. If granted, a variance shall involve only the least modification necessary to provide relief.
- E. In granting any variance, the Zoning Hearing Board shall attach the reasonable conditions and safeguards outlined herein. These conditions and safeguards are necessary in order to protect the public health, safety, and welfare of the residents of the municipality.
- F. Whenever a variance is granted, the Zoning Hearing Board shall notify the applicant in writing that:
1. The granting of the variance may result in increased premium rates for flood insurance.
 2. Such variances may increase the risks to life and property.
- G. In reviewing any request for a variance, the Zoning Hearing Board shall consider, at a minimum, that there is good and sufficient cause, including:
1. That there are unique physical circumstances or conditions, including irregularity, narrowness, or shallowness of lot size or shape, or exceptional topographical or other physical conditions peculiar to the particular property and that the unnecessary hardship is due to such conditions and not the circumstances or conditions generally created by the provisions of the zoning Ordinance in the neighborhood or district in which the property is located.
 2. That because of such physical circumstances or conditions, there is no possibility that the property can be developed in strict conformity with the provisions of the zoning Ordinance and that the authorization of a variance is therefore necessary to enable the reasonable use of the property.
 3. That such unnecessary hardship has not been created by the appellant.
 4. That the variance, if authorized, will not alter the essential character of the neighborhood or district in which the property is located, nor substantially or permanently impair the appropriate use or development of adjacent property, nor be detrimental to the public welfare.

5. That failure to grant the variance would result in exceptional hardship to the applicant.
6. That the granting of the variance will neither result in an unacceptable or prohibited increase in flood heights, additional threats to public safety, or extraordinary public expense, nor create nuisances, cause fraud on, or victimize the public, or conflict with any other applicable state or local Ordinances and regulations.
7. A complete record of all variance requests and related actions shall be maintained by [Name of Municipality]. In addition, a report of all variances granted during the year shall be included in the required report to FEMA.

Article 8. Technical Provisions in the Event of a Variance Being Granted

Section 8.1 General

- A. In granting any variance, [Name of Municipality] shall attach the following technical provisions to the proposal for which the variance has been granted. These conditions and safeguards are necessary in order to protect the public health, safety, and welfare of the residents of the municipality.

Section 8.2 Alteration or Relocation of Watercourses

- A. No encroachment, alteration, or improvement of any kind shall be made to any watercourse until all adjacent municipalities which may be affected by such action have been notified by the municipality, and until all required permits or approvals have been first obtained from DEP.
- B. No encroachment, alteration, or improvement of any kind shall be made to any watercourse unless it can be shown that the activity will not reduce or impede the flood carrying capacity of the watercourse in any way.
- C. In addition, FEMA and PA DCED shall be notified prior to any alteration or relocation of any watercourse.
- D. The municipality shall require technical or scientific data to be submitted to FEMA for a Letter of Map Revision (LOMR) within six (6) months of the completion of any new construction, development, or other activity resulting in changes in the BFE. A LOMR or Conditional Letter of Map Revision (CLOMR) is required for:
 1. Any development that causes a rise in the base flood elevations within the floodway; or
 2. Any development occurring in Zones A1-30 and Zone AE without a designated floodway, which will cause a rise of more than one foot in the base flood elevation; or
 3. Any alteration or relocation of a stream (including but not limited to installing culverts and bridges) the applicant shall (as per 44 CFR Part 65.12):
 - a. Apply to FEMA for conditional approval of such action prior to permitting the encroachments to occur.
 - b. Upon receipt of the Administrator's conditional approval of map change and prior to approving the proposed encroachments, a community shall provide evidence to FEMA of the adoption of floodplain management ordinances incorporating the increased base flood elevations and

- / or revised floodway reflecting the post-project condition.
- c. Upon completion of the proposed encroachments, the applicant shall provide as-built certifications to [Municipality]. FEMA will initiate a final map revision upon receipt of such certifications in accordance with 44 CFR Part 67.

Section 8.3 Residential and Non-Residential Structures

- A. Any new residential construction or substantial improvement shall have the lowest floor (including basement) elevated up to, or above, the regulatory flood elevation. The design and construction standards and specifications contained in the [Name of Municipality] Building Code shall be used. In AO Zones, any new construction or substantial improvement shall have the lowest floor (including basement) at, or above, the highest adjacent grade at least as high as the elevation specified on the FIRM.
- B. Any new non-residential construction or substantial improvement of a non-residential structure shall have the lowest floor (including basement) elevated up to, or above, the regulatory flood elevation, or be designed and constructed so that the space enclosed below the regulatory flood elevation is floodproofed so that the structure is watertight with walls substantially impermeable to the passage of water, and has structural components with the capability of resisting hydrostatic and hydrodynamic loads and effects of buoyancy. In AO Zones, any new construction or substantial improvement shall have the lowest floor (including basement) at, or above, the highest adjacent grade at least as high as the elevation specified on the FIRM.
- C. Any non-residential structure, or part thereof, made watertight below the regulatory flood elevation shall be floodproofed in accordance with the W1 or W2 space classification standards contained in the publication entitled Flood-Proofing Regulations published by the U.S. Army Corps of Engineers (May 2000, as amended) or with some other equivalent standard. All plans and specifications for such floodproofing shall be accompanied by a statement certified by a registered professional engineer or architect which states that the proposed design and methods of construction are in conformance with the above referenced standards.
- D. The design and construction standards and specifications contained in the [Name of Municipality] Building Code shall be used.

Section 8.4 Space Below the Lowest Floor

- A. Fully enclosed space below the lowest floor (excluding basements) which will be used solely for the parking of a vehicle, building access, or incidental storage in an area other than a basement, shall be designed and constructed to allow for the automatic entry and exit of floodwaters for the purpose of equalizing hydrostatic forces on exterior walls. The term “fully enclosed space” also includes crawl spaces.
- B. Designs for meeting this requirement must either be certified by a registered professional engineer or architect, or meet or exceed the following minimum criteria:

1. Minimum of two openings having a net total area of not less than one (1) square inch for every square foot of enclosed space.
2. The bottom of all openings shall be no higher than one (1) foot above grade.
3. Openings may be equipped with screens, louvers, etc. or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

Section 8.5 Accessory Structures

- A. Structures accessory to a principal building need not be elevated or floodproofed to remain dry, but shall comply, at a minimum, with the following requirements:
 1. The structure shall not be designed or used for human habitation, but shall be limited to the parking of vehicles, or to the storage of tools, material, and equipment related to the principal use or activity.
 2. Floor area shall not exceed 100 square feet.
 3. The structure will have a low damage potential.
 4. The structure will be located on the site so as to cause the least obstruction to the flow of floodwaters.
 5. Power lines, wiring, and outlets will be elevated to the regulatory flood elevation.
 6. Permanently affixed utility equipment and appliances such as furnaces, heaters, washers, dryers, etc. are prohibited.
 7. Sanitary sewer facilities are prohibited.
- B. The structure shall be adequately anchored to prevent flotation or movement and shall be designed to automatically provide for the entry and exit of floodwater for the purpose of equalizing hydrostatic forces on the walls. Designs for meeting this requirement must either be certified by a registered professional engineer or architect, or meet or exceed the following minimum criteria:
 1. A minimum of two openings having a net total area of not less than one (1) square inch for every square foot of enclosed space.
 2. The bottom of all openings shall be no higher than one (1) foot above grade.
 3. Openings may be equipped with screens, louvers, etc. or other coverings or devices provided that they permit the automatic entry and exit of floodwaters.

Section 8.6 Manufactured Homes

- A. Where permitted by variance within the Flood Hazard District, all manufactured homes, and any improvements thereto, shall be:
 1. Placed on a permanent foundation.
 2. Elevated so that the lowest floor of the manufactured home is at, or above, regulatory flood elevation.
 3. All ductwork and utilities including HVAC/heat pumps elevated to regulatory flood elevation.
 4. Anchored to resist flotation, collapse, or lateral movement.
 5. Shall be prohibited within the area measured fifty (50) feet landward from the top-of-bank of any watercourse.
- B. Installation of manufactured homes shall be done in accordance with the manufacturer's installation

instructions. Where the applicant cannot provide the above information, the more restrictive requirements of the [Name of Municipality] Building Code or the U.S. Department of Housing and Urban Development's Permanent Foundations for Manufactured Housing, September 1996 Edition as amended, shall apply.

- C. Consideration shall be given to the installation requirements of the [Name of Municipality] Building Code or the most recent revisions thereto where appropriate and/or applicable to units where the manufacturer's standards for anchoring cannot be provided or were not established for the proposed installation.

Section 8.7 Recreational Vehicles

A. Recreational vehicles must either:

1. Be on the site for fewer than 180 consecutive days only and not parked in the floodway.
2. Be fully licensed and ready for highway use.
3. If the provisions of 8.7(A)(1) and (2) cannot be met, recreational vehicles must meet the permit requirements for manufactured homes in Section 8.6.

Section 8.8 Development Which May Endanger Human Life

- A. Any new or substantially improved structure which will be used for the production or storage of any of the following dangerous materials or substances, or will be used for any activity requiring the maintenance of a supply of more than 550 gallons, or other comparable volume, of any of the following dangerous materials or substances on the premises; or will involve the production, storage, or use of any amount of radioactive substances shall be subject to the provisions of this Section, in addition to all other applicable provisions. The following list of materials and substances are considered dangerous to human life:

1. Acetone
2. Ammonia
3. Benzene
4. Calcium carbide
5. Carbon disulfide
6. Celluloid
7. Chlorine
8. Hydrochloric acid
9. Hydrocyanic acid
10. Magnesium
11. Nitric acid and oxides of nitrogen
12. Petroleum products (gasoline, fuel oil, etc.)
13. Phosphorus
14. Potassium
15. Sodium
16. Sulphur and sulphur products

17. Pesticides (including insecticides, fungicides, and rodenticides)
 18. Radioactive substances, insofar as such substances are not otherwise regulated.
- B. Within any Floodway Area, any structure of the kind described in Subsection A., above, shall be prohibited. No variance shall be granted.
- C. Where permitted by a variance within the floodplain area, any new or substantially improved structure of the kind described in Subsection A. above, shall be:
1. Elevated or designed and constructed to remain completely dry up to regulatory flood elevation.
 2. Designed to prevent pollution from the structure or activity during the course of a 100-year base flood elevation.
 3. Any such non-residential structure, or part thereof, that will be built below the regulatory flood elevation shall be designed and constructed in accordance with the standards for completely dry floodproofing contained in the publication Flood-Proofing Regulations(U.S. Army Corps of Engineers, May 2000, as amended), or with some other equivalent watertight standard.

Section 8.9 Fill

A. If fill is used, it shall:

1. Extend laterally at least fifteen (15) feet beyond the building line from all points.
2. Consist of soil or small rock materials only.
3. Be compacted to provide the necessary permeability and resistance to erosion, scouring, or settling.
4. Be no steeper than one (1) vertical to two (2) horizontal, feet unless substantiated data, justifying steeper slopes are submitted to, and approved, by the Floodplain Administrator.
5. Be used to the extent to which it does not adversely affect adjacent properties.

Section 8.10 Drainage Facilities

A. Storm drainage facilities shall be designed to convey the flow of stormwater runoff in a safe and efficient manner. The system shall ensure proper drainage along streets, and provide positive drainage away from buildings. The system shall also be designed to prevent the discharge of excess runoff onto adjacent properties.

Section 8.11 Water and Sanitary Sewer Facilities and Systems

- A. All new or replacement water supply and sanitary sewer facilities and systems shall be located, de-signed and constructed to minimize or eliminate flood damages and the infiltration of floodwaters.
- B. Sanitary sewer facilities and systems shall be designed to prevent the discharge of untreated sewage into floodwaters.

- C. No part of any on-site sewage system shall be located within any Flood Hazard District except in strict compliance with all state and local regulations for such systems. If any such system is permitted, it shall be located so as to avoid impairment to it, or contamination from it, during a flood.
- D. The design and construction provisions of the [Name of Municipality] Building Code and FEMA #P-348, Protecting Building Utilities From Flood Damages and The International Private Sewage Disposal Code shall be utilized.

Section 8.12 Other Utilities

- A. All other utilities such as gas lines, electrical and telephone systems shall be located, elevated (where possible) and constructed to minimize the chance of impairment during a flood.

Section 8.13 Streets

- A. The finished elevation of all new streets shall be no more than one (1) foot below the regulatory flood elevation.

Section 8.14 Storage

- A. All materials that are buoyant, flammable, explosive, or in times of flooding could be injurious to human, animal, or plant life, and not listed in Section 8.8, Development Which May Endanger Human Life, shall be stored at, or above, the regulatory flood elevation and/or floodproofed to the maximum extent possible.

Section 8.15 Placement and Composition of Buildings and Structures

- A. All buildings and structures shall be designed, located, and constructed so as to offer the minimum obstruction to the flow of water and shall be designed to have a minimum effect upon the flow and height of floodwater.
- B. All buildings and structures shall be firmly anchored in accordance with accepted engineering practices to prevent flotation, collapse, or lateral movement.
- C. All air ducts, large pipes, storage tanks, and other similar objects or components located below the regulatory flood elevation shall be securely anchored or affixed to prevent flotation.
- D. Wood flooring used at, or below, the regulatory flood elevation shall be installed to accommodate a lateral expansion of the flooring, perpendicular to the flooring grain without causing structural damage to the building.
- E. Plywood used at, or below, the regulatory flood elevation shall be of a “marine” or “water-resistant”

variety.

- F. Walls and ceilings at, or below, the regulatory flood elevation shall be designed and constructed of materials that are “water-resistant” and will withstand inundation.
- G. Windows, doors, and other components at, or below, the regulatory flood elevation shall be made of metal or other “water-resistant” material.
- H. Paints and other finishes used at, or below, the regulatory flood elevation shall be of “marine” or “water-resistant” quality.
- I. Adhesives used at, or below, the regulatory flood elevation shall be of a “marine” or “water-resistant” variety.
- J. All wooden components (doors, trim, cabinets, etc.) at, or below, the regulatory flood elevation shall be finished with a “marine” or “water resistant” paint or other finishing material.
- K. Electrical distribution panels shall be at least three (3) feet above the regulatory flood elevation.
- L. Separate electrical circuits shall serve lower levels and shall be dropped from above.
- M. Water heaters, furnaces, air conditioning and ventilating units, and other electrical, mechanical or utility equipment or apparatus shall not be located below the regulatory flood elevation.
- N. All gas and oil supply systems shall be designed to prevent the infiltration of floodwaters into the system and discharges from the system into floodwaters. Additional provisions shall be made for the drainage of these systems in the event that floodwater infiltration occurs.

Section 8.16 Hospitals, Nursing Homes, Jails or Prisons, Manufactured Home Parks

- A. Where a variance has been granted for the construction, enlargement, or expansion of a structure used or intended to be used for a hospital, nursing home, jail or prison, or manufactured home park in the Flood Hazard District, it shall be located, constructed and maintained in a manner that will fully protect the health and safety of the general public and any occupants of the structure. At a minimum, all new structures shall be designed, located, and constructed so that the structure will survive inundation by waters of the base flood elevation without any lateral movement or damage to either the structure itself, or to any of its equipment or contents below the regulatory flood elevation.
- B. The lowest floor (including basement) will be elevated to regulatory flood elevation.
- C. The occupants of the structure can remain inside for an indefinite period of time and be safely evacuated

at any time during the 100-year base flood elevation.

- D. Prevent the risk of any significant possibility of pollution, increased flood levels or flows, or debris endangering life and property.
- E. All hydrologic and hydraulic analyses shall be undertaken only by professional engineers or others of demonstrated qualifications, who shall certify that the technical methods used correctly reflect currently accepted technical concepts. Studies, analyses, computations, etc. shall be submitted in sufficient detail to allow a thorough technical review by [Name of Municipality] and the PA DCED.

Section 8.17 Application Requirements for Hospitals, Nursing Homes, Jails Or Prisons, Manufactured Home Parks

- A. Where a variance has been granted for the construction, enlargement, or expansion of a structure used or intended to be used for a hospital, nursing home, jail or prison, or manufactured home park in the Flood Hazard District, applicants shall provide five copies of the following items to [Name of Municipality]:
 - 1. A written request.
 - 2. A small scale map showing the vicinity in which the proposed site is located.
 - 3. A plan of the entire site, clearly and legibly drawn at a scale of one (1) inch being equal to one hundred (100) feet or less, showing the following:
 - a. North arrow, scale and date.
 - b. Topography based upon the North American Vertical Datum (NAVD) of 1988, showing existing and proposed contours at intervals of two (2) feet.
 - c. All property and lot lines including dimensions, and the size of the site expressed in acres or square feet.
 - d. The location of all existing streets, drives, other access ways, and parking areas, with information concerning widths, pavement types and construction, and elevations.
 - e. The location of any existing bodies of water or watercourses, buildings, structures and other public or private facilities, including railroad tracks and facilities, and any other natural and man-made features affecting, or affected by, the proposed activity or development.
 - f. The location of the floodplain boundary line, information and spot elevations concerning the base flood elevation, and information concerning the flow of water including direction and velocities.
 - g. The location of all proposed buildings, structures, utilities, and any other improvements.
 - h. Any other information which [Municipality] considers necessary for review of the application.
 - 4. Plans of all proposed buildings, structures and other improvements, clearly and legibly drawn at suitable scale showing the following:
 - a. Sufficiently detailed architectural or engineering drawings, including floor plans, sections, and exterior building elevations, as appropriate.
 - b. For any proposed building, the elevation of the lowest floor (including basement) and, as required, the elevation of any other floor.
 - c. Complete information concerning flood depths, pressures, velocities, impact and uplift forces,

- and other factors associated with the base flood elevation.
- d. Detailed information concerning any proposed floodproofing measures.
 - e. Cross section drawings for all proposed streets, drives, other access ways, and parking areas, showing all rights-of-way and pavement widths.
 - f. Profile drawings for all proposed streets, drives, and vehicular access ways including existing and proposed grades.
 - g. Plans and profiles of all proposed sanitary and storm sewer systems, water supply systems, and any other utilities and facilities.
5. Certification from the applicant that the site upon which the activity or development is proposed is an existing separate and single parcel, owned by the applicant or the client he/she represents.
 6. Certification from a registered professional engineer, architect, or landscape architect that the proposed construction has been adequately designed to protect against damage from the base flood elevation.
 7. A statement, certified by a registered professional engineer, architect, landscape architect, or other qualified person which contains a complete and accurate description of the nature and extent of pollution that might possibly occur from the development during the course of a base flood elevation, including a statement concerning the effects such pollution may have on human life.
 8. A statement certified by a registered professional engineer, architect, or landscape architect, which contains a complete and accurate description of the effects the proposed development will have on base flood elevations and flows.
 9. A statement, certified by a registered professional engineer, architect, or landscape architect, which contains a complete and accurate description of the kinds and amounts of any loose buoyant materials or debris that may possibly exist or be located on the site below the base flood elevation and the effects such materials and debris may have on base flood elevations and flows.
 10. The appropriate component of the PA DEP "Sewage Facilities Planning Module for New Land Development".
 11. Where any excavation or grading is proposed, a plan meeting the requirements of the PA DEP to implement and maintain erosion and sedimentation control.
 12. Any other applicable permits such as, but not limited to, a permit for any activity regulated by the PA DEP under Section 302 of Act 1978-166.
 13. An evacuation plan which fully explains the manner in which the site will be safely evacuated before or during the course of a 100-year flood.

Section 8.18 Application Review Procedures for Hospitals, Nursing Homes, Jails and Prisons, Manufactured Home Parks

- A. Upon receipt of an application for the construction, enlargement, or expansion of a structure used or intended to be used for a hospital, nursing home, jail or prison or manufactured home park in the Flood Hazard District by [Name of Municipality], the following procedures shall apply:
 1. Before issuing any permits, [Name of Municipality] shall allow the PA DCED thirty (30) days to review the application.
 2. If [Name of Municipality] does not receive any communication from the PA DCED during the thirty (30) day review period, it may issue permits to the applicant.
 3. If the PA DCED should decide to disapprove an application, it shall notify [Name of Municipality]

and the applicant, in writing, of the reasons for the disapproval, and [Name of Municipality] shall not issue permits.

- B. No application for the construction, enlargement, or expansion of a structure used or intended to be used for a hospital, nursing home, jail or prison or manufactured home park in the Flood Hazard District shall be approved unless it can be determined that the structure or activity will be located, constructed and maintained in a manner which will:
1. Fully protect the health and safety of the general public and any occupants of the structure. At a minimum, all new structures shall be designed, located, and constructed so that the structure will survive inundation by waters of the base flood elevation without any lateral movement or damage to either the structure itself, or to any of its equipment or contents below the regulatory flood elevation.
 2. The lowest floor (including basement) will be elevated to at least to regulatory flood elevation.
 3. The occupants of the structure can remain inside for an indefinite period of time and be safely evacuated at any time during the base flood elevation.
 4. Prevent any significant possibility of pollution, increased flood levels or flows, or debris endangering life and property.
- C. All hydrologic and hydraulic analyses shall be undertaken only by professional engineers or others of demonstrated qualifications, who shall certify that the technical methods used correctly reflect currently accepted technical concepts. Studies, analyses, computations, etc. shall be submitted in sufficient detail to allow a thorough technical review by [Name of Municipality] and the PA DCED.

Article 9. Administration

Section 9.1 Designation of the Floodplain Administrator

- A. The [Building Permit Officer, Zoning Officer, Municipal Manager, etc.] within the [Office, Department, etc.] is hereby appointed to administer and enforce this Ordinance and is referred to herein as the Floodplain Administrator. The Floodplain Administrator may: fulfill the duties and responsibilities set forth in these regulations; delegate duties and responsibilities set forth in these regulations to qualified technical personnel, plan examiners, inspectors, and other employees; or enter into a written agreement or written contract with another agency or private sector entity to administer specific provisions of these regulations. Administration of any part of these regulations by another entity shall not relieve the community of its responsibilities pursuant to the participation requirements of the National Flood Insurance Program as set forth in the Code of Federal Regulations at 44 C.F.R.

Section 59.22.

- B. In the absence of a designated Floodplain Administrator, the Floodplain Administrator duties are to be fulfilled by [Designated Municipal Official].

Section 9.2 Duties and Responsibilities of the Floodplain Administrator

- A. The Floodplain Administrator shall issue a permit only after it has been determined that the proposed work to be undertaken will be in conformance with the requirements of this and all other applicable codes and Ordinances.
- B. Prior to the issuance of any permit, the Floodplain Administrator shall review the application for the permit to determine if all other necessary government permits required by state and federal laws have been obtained, such as those required by the Pennsylvania Sewage Facilities Act (Act 1966-537, as amended); the Pennsylvania Dam Safety and Encroachments Act (Act 1978-325, as amended); the Pennsylvania Clean Streams Act (Act 1937-394, as amended); and the U.S. Clean Water Act, Section 404, 33, U.S.C. 1344. No permit shall be issued until this determination has been made.
- C. In the case of existing structures, prior to the issuance of any permit, the Floodplain Administrator shall review the history of repairs to the subject building, so that any repetitive loss issues can be addressed before the permit is issued.
- D. During the construction period, the Floodplain Administrator or other authorized official shall inspect the premises to determine that the work is progressing in compliance with the information provided on the permit application and with all applicable municipal laws and Ordinances. The Floodplain Administrator shall make as many inspections during and upon completion of the work as are necessary.
- E. In the discharge of his/her duties, the Floodplain Administrator shall have the authority to enter any building, structure, premises or development in the Flood Hazard District, upon presentation of proper credentials, at any reasonable hour to enforce the provisions of this Ordinance.
- F. In the event the Floodplain Administrator discovers that the work does not comply with the permit application or any applicable laws and Ordinances, or that there has been a false statement or misrepresentation by any applicant, the Floodplain Administrator shall revoke the permit and report such fact to the [Municipal Elected Body] for whatever action it considers necessary.
- G. The Floodplain Administrator shall maintain in perpetuity all records associated with the requirements of this Ordinance including, but not limited to, permitting, inspection and enforcement.
- H. The Floodplain Administrator shall consider the requirements of the [Name of Municipality] Building Code.

Section 9.3 Application Procedures and Requirements

- A. Application for such a permit shall be made, in writing, to the Floodplain Administrator on forms supplied by [Name of Municipality]. Such application shall contain the following:
 - 1. Name and address of applicant.
 - 2. Name and address of owner of land on which proposed construction is to occur.
 - 3. Name and address of contractor.

4. Site location including address.
 5. Listing of other permits or variances required.
 6. Brief description of proposed work and estimated cost, including a breakout of flood-related cost and the market value of the building before the flood damage occurred where appropriate.
- B. If any proposed construction or development is located entirely or partially within any Flood Hazard District, applicants for permits shall provide all the necessary information in sufficient detail and clarity to enable the Floodplain Administrator to determine that:
1. All such proposals are consistent with the need to minimize flood damage and conform to the requirements of this and all other applicable codes and Ordinances.
 2. All utilities and facilities, such as sewer, gas, electrical and water systems are located and constructed to minimize or eliminate flood damage.
 3. Adequate drainage is provided so as to reduce exposure to flood hazards.
 4. Structures will be anchored to prevent floatation, collapse, or lateral movement.
 5. Building materials are flood-resistant.
 6. Appropriate practices that minimize flood damage have been used.
 7. Electrical, heating, ventilation, plumbing, air conditioning equipment, and other service facilities have been designed and/or located to prevent water entry or accumulation.
- C. Applicants shall file the following minimum information plus any other pertinent information as may be required by the Floodplain Administrator to make the above determination:
1. A completed permit application form.
 2. A plan of the entire site, clearly and legibly drawn at a scale of one (1) inch being equal to one hundred (100) feet or less, showing:
 - a. North arrow, scale, and date.
 - b. Topographic contour lines, if available.
 - c. The location of all existing and proposed buildings, structures, and other improvements, including the location of any existing or proposed subdivision and development.
 - d. The location of all existing streets, drives, and other access ways.
 - e. The location of any existing bodies of water or watercourses, the Flood Hazard District, and, if available, any information that pertains to the floodway, and the flow of water, including direction and velocities.
 - f. The proposed lowest floor elevation of any proposed building based upon North American Vertical Datum of 1988.
 - g. The elevation of the base flood.
 - h. Supplemental information as may be necessary by the [Name of Municipality] Building Code.
 - i. If available, information concerning flood depths, pressures, velocities, impact and uplift forces and other factors associated with a base flood elevation; and detailed information concerning any proposed floodproofing measures and corresponding elevations.
 - j. Documentation, certified by a registered professional engineer or architect, to show that the cumulative effect of any proposed development within an AE Area/District without floodway when combined with all other existing and anticipated development, will not increase the base flood elevation more than one (1) foot at any point.

- k. A document, certified by a registered professional engineer or architect, which states that the proposed construction or development has been adequately designed to withstand the pressures, velocities, impact and uplift forces associated with the base flood elevation. Such statement shall include a description of the type and extent of floodproofing measures which have been incorporated into the design of the structure and/or the development.
3. Applications for permits shall be accompanied by a fee, payable to the municipality based upon the estimated cost of the proposed construction as determined by the Floodplain Administrator.

Section 9.4 Changes

- A. After the issuance of a permit by the Floodplain Administrator, no changes of any kind shall be made to the application, permit, or any of the plans, specifications or other documents submitted with the application without the written consent or approval of the Floodplain Administrator. Requests for any such change shall be in writing, and shall be submitted by the applicant to Floodplain Administrator for consideration.

Section 9.5 Placards

- A. In addition to the permit, the Floodplain Administrator shall issue a placard which shall be displayed on the premises during the time construction is in progress. This placard shall show the number of the permit, the date of its issuance and be signed by the Floodplain Administrator.

Section 9.6 Start of Construction

- A. Work on the proposed construction or development shall begin within 180 days after the date of issuance of the development permit. Work shall also be completed within twelve (12) months after the date of issuance of the permit or the permit shall expire unless a time extension is granted, in writing, by the Floodplain Administrator. The issuance of development permit does not refer to the zoning approval.
- B. The actual start of construction means either the first placement of permanent construction of a structure on a site, such as the pouring of slab or footings, the installation of piles, the construction of columns, or any work beyond the stage of excavation; or the placement of a manufactured home on a foundation. Permanent construction does not include land preparation, such as clearing, grading, and filling; nor does it include the installation of streets and/or walkways; nor does it include excavation for a basement, footings, piers, or foundations or the erection of temporary forms; nor does it include the installation on the property of accessory buildings, such as garages or sheds not occupied as dwelling units or not part of the main structure. For a substantial improvement, the actual start of construction means the first alteration of any wall, ceiling, floor, or other structural part of a building, whether or not that alteration affects the external dimensions of the building.
- C. Time extensions shall be granted only if a written request is submitted by the applicant, who sets forth sufficient and reasonable cause for the Floodplain Administrator to approve such a request and the original permit is compliant with the Ordinance and FIRM/FIS in effect at the time the extension is

granted.

Section 9.7 Enforcement

- A. Whenever the Floodplain Administrator or other authorized municipal representative determines that there are reasonable grounds to believe that there has been a violation of any provisions of this Ordinance, or of any regulations adopted pursuant thereto, the Floodplain Administrator shall give notice of such alleged violation as hereinafter provided. Such notice shall:
1. Be in writing.
 2. Include a statement of the reasons for its issuance.
 3. Allow a reasonable time not to exceed a period of thirty (30) days for the performance of any act it requires.
 4. Be served upon the property owner or his agent as the case may require; provided, however, that such notice or order shall be deemed to have been properly served upon such owner or agent when a copy thereof has been served with such notice by any other method authorized or required by the laws of Pennsylvania.
 5. Contain an outline of remedial action which, if taken, will effect compliance with the provisions of this Ordinance.
- B. Any person who fails to comply with any or all of the requirements or provisions of this Ordinance or who fails or refuses to comply with any notice, order of direction of the Floodplain Administrator or any other authorized employee of the municipality shall pay a fine to [Name of Municipality], of not less than (Figure to be Set by the Municipality) nor more than (Figure to be Set by the Municipality), plus costs of prosecution. In addition to the above penalties all other actions are hereby reserved including an action in equity for the proper enforcement of this Ordinance. The imposition of a fine or penalty for any violation of, or noncompliance with, this Ordinance shall not excuse the violation or noncompliance or permit it to continue and all such persons shall be required to correct or remedy such violations and noncompliance within a reasonable time. Any development initiated or any structure or building constructed, reconstructed, enlarged, altered, or relocated, in noncompliance with this Ordinance may be declared by the [Municipal Elected Body] to be a public nuisance and abatable as such.

Section 9.8 Appeals

- A. Any person aggrieved by any action or decision of the Floodplain Administrator concerning the administration of the provisions of this Ordinance, may appeal to the [Zoning Hearing Board OR Court of Common Pleas]. Such appeal must be filed, in writing, within thirty (30) days after the decision, determination or action of the Floodplain Administrator.
- B. Upon receipt of such appeal, the [Zoning Hearing Board OR Court of Common Pleas] shall set a time and place, within not less than ten (10), or not more than thirty (30) days, for the purpose of considering the appeal. Notice of the time and place at which the appeal will be considered shall be given to all parties.

- C. Any person aggrieved by any decision of the [Zoning Hearing Board OR Court of Common Pleas] may seek relief there from by appeal to court, as provided by the laws of Pennsylvania including the Pennsylvania Floodplain Management Act.

Section 9.9 Enactment

This Ordinance [Ordinance Number] shall be effective on [Effective date] and shall remain in force until modified, amended or rescinded by [Name of Municipality], [County], Pennsylvania.

ENACTED AND ADOPTED by the [Elected Body] this _____ day of _____, _____.

ATTEST:

[BOARD, COUNCIL, ETC.] OF [NAME OF MUNICIPALITY]

[Name of Municipality] Secretary

By: _____

[Elected Body] President/Chairperson

APPENDIX D

MEMORANDUM OF UNDERSTANDING WITH NON-PROFITS FOR CONSTRUCTION/ MAINTENANCE OF TRAILS

Memorandum of Understanding (MOU)
between the Pittsburgh Trails Advocacy Group (PTAG) and Butler County, Pennsylvania

This MOU dated _____ establishes and defines the working relationship between the Pittsburgh Trails Advocacy Group (PTAG), a not for profit corporation and Butler County, acting through its Parks Department, in order to support shared objectives of improving recreational opportunities related to park trails within the Butler County park system.

PTAG's purpose is to protect and encourage shared use trail access to the wooded trails in Western Pennsylvania. PTAG is concerned with single track trails used by mountain bikers, equestrians, and hikers. PTAG works with city, county, state, and private landowners to ensure that all trails are approved by the landowner or land manager and constructed and maintained to International Mountain Bike Association (IMBA) standards, with minimal impact on the environment, recognizing that the larger mission of creating sustainable trails is the preservation of Western Pennsylvania's forests, lakes, rivers, and streams. PTAG works to educate all users on responsible trail use with the goal of fostering improved relations among landowners and trail users. PTAG has been providing this service to the western Pennsylvania region since 2001.

Butler County recognizes that trail use, to include mountain biking, is a healthy, popular, and authorized recreational choice in county parks for the citizens of Pennsylvania and is consistent with the Parks Department's mission to enhance the quality of life and well being of Butler County residents through a regional parks system that: (1) Provides quality landscapes, facilities, programs, and special events that meet county-wide needs for leisure and recreation on behalf of the diverse segments of the community; (2) Conserves natural and cultural resources while offering educational programs and opportunities for hands on experience; (3) Forms an integral part of a county-wide system of open spaces, greenways, and trails; (4) and Contributes to the economic vitality of the County.

Butler County is concerned about public physical fitness and health, encourages programs that increase interest in, enthusiasm for, and participation in health and fitness. Additionally, Butler County considers the parks to be an important natural resource and recognizes the absolute need for sustainable and purposeful trails to enable its citizens to respect and protect the land.

PTAG's Responsibilities:

1. PTAG agrees to develop and supply a volunteer base for the repair, maintenance, and installation of multi-use trails. PTAG may also solicit volunteers from other user groups to participate in trail work. Butler County remains responsible for maintenance of all improved surface (gravel) roads and fire roads, for which PTAG will have no responsibility.
2. The PTAG Board of Directors will designate a steward team or representative for each park in which PTAG is asked to undertake trail work. The park steward will coordinate trail projects with the PTAG Board of Directors and the Parks Director, or his or her duly authorized representative. PTAG will supply volunteers with hand tools of the trail building trade. The appointed park steward shall have be trained in IMBA sustainable trail building techniques by participating in a International Mountain Bicycle Association (IMBA) Trail Care Crew Workshop/Trail Building Workshop (IMBA Trained).

3. An IMBA Trained PTAG representative will provide training and safety instruction before each work session and lead each trail work crew. PTAG will also provide a first aid kit on all work details.
4. Trail work performed by PTAG includes, but is not limited to, the following: corridor clearing, tread improvement, water and erosion control measures, installation of crib walls and rolling crown switchbacks, bridge building, culvert installation, step installation, installation of trail guide structures, signing and blazing of trails, armoring and/or hardening of water crossings, and closure or restoration of existing trails.
5. PTAG may also propose the design and installation of new trails where appropriate, or as requested, subject to PTAG Board approval. New trail construction must be approved by the Parks Director in writing. New trails will be sustainable, purposeful, and of the highest quality possible so as to improve the user experience, improve trail connectivity, and reduce user conflict. The designated PTAG steward will submit any new trail proposals to the PTAG board for approval prior to submission to the Parks Director. All new trail design layouts will minimize the impact on natural resources while enhancing the user experience.
6. PTAG agrees to maintain, inspect, repair, insure, and in all respects service the Freeride and Bike Skills Area as authorized by this MOU. PTAG may also install future freeride trails and features subject to Parks Director written approval. The a Freeride and Bike Skills Area, and the natural and artificial features located thereon, shall remain the property of Butler County, and as such, the County reserves the right to perform the same services listed above when deemed necessary in its discretion. The Freeride and Bike Skills Area shall enjoy the same rights and privileges to exist and remain as do any other similar county park feature. Evidence of satisfactory insurance with notice of cancellation to County will be provided. Butler County will be covered under the insurance as “additional Insured”.
7. Recognizing that PTAG may not necessarily service all trails within the County park system, PTAG will maintain a log of all trails built, repaired, or maintained, so as to ensure it can provide meaningful comment on any given proposed trail event.

Butler County’s Responsibilities:

1. Butler County authorizes PTAG to perform trail work on all trails located within the Butler County Park system.
2. From time to time Butler County may also supply tools and personnel where appropriate or requested to assist PTAG with trail work.
3. The County authorizes the installation of a Freeride and Bike Skills Area location in mutually agreed upon location by PTAG and the Parks Director.
4. In order to ensure that all PTAG serviced trails are used and preserved in accordance with PTAG’s mission, a PTAG representative, as appointed by the PTAG Board, is invited by Butler County to be present at any and all County meetings regarding proposed trail events in order to offer comment on proposed trail use in an advisory capacity. Under no circumstances will PTAG act as an approval authority for any proposed trail event within the park system.

If any provisions of this MOU are determined to be inconsistent with existing laws, regulations, or directives governing the signatories, then only those provisions of this MOU not affected by an inconsistency shall remain in full force and effect.

Any fiscal or funding arrangements are not governed by this MOU, rather arrangements involving contribution

or reimbursement of funds will be outlined in separate agreements as authorized by the appropriate statutory authority. PTAG agrees to maintain liability insurance for all PTAG serviced trails within the County park system.

This agreement will remain in effect for five (5) years at which time it will continue on a year to year basis unless specifically renewed or modified by agreement of all parties. This agreement may be amended at any time by agreement of all parties, or it may be terminated unilaterally by any party. PTAG also reserves the right to decline trail work requests for good cause without affecting the validity of this agreement. This MOU will constitute a permit for PTAG to perform work as specified by the MOU.

By:

Pittsburgh Trails Advocacy Group

Butler County Parks & Recreation Department

President

Butler County Parks and Recreation Director

Butler County Commissioners

William L. McCarrier

A. Dale Pinkerton

James Eckstein

Butler County Solicitor

APPENDIX E

COMPLETE STREETS POLICY

Complete Streets Policy

Complete Streets policies formalize a community's goal to have streets that are safe for all types of users of all ages and abilities. Policies direct decision-makers to consistently fund, plan for, design, construct, operate and maintain community streets to accommodate all anticipated users, including people walking, bicycling, taking public transportation and driving cars as well as commercial vehicles. The National Complete Streets Coalition promotes a comprehensive policy model that includes ten ideal elements:

1. Vision: The policy establishes a motivating vision for why the community wants to Complete Streets: for improved safety, better health, increased efficiency, convenience of choices or other reasons.
- 2.
3. All users and modes: The policy specifies that “all modes” includes walking, bicycling, riding public transportation, driving trucks, buses and automobiles and “all users” includes people of all ages and abilities.
- 4.
5. All projects and phases: All types of transportation projects are subject to the policy, including design, planning, construction, maintenance, and operations of new and existing streets and facilities.
- 6.
7. Clear, accountable exceptions: Any exceptions to the policy are specified and approved by a high-level official.
8. Network: The policy recognizes the need to create a comprehensive, integrated and connected network for all modes and encourages street connectivity.
9. Jurisdiction: All other agencies that govern transportation activities can clearly understand the policy's application and may be involved in the process as appropriate.
10. Design: The policy recommends use of the latest and best design criteria and guidelines, while recognizing the need for flexibility to balance user needs.
11. Context sensitivity: The current and planned context—buildings, land use and transportation needs—is considered in planning and design solutions for transportation projects.
12. Performance measures: The policy includes performance standards with measurable outcomes.
13. Implementation steps: Specific next steps for implementing the policy are described.

Resources

- Elements of an ideal Complete Streets policy:
<http://www.smartgrowthamerica.org/documents/cs/policy/cs-policyelements.pdf>
- Complete Streets Policy Development 101: Presentation
<http://www.smartgrowthamerica.org/documents/cs/resources/cs-policy.pptx>

- Complete Streets Local Policy Workbook
<http://www.smartgrowthamerica.org/documents/cs/resources/cs-policyworkbook.pdf>
- Best of Complete Street Policies 2014
www.smartgrowthamerica.org/documents/best-complete-streets-policies-of-2014.pdf

Model Complete Streets Resolution

WHEREAS “Complete Streets” are streets that are safe and convenient for all users, including pedestrians, bicyclists, public transportation riders and motor vehicle drivers of all ages and abilities; and

WHEREAS, [Municipality] recognizes that streets are a key factor in the way people experience the public realm and play a vital role in promoting economic development, public safety, health and quality of life; and

WHEREAS, the design and function of our streets has often favored the motorist over the needs and safety of other users of the transportation network, particularly pedestrians, bicyclists, transit users and persons with disabilities; and

WHEREAS, [Municipality] is committed to providing increased mobility choices and improved safety for all its residents, as embodied in the goals and policies of the Municipality’s Comprehensive Plan; and

WHEREAS, investments in pedestrian, bicycle and transit infrastructure will help promote “active transportation” and bring physical activity into the daily lives of the citizens of [Municipality] which will improve their health, reduce the incidence of diseases related to inactivity such as obesity and heart attacks and improve air quality and limit greenhouse gas emissions by reducing traffic congestion; and

WHEREAS, [Municipality] seeks to create an interconnected network of transportation facilities that accommodate all modes of travel in a manner consistent with the community context and goals and that incorporate green infrastructure measures, where appropriate;

NOW THEREFORE BE IT RESOLVED that [Municipality], Pennsylvania commits to a Complete Streets Policy that will incorporate Complete Streets into the planning, design and operation of all future street, sidewalk, trail and other transportation projects, whether new construction, reconstruction, rehabilitation or pavement resurfacing and restoration; and

BE IT FURTHER RESOLVED that municipal staff are directed to review and update, as needed, language in the [Municipality] Comprehensive Plan, SALDO, zoning ordinance, other codes and Capital Improvement Plan, to incorporate the intent of this Complete Streets Policy and use best practice design guidelines as set forth in the attached Municipality Complete Streets Policy, which shall be effective immediately upon the enactment.

Chairperson [City Council/Borough Council Board of Supervisors]

Council Member/Supervisor

Council Member/Supervisor

Council Member/Supervisor

Council Member/Supervisor

Council Member/Supervisor

Enacted this (day) of Month, (Year)

Model Complete Streets Policy

Complete Streets Policy Statement

It is the policy of [Municipality] to establish an interconnected network of streets that is planned, designed and maintained in a manner that provides safe and convenient access for users of all modes of travel, including motorists, pedestrians, bicyclists and transit, and all ages and abilities.

Purpose

The [Municipality] seeks through this Complete Streets Policy to create an interconnected network of streets, sidewalks, pathways and other transportation facilities that accommodate users of all ages and abilities and modes of travel, including motorists, pedestrians, bicyclists and transit users, in a manner consistent with community context and goals. The intent of this Policy is to better integrate physical activity into the daily lives of those who live in and visit [Municipality] through an increased emphasis on active transportation modes which will contribute to improved safety, health, reduced traffic congestion, improved air quality, reduced emissions of greenhouse gases and more economically vibrant communities.

Goals

- A. Create an efficient and interconnected multi-modal transportation system that ensures that the safety and convenience of all users of the transportation system are accommodated
- B. Support the Municipality Comprehensive Plan, and, in particular, its transportation elements, and efforts to create more walkable, livable communities
- C. Incorporate the principles in this Policy into all aspects of the transportation project development pro-

- cess, including project identification, scoping procedures, design and all phases of construction
- D. Ensure the use of the latest and best design standards, policies and guidelines
 - E. Provide flexibility for different types of streets, areas and users
 - F. Ensure that the Complete Streets are designed be context-sensitive and meet the values and design of the communities in which they are located.

Directives

1. This Complete Streets Policy applies to all municipal street, sidewalk and trail projects, including new construction, reconstruction or rehabilitation projects to accommodate users of all ages and abilities, including pedestrians, bicyclists, transit users, motorists, emergency responders and other road users. It applies to all street projects whether public or private and all improvements regardless of funding source.
2. Accommodations for all users of the surface transportation network shall be in accordance with the latest and best design standards, principles, policies and guidelines and shall be consistent with the context and character of the surrounding built and natural environments and enhance the appearance of such. Innovative and/or nontraditional design options will also be considered, as appropriate.
3. Roadways, sidewalks, shared-use paths, street crossings, pedestrian signals, signs, street furniture, transit stops and facilities and all connecting pathways shall be designed, constructed, operated and maintained so that all users of the surface transportation network can travel safely, reliably and independently.
4. Reasonable effort shall be made to identify adjacent alternative routes and/or methods of travel to provide a safe, reliable and interconnected surface transportation network where accommodations for all users cannot be made;

Implementation

The [Municipality] will establish a Complete Streets program that includes the following elements:

1. Municipal staff will review and update, as needed, language in the [Municipal] comprehensive plan, SALDO and zoning ordinance and other codes to incorporate the intent of this Complete Streets Policy. The municipality will update and/or create a Capital Improvement Program (CIP) that will provide the financial mechanism and commitment to support complete street projects.
2. Design Guidelines on how to build Complete Streets will be adopted and implemented.
3. Workshops will be designed and offered to Municipal decision makers, planners and engineers to provide information on the design and implementation of Complete Streets.
4. A system of performance measures will be implemented and data collected and analyzed to determine the increased use of active transportation modes and the success of this Policy.
5. The [Municipal] Planning Commission shall prepare and provide to the [City or Borough Council or

Board of Supervisors] an annual report on the municipality's consistency with this Complete Streets Policy with respect to all street construction, reconstruction, rehabilitation and pavement maintenance projects.

Exemptions

Exemptions from the Complete Streets Policy shall be considered under the following conditions:

1. The Municipal Engineer determines and provides written justification that establishing such new facilities would require an excessive and disproportionate cost;
2. The Municipal Engineer determines and provides written justification that inclusion of such new facilities would create a public safety risk for users of the public right-of-way
3. The Municipal Engineer determines and provides written justification that there is insufficient space within the right-of-way to safely accommodate such new facilities;
4. Pedestrians and bicyclists are prohibited by law from using the facility;
5. The project is limited to routine or seasonal maintenance activities such as mowing, sweeping or spot pavement repairs.
6. An affected roadway prohibits, by law, use by specified users (such as an interstate freeways or pedestrian malls), in which case a greater effort shall be made to accommodate those specified users elsewhere, including on roadways that cross or otherwise intersect with the affected roadway

The [Municipality] Complete Streets Policy shall be in effect immediately upon adoption by the [City Council/Borough Council or Board of Supervisors]. Surface transportation projects in the final stages of design or under construction at the time of adoption are exempt from this Policy.

Adopted by the

City Council/Borough Council/Board of Supervisors

Date _____

APPENDIX F

MODEL BICYCLE PARKING ORDINANCE

An Ordinance of [Jurisdiction (e.g. the City of _____)] Providing for Bicycle Parking and Adding to the [Jurisdiction] [Zoning/Planning/Municipal/County] Code.

Source: <http://www.changelabsolutions.org/publications/bike-parking>

ChangeLab Solutions is a nonprofit organization that provides legal information on matters relating to public health. The legal information provided in this document does not constitute legal advice or legal representation. For legal advice, readers should consult a lawyer. Support provided by a grant from the Robert Wood Johnson Foundation.

The [Adopting Body] does ordain as follows:

SECTION I. FINDINGS. The [Adopting Body] hereby finds and declares as follows:

- 1. WHEREAS**, the [Adopting Body] has a goal of improving the health of its residents and the air quality of the community;
- 2. WHEREAS**, both obesity and insufficient physical activity are creating significant health problems for Americans, leading to increased risk of heart disease, diabetes, endometrial, breast, and colon cancers, high blood pressure, high cholesterol, stroke, liver and gallbladder disease, sleep apnea, respiratory problems, and osteoarthritis;¹
- 3. WHEREAS**, a primary contributor to obesity is lack of sufficient physical activity;²
- 4. WHEREAS**, bicycling is a safe, low-impact aerobic activity, enjoyed by millions of Americans, and provides a convenient opportunity to obtain physical exercise while traveling to work, shops, restaurants, and many other common destinations;³
- 5. WHEREAS**, bicycling frequently provides a practical alternative to driving, since 28 percent of all car trips are to destinations within 1 mile of home,⁴ 40 percent of all trips are two miles or less from home,⁵ and around 30 percent of commuters travel 5 miles or less to work;⁶
- 6. WHEREAS**, bicycling can greatly increase access to important services and provide more range of travel for people who do not own or cannot operate a car, including our increasing aging population, children and youth, people who are low-income, and those with disabilities or medical restrictions on driving due to issues like seizure disorders or vision impairments;⁷
- 7. WHEREAS**, replacing car trips with bicycle trips improves air quality by reducing the amount of carbon dioxide emissions, in light of the fact that transportation sources account for nearly one third of all such emissions in the United States, an average motor vehicle emits 8.8 kilograms of carbon dioxide per gallon of gasoline that it burns, and biking emits essentially none;⁸
- 8. WHEREAS**, asthma rates are at their highest levels ever, with nearly one in 10 children and almost one in 12 Americans of all ages suffering from asthma, and replacing motor vehicle trips with bicycle trips reduces the pollutants that directly contribute to asthma in both children and adults;⁹
- 9. WHEREAS**, replacing car trips with bicycle trips reduces congestion and wear and tear on roads,

improving quality of life for residents and providing a financial benefit for [Jurisdiction];

10. WHEREAS, providing safe, convenient, and adequate bicycle parking is necessary to encourage increased use of bicycles as a form of transportation;¹⁰

11. WHEREAS, cities that have improved bicycle infrastructure, including parking, have seen a measurable increase in bicycle trips;¹¹

12. WHEREAS, in light of the foregoing, [Adopting Body] desires to add new bicycle parking requirements to increase the availability of safe and convenient bicycle parking; and

13. WHEREAS, it is the intent of the [Adopting Body] in enacting this Ordinance to (1) encourage healthy, active living, (2) reduce traffic congestion, air pollution, wear and tear on roads, and use of fossil fuels, and (3) improve safety and quality of life for residents of [Jurisdiction] by providing safe and convenient parking for bicycles;

SECTION II. [ARTICLE/CHAPTER] OF THE [JURISDICTION] [ZONING/PLANNING/MUNICIPAL/COUNTY CODE] IS HEREBY ADDED TO READ AS FOLLOWS: “BICYCLE PARKING REQUIREMENTS FOR NEW DEVELOPMENT AND MAJOR RENOVATIONS.”

§ 1. **PURPOSE:** The purpose of this section is to provide sufficient safe and convenient bicycle parking in New Developments and Major Renovations to encourage bicycling as a form of transportation, reducing traffic congestion, air pollution, wear and tear on roads, and use of fossil fuels, while fostering healthy physical activity.

§ 2. **DEFINITIONS:** Unless the context clearly requires otherwise, the following terms shall have the following meanings:

- (A) **“Bicycle Parking Space”:** A physical space that is a minimum of [2.5] feet in width by [6] feet in length with a vertical clearance of at least [7] feet that allows for the parking of one bicycle, and if located outside, is hard surfaced and well drained.
- (B) **“Bike Locker”:** A lockable enclosure consistent with industry standards that (i) can hold one bicycle, (ii) is made of durable material, (iii) is designed to fully protect the bicycle against [insert specific local weather concerns, e.g.: rain, snow, ice, high winds], (iv) provides secure protection from theft, (v) opens sufficiently to allow bicyclists easy access, and (vi) is of a character and color that adds aesthetically to the immediate environment.
- (C) **“Bike Rack”:** A device consistent with industry standards that (i) is capable of supporting a bicycle in a stable position, (ii) is made of durable materials, (iii) is no less than [36] inches tall (from base to top of rack) and no less than [1.5] feet in length, (iv) permits the securing of the bicycle frame and one wheel with a U-shaped lock, and (v) is of a character and color that adds aesthetically to the immediate environment.

- (D) **“In-Street Bicycle Parking”**: A portion of a vehicle parking lane or other area on a roadway that is set aside for the parking of bicycles.
- (E) **“Long-Term Bicycle Parking”**: Bicycle parking that is primarily intended for bicyclists who need bicycle parking for more than 3 hours and is fully protected from the weather.
- (F) **“Long-Term Bicycle Parking Space”**: A Bicycle Parking Space that provides Long-Term Bicycle Parking.
- (G) **“Major Renovation”**: Any physical improvement of an existing building or structure, excluding single-family dwellings and multi-family dwellings with 4 or fewer units, that requires a building permit and has an estimated construction cost equal to or exceeding [\$250,000], excluding cost of (1) compliance with accessibility requirements for individuals with disabilities under governing federal, state, or local law, and (2) seismic or other structural safety retrofit.
- (H) **“New Development”**: Any construction of a new building or facility that requires a building permit, excluding single-family dwellings and multi-family dwellings with 4 or less units.
- (I) **“Short-Term Bicycle Parking”**: Bicycle parking primarily intended for bicyclists who need bicycle parking for 3 hours or less.
- (J) **“Short-Term Bicycle Parking Space”**: A Bicycle Parking Space that provides Short-Term Bicycle Parking.

§ 3. BICYCLE PARKING SPACES REQUIRED: Short-Term and Long-Term Bicycle Parking Spaces shall be required for all New Development and Major Renovations.

- (A) **Required Number of Bicycle Parking Spaces:** All New Development and Major Renovations shall provide at least the number of Short-Term and Long-Term Bicycle Parking Spaces identified in the table in this subsection [Section II, § 3(A)]; however, the number shall not fall below a minimum of [2] Short-Term and [2] Long-Term Bicycle Parking Spaces, regardless of other provisions herein, except that multi-family dwellings that have private garages (or equivalent separate storage space for each unit) are not required to provide any Long-Term Bicycle Parking Spaces. Where the calculation of total required spaces results in a fractional number, the next highest whole number shall be used. Up to half of the required Short-Term Bicycle Parking Spaces may be replaced with Long-Term Bicycle Parking Spaces.

General Use Category	Specific Use	Number of Short-Term Bicycle Parking Spaces Required	Number of Long-Term Bicycle Parking Spaces Required
Residential	Multi-Family Dwelling with more than 4 units:		
	(a) <i>without</i> private garage or equivalent separate storage space for each unit	[.05] per bedroom or [1] per [20] units	[.5] per bedroom or [1-4] per [4] units
	(b) <i>with</i> private garage or equivalent separate storage space for each unit	[.05] per bedroom or [1] per [20] units	None
Commercial	Office Building	[1] per each [20,000] sq.ft. of floor area	[1-1.5] per [10,000] sq.ft. of floor area
	General Retail	[1] per each [5,000] sq.ft. of floor area	[1] per [10,000-12,000] sq.ft. of floor area
	Grocery	[1] per each [2,000] sq.ft. of floor area	[1] per [10,000-12,000] sq.ft. of floor area
	Restaurant	[1] per each [2,000] sq.ft. of floor area	[1] per [10,000-12,000] sq.ft. of floor area
	Parking Garage	[2] spaces	[1] per [20] motor vehicle spaces
	Outdoor Parking Lot	[1] per [20] motor vehicle spaces	[2] spaces
Civic	Non-assembly cultural (e.g., library, government buildings)	[1] per each [8,000 -10,000] sq. ft. of floor area	[1-1.5] per each [10-20] employees
	Assembly (e.g., church, theater, stadiums, parks)	Spaces for [2-5] per cent of maximum expected daily attendance	[1- 1.5] per each [20] employees
	Schools (K-12)	[1] per each [20] students of planned capacity	[1] per each [10-20] employees and [1] per each [20] students of planned capacity for grades 6-12
	Colleges and Universities	[1] per each [10] students of planned capacity	[1] per each [10-20] employees and [1] per each [10] students of planned capacity or [1] per each [20,000] sq. feet of floor area, whichever is greater
Industrial	Manufacturing and Production, Agriculture	[2] spaces (Can be increased at discretion of Planning/Zoning Administrator)	[1] per 20 employees

- (B) If the New Development or Major Renovation is for a use not listed in the above table, the number of Bicycle Parking Spaces required shall be calculated on the basis of a similar use, as determined by the [Planning Director/Zoning Administrator].
- (C) If the Major Renovation has an estimated construction cost of between [\$250,000] and [\$1,000,000], excluding the cost of (1) compliance with accessibility requirements for individuals with disabilities under governing federal, state, or local law, and (2) seismic or other structural safety retrofit, the number of Bicycle Parking Spaces required by subsections [Section II, § (3)(A)-(B)], shall be reduced by 50 percent; however, the minimum requirement of [2] short-term and [2] long-term bicycle parking spaces shall still apply.

§ 4. BUILDING PERMITS AND CERTIFICATES OF OCCUPANCY: Prior to issuance of a building permit for New Development or a Major Renovation, the submitted plans must include specific provisions for bicycle parking that are consistent with the requirements of this Ordinance. No certificate of occupancy for said building permit shall issue at the conclusion of the project until [Jurisdiction] finds that the applicable provisions of this Ordinance have been complied with.

§ 5. EXISTING BICYCLE PARKING AFFECTED BY CONSTRUCTION: In the event that the [Jurisdiction] has authorized a permit holder to remove existing bicycle parking in the public right-of-way due to construction, the permit holder shall replace such bicycle parking no later than the date of completion of the construction. At least [7] days prior to removal of such bicycle parking, the permit holder shall post, in the immediate vicinity of the bicycle parking area, a weather-proof notice, with a minimum type size of [1] inch, specifying the date of removal. In the event that any bicycles remain parked on the date of the removal, such bicycles shall be stored for a reasonable period, not less than [45] days, and a conspicuous, weather-proof notice shall be placed as close as feasible to the site of the removed bicycle parking containing information as to how to retrieve a removed bicycle.

If bicycle parking is likely to be removed, pursuant to this section, for more than [120] days, it shall, to the extent possible, be temporarily re-sited, in coordination with [insert appropriate department, such as Department of Public Works], to a location as close to the original site as feasible, pending completion of the construction. If the temporary site is not clearly visible from the original site, the permit holder shall post a conspicuous, weather-proof notice in the immediate vicinity of the original site informing bicyclists of the location of the temporary site.

§ 6. BICYCLE PARKING STANDARDS - GENERAL:

- (A) All Bicycle Parking Spaces shall be:
 - (1) well lit if accessible to the public or bicyclists after dark;
 - (2) located to ensure significant visibility by the public and building users, except in the case of Long-Term Bicycle Parking that is located in secured areas;
- (3) accessible without climbing more than one step or going up or down a slope in excess of [12] percent, and via a route on the property that is designed to minimize conflicts with motor vehicles and

pedestrians.

(B) All In-Street Bicycle Parking and Bicycle Parking Spaces located in a parking facility shall be:

- (1) clearly marked; and
- (2) separated from motor vehicles by some form of physical barrier (such as bollards, concrete or rubber curbing or pads, reflective wands, a wall, or a combination thereof) designed to adequately protect the safety of bicyclists and bicycles.

(C) All Bike Racks shall be located at least [36] inches in all directions from any obstruction, including but not limited to other Bike Racks, walls, doors, posts, columns, or exterior or interior landscaping.

(D) Unless Bicycle Parking Spaces are clearly visible from an entrance, a sign indicating their location shall be prominently displayed outside the main entrance to the building or facility, and additional signs shall be provided as necessary to ensure easy way finding. A “Bicycle Parking” sign shall also be displayed on or adjacent to any indoor room or area designated for bicycle parking. All outdoor signs required by this subsection [Section II, § 6(D)] shall be no smaller than [12] x [18] inches and utilize a type size of at least [2] inches. All indoor signs required by this subsection [Section II, § 6(D)] shall be no smaller than [8] x [10] inches and utilize a type size of at least [5/8] inch.

§ 7. ADDITIONAL REQUIREMENTS APPLICABLE TO SHORT-TERM BICYCLE PARKING ONLY: All Short-Term Bicycle Parking Spaces shall contain Bike Racks and shall meet the following requirements, in addition to the requirements in [Section II, § 3] above:

(A) Location:

(1) Short-Term Bicycle Parking must be located either (a) within [50] feet of the main public entrance of the building or facility, or (b) no further than the nearest motor vehicle parking space to the main public entrance (excluding parking for individuals with disabilities), whichever is closer. If the New Development or Major Renovation contains multiple buildings or facilities, the required Short-Term Bicycle Parking shall be distributed to maximize convenience and use.

(2) Short-Term Bicycle Parking Spaces may be located either (a) on-site or (b) in the public right-of-way (e.g., sidewalk or In-Street Bicycle Parking), provided that an encroachment permit is obtained for the installation and the installation meets all other requirements of [indicate the law governing encroachments on public rights-of-way]. If Bike Racks are located on public sidewalks, they must provide at least [5] feet of pedestrian clearance, and up to [6] feet where available, and be at least [2] feet from the curb.

(B) Bike Rack Requirements: Bike Racks used for Short-Term Bicycle Parking must be securely attached to concrete footings, a concrete sidewalk, or another comparably secure concrete surface, and made to withstand severe weather and permanent exposure to the elements.

§ 8. ADDITIONAL REQUIREMENTS APPLICABLE TO LONG-TERM BICYCLE PARKING ONLY: Long-Term

Bicycle Parking shall be provided in either (1) Bike Lockers or (2) indoor rooms or areas specifically designated for bicycle parking (including designated areas of an indoor parking facility), and shall satisfy the following requirements, in addition to those set forth in [Section II, § 3] above:

- (A) **Location:** Long-Term Bicycle Parking may be located either on- or off-site. If located off-site, it shall be no more than [300 feet] from the main public entrance.
- (B) **Requirements for Indoor Long-Term Bicycle Parking:** Long-Term Bicycle Parking located in designated indoor rooms or areas shall contain Bike Racks or comparable devices. Such rooms shall be designed to maximize visibility of all portions of the room or designated area from the entrance. Supplemental security measures (such as limiting access to a designated indoor bike parking room to persons with a key, smart card, or code) are optional.

§ 9. MOTOR VEHICLE PARKING SPACE CREDITS:

- (A) For every [6] Bicycle Parking Spaces provided, the number of required off-street motor vehicle parking spaces (excluding parking spaces for individuals with disabilities) on a site shall be reduced by [1] space.
- (B) To encourage the installation of showers at non-residential sites, the number of required off-street motor vehicle parking spaces for such sites shall be reduced as follows: A credit of [1] space shall be provided for the first shower installed, with additional off-street motor vehicle parking credits available at a rate of [1] space for each additional shower provided per [25] required Bicycle Parking Spaces. In order to claim these credits, which shall be in addition to the bicycle parking credits provided for in [Section II, § 9(A)], shower facilities must be readily available for use by all employees of the New Development or Major Renovation.

§ 10. **(optional) MODIFICATION OF REQUIREMENTS:** In the event that satisfying all of the requirements of [Section II] would be (a) infeasible due to the unique nature of the site, or (b) cause an unintended consequence that undermines the purpose of this Ordinance, a property owner (or designee) may submit a written request to the [Planning Director/Zoning Administrator/other Local Administrator or designee] for a modification of the requirements of [Section II]. The request shall state the specific reason(s) for the request, provide supporting documentation, and propose an alternative action that will allow the purposes of this Ordinance to be fulfilled as much as possible.

SECTION III. [ARTICLE/CHAPTER] OF THE [JURISDICTION] [ZONING/PLANNING/MUNICIPAL/COUNTY CODE] IS HEREBY ADDED TO READ “BICYCLE PARKING REQUIREMENTS FOR PARKING FACILITIES.”

§ 1. **PURPOSE:** The purpose of [Section III] is to provide sufficient safe and convenient bicycle parking in parking facilities so as to encourage bicycling as a form of transportation, which in turn reduces traffic congestion, air pollution, wear and tear on roads, and use of fossil fuels, while fostering healthy physical activity.

§ 2. **DEFINITIONS:** The definitions set forth in [Section II, § 2] shall apply to [Section III], unless the context

clearly requires otherwise.

§ 3. **LICENSING CONDITIONS:** As a condition of the issuance or renewal of a license required by the [Jurisdiction] for a parking facility, parking facilities shall provide [1] Bicycle Parking Space per each [20] vehicle parking spaces provided, with a minimum of [6] Bicycle Parking Spaces. Where the calculation of total required spaces results in a fractional number, the next highest whole number shall be used.

§ 4. **LOCATION:** All Bicycle Parking Spaces required by [Section III] shall be located in an area, preferably on the ground floor, that (i) can be conveniently and safely accessed by bicycle and by foot in a way that minimizes conflicts with motor vehicles, (ii) is not isolated, and (iii) maximizes visibility by parking facility patrons and attendants. If the licensed parking facility has multiple entrances, the required Bicycle Parking Spaces may be spread out among the multiple entrances. Bicycle Parking Spaces shall be accessible without climbing more than one step or going up or down a slope in excess of [12] percent.

§ 5. **BIKE RACKS:** All Bicycle Parking Spaces required by [Section III] shall contain Bike Racks and shall be well lit if accessible to the public or bicyclists after dark or if in an interior or darkened location. All Bike Racks shall also provide a clearance of at least [36] inches in all directions from any obstruction (including but not limited to other bike racks, walls, doors, posts, columns or landscaping), and shall be separated from vehicles by some form of physical barrier (such as bollards, concrete or rubber curbing or pads, reflective wands, a wall, or a combination thereof) designed to adequately protect the safety of bicyclists and bicycles. All Bike Racks located outdoors shall also be securely attached to concrete footings and made to withstand severe weather and permanent exposure to the elements.

§ 6. **SIGNAGE:** Parking facilities shall also install prominent signs, no smaller than [12] x [18] inches and utilizing a type size of at least [2] inches, in or near each entrance that advertise the availability of bicycle parking, and the location, if it is not visible from the entrance.

§ 7. **CONTRACTUAL LIMITS ON LIABILITY:** [Section III] shall not interfere with the rights of a parking facility owner (or designee) to enter into agreements with facility users or take other lawful measures to limit the parking facility's liability to users, including bicycle users, with respect to parking in the parking facility, provided that such agreements or measures are otherwise in accordance with the requirements of [this Ordinance] and the law.

SECTION IV. [ARTICLE/CHAPTER] OF THE [JURISDICTION] [ZONING/PLANNING/MUNICIPAL/COUNTY CODE] IS HEREBY ADDED TO READ "BICYCLE PARKING REQUIREMENTS FOR SPECIAL EVENTS INVOLVING STREET CLOSURES."

§ 1. **PURPOSE:** The purpose of [Section IV] is to provide sufficient safe and convenient bicycle parking at special events involving street closures to encourage bicycling as a form of transportation, which in turn reduces traffic congestion, air pollution, wear and tear on roads, and use of fossil fuels, while fostering healthy physical activity.

§ 2. **CONDITIONS ON STREET CLOSURE PERMITS:** As a condition of a permit for the closure of a street for a special event in which the daily number of participants is projected to be [1,000] or more, monitored

bicycle parking shall be provided by the event sponsor (or a designee) for at least [1] % of expected daily participants beginning [½ hour] before and ending [½ hour] after the time of the event each day of the event.

§ 3. **REQUIREMENTS FOR MONITORED PARKING:** Monitored bicycle parking shall include the presence, at all times, of one attendant, or more as needed, to receive bicycles, dispense claim checks, return bicycles, and provide security for all bicycles.

§ 4. **LOCATION:** All monitored bicycle parking shall be located within [500] feet of at least one regular entrance or access point to the event.

§ 5. **PUBLICITY AND SIGNAGE:** All publicity, including signs, for the event shall state the availability of monitored bicycle parking, its location, and cost, if any. All event maps shall include the location of monitored bicycle parking. If monitored bicycle parking is not within eyeshot of each entrance, signs shall be provided to ensure easy way finding.

§ 6. **INSURANCE COVERAGE AND FEES:** The event sponsor or designee must provide insurance coverage for the monitored bicycle parking in case of damaged or stolen bicycles, and may charge users a fee to cover the cost of providing the monitored parking.

SECTION V. [ARTICLE/CHAPTER] OF THE [ZONING/PLANNING/MUNICIPAL/COUNTY CODE] IS HEREBY ADDED TO READ “REMOVAL OF ABANDONED BICYCLES.”

§ 1. **PURPOSE:** The purpose of [Section V] is to ensure the reasonably prompt removal of bicycles abandoned in Bicycle Parking Spaces so as to encourage bicycling as a form of transportation, which in turn reduces traffic congestion, air pollution, wear and tear on roads, and use of fossil fuels, while fostering healthy physical activity.

§ 2. **DEFINITIONS:** The definitions set forth in [Section II, § 2] of this Ordinance shall apply to [Section V], unless the context clearly requires otherwise.

§ 3. **REMOVAL REQUIREMENTS:** On [a quarterly basis], owners of property (or a designee) subject to [Sections II or III of this Ordinance] shall remove, from all Bicycle Parking Spaces associated with their property, including those located on the public right-of-way, bicycles that have been abandoned. A bicycle shall be deemed to be abandoned if it has not been removed after having been tagged with a notice of removal for [2] weeks for Short-Term Bicycle Parking Spaces or [4] weeks for Long-Term Bicycle Parking Spaces. However, a bicycle shall not be deemed to be abandoned if the bicyclist and property owner (or designee) have a written agreement regarding provision of long term storage covering the time period in question. Abandoned bicycles may be donated to non-profits that reuse bicycles or may be disposed of in any lawful manner.

SECTION VI. [ARTICLE/CHAPTER] OF THE [JURISDICTION] [ZONING/PLANNING/MUNICIPAL/COUNTY CODE] IS HEREBY ADDED TO READ “IMPLEMENTATION OF ORDINANCE.”

§ 1. **REGULATIONS AND PROCEDURES:** The [Planning Director/Zoning Administrator and/or other relevant local administrator(s)] [is/are] authorized to promulgate new and amend existing rules, regulations, procedures or forms as necessary or appropriate to implement the provisions of [this Ordinance].

§ 2. **TRAINING:** [Jurisdiction] shall periodically make trainings or training materials available to planners and other employees involved in the implementation and enforcement of [this Ordinance].

§ 3. **REPORTING:** The [Planning Director/Zoning Administrator] shall provide an annual report to the [Adopting Body] regarding the implementation of this Ordinance that shall, at a minimum, include the following information relevant to the preceding year: (1) the number of Short and Long-Term Bicycle Parking Spaces created pursuant to [Sections II and III], and the number of events for which special event bicycle parking was provided under [Section IV] ; (2) *(if applicable)* a brief summary of each request for modification received and action taken in response thereto; and (3) any other information learned that would improve future implementation of [this Ordinance] and its goals.

SECTION VII. STATUTORY CONSTRUCTION:

- (A) All ordinances or parts thereof that conflict or are inconsistent with this Ordinance are repealed to the extent necessary to give this Ordinance full force and effect.
- (B) If any section or portion of this Ordinance is judicially invalidated for any reason, that portion shall be deemed a separate and independent provision, and such ruling shall not affect the validity of the remaining portions of this Ordinance.

SECTION VIII. EFFECTIVE DATE: This Ordinance shall be effective [upon passage *(insert other date if desired)*] (“Effective Date”), except that:

- (A) [Section II, § 3] (“Bicycle Parking Spaces Required”), and [Section II, § 4] (“Building Permits and Certificates of Occupancy”) shall only apply to New Development and Major Renovations for which a building permit is issued on or after [120] days from the Effective Date.
- (B) [Section III] (“Bicycle Parking Requirements for Parking Facilities”) shall apply to Parking Facilities that were licensed prior to the Effective Date, and have less than [180] days remaining on their license, as follows: [1/2] of the required number of Bicycle Parking Spaces shall be provided no later than [120] days from the expiration of the parking facility’s license, with full implementation required no later than [180] days from the expiration of the parking facility’s license.
- (C) [Section IV] (“Bicycle Parking Requirements for Special Events Involving Street Closures”) shall not apply to events for which the temporary street closure was authorized pursuant to an application submitted prior to the Effective Date.

APPENDIX G

SAMPLE TRAIL DESIGN

REQUIREMENTS

Design Requirements for Trails

To be successful, a trail must be designed to be physically, ecologically, and economically sustainable. This includes: economically sustainable. This includes:

- **Physical Sustainability**
Designing trails to retain their structure and form over years of use and under forces of humans and nature is a key factor in sustainability. Trail use promotes change, so trails must be designed in anticipation of change to ensure that they remain physically stable with appropriate maintenance and management.
- **Ecological Sustainability**
Minimizing the ecological impacts of trails, and protecting sensitive natural and cultural resources is fundamental in sustainable trail design and development.
- **Economic Sustainability**
For any trail to be sustainable, the implementing agency or advocacy group must have the capacity to economically support it over its life cycle. Developing and committing to a long-term maintenance strategy is a critical aspect of a successful trail program.

How Does this Translate on the Ground?

While there are many factors that can influence the sustainability of trails, when you design them, they should achieve the following objectives.

Connect Positive, and Avoid Negative, Control Points

Sustainable trails lead users to desired destinations such as water features, historic sites, vistas, interesting landforms and user facilities; while avoiding wet areas, steep slopes, critical habitats, and other culturally or environmentally sensitive areas.

Keep Water Off the Trail

Erosion is the number one problem for sustainable trails. It damages trails, is expensive to repair and diminishes the user experiences. Water is the primary erosive force. Trails that collect water or channel water will be both environmentally and economically un-sustainable.

Follow Natural Contours

Trails lie on the land in three ways: 1) Fall Line Trail - along a fall-line, parallel with the direction of the slope, 2) Flat Trail - on flat ground with little slope or cross slope, and 3) Contour Trail - along the contour with subtle elevation changes. Of these types of trails, only the contour trail easily sheds water and is thus sustainable.

Keep Users on the Trail

When users leave the trail tread, they widen it, create braided trails, and create social trails. These can cause environmental damage and raise maintenance costs. Users leave the trail when it becomes eroded or wet, or when the trail does not meet their needs or expectations.

Ultimately, a sustainable trail design will most often be a contour trail that connects desired control points by contouring along the sides of slopes while making subtle changes in grade.

Upon establishing your Trail Management Objectives (see Chapter 5 – Management) and referring to the user characteristics and design requirements for the respective trail type (as detailed in Chapter 2 - Design Requirements for Specific Trail Users), you are ready to begin the design of your trail.

Important considerations in sustainable trail design include:

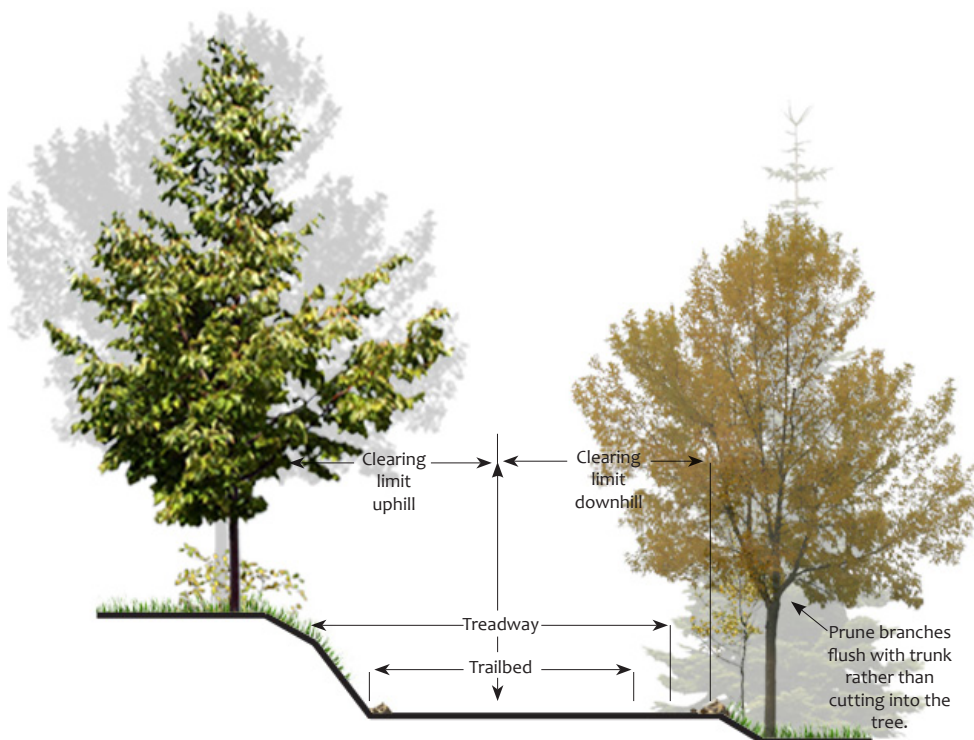
- Trail Corridor
- Tread Design
- Tread Drainage
- Changes in Trail Grade
- Drainage Solutions
- Tread Reinforcement & Trail Structures
- Trailhead Design
- Signage and Markings
- Trail Gates and Barriers
- Bridges
- Landscaping with Native Plants

Each of these considerations are described in this Chapter.

Trail Corridor

The trail corridor is the area that your trail will pass through. The trail corridor includes the trail's tread and the area above, below, and to the sides of the tread. Trail standards typically define the edges of the trail corridor as the clearing limits. Vegetation is trimmed back, and obstacles, such as boulders, fallen trees, and branches, are removed from the trail corridor to make it possible to walk or ride on the tread.

The dimensions for the trail tread, shoulders, upper clearing limits, lower clearing limits, and the clearing height are determined by the needs of the target users and the level of difficulty established for the trail.



Typical Trail Corridor Elevation

Tread Design

After clearing the trail corridor, clear the treadway of organic material and then shape into a slightly outsloped walking surface. In most cases your work will occur on a slope, so excavation will occur across the side of a hill. A “sidehill” trail has a near level, slightly outsloping bench for the trail surface. In many cases this type of design allows for trail construction to occur without manmade structures. There are two ways to build a sidehill trail: full bench and partial bench.

Full Bench Trail Tread

A full bench trail tread has its entire width excavated into the hillside. Trail designers generally prefer a full bench tread for most trails, especially on steeper terrain with poor soils. The steeper the side slope, the closer the construction will resemble a full bench.

Use full bench tread construction where possible. If not possible, construct a partial bench tread and reinforce it with a retaining wall on the downslope side of the fill, if necessary. Typically it is more costly and time consuming to construct a partial bench tread as compared to constructing a full bench tread.

Partial Bench Trail Tread

Partial bench construction is when part of the tread is excavated and the soil that is removed is placed on the lower edge of the trail corridor to fill and build up the tread. The fill should make up no more than half of the tread width. Remove all organic material from the tread to mineral soil and place organic soil on the outside of the bench.

Common failures resulting from improper construction of trail treads include:

- Fill material slipping downhill resulting in sliding of the trail.
- Fill material compacting and creating a berm on the downslope side of the trail.

Trail Tread and Materials

Selecting the tread surface is one of the most important decisions when designing your trail. When several different types of users will use the trail the surface material selected must meet the needs of all users.

Various Considerations

Loading

Designing and selecting trail surfaces is similar to designing and selecting highway pavement sections. Consideration must be given to the loads being placed on the surface. Conduct a soils investigation to determine the load bearing capabilities of the native soil, or former railroad bed (if ballast has been removed), and the need for any special treatments. A soils investigation will also help determine whether subsurface drainage may be applicable and how freeze-thaw cycles may affect a trail. Consider using geotextile fabrics to reinforce weak sub-grades or subsoils.

While loads on trails will be much less than roadways, trail managers may require the tread design to sustain the wheel loads of occasional emergency, patrol, maintenance and other motor vehicles that may travel on or cross the trail.

When motor vehicles drive on trails, their wheels often will be at, or very near, the edges of the trail. This can cause edge damage that, in turn, will reduce the effective operating width of the trail. Therefore, when designing a trail to accommodate emergency response vehicles, construct it wide enough and with adequate edge support to accommodate vehicles. You can reinforce the edges of the tread by stabilizing the shoulders with geotextile and/or stabilizing products.

Surface Texture

On shared use paths and rail trails, it is important to construct and maintain a smooth riding surface. Use machines

to lay aggregate and asphalt pavements; use soil sterilizers where necessary to prevent vegetation from erupting through the pavement. On concrete pavements, saw cut the transverse joints necessary to control cracking, rather than tooling the joints to provide a smoother ride.

Do not sacrifice skid resistant qualities for the sake of smoothness. Users prefer a broom or burlap drag concrete finish. Where a shared use path crosses an unpaved road or driveway, pave the road or driveway a minimum of 20 feet on each side of the crossing to reduce the amount of gravel scattered onto or along the path by motor vehicles. The pavement cross section at the crossing should adequately sustain the expected loading at that location.

Accessibility

Upon construction the tread must be stable and firm. The following table lists commonly used tread surface materials and summarizes each surface's ability to provide a firm, stable, and slip resistant surface.

Tread Surface Options

Surface Material	Firmness	Stability	Slip Resistance
Asphalt	Firm	Stable	Slip Resistant
Concrete, Broom finish	Firm	Stable	Slip Resistant
Soil with Stabilizer	Firm	Stable	Slip Resistant
Compacted Aggregate, 3/4" minus, with Stabilizer	Firm	Stable	Not Slip Resistant
Compacted Aggregate, 3/4" minus, without Stabilizer	Firm	Stable	Slip Resistant
Wood Planks	Firm	Stable	Not Slip Resistant
Grass or Vegetation/Groundcover	Soft	Moderately Stable	Not Slip Resistant

Construct the trail tread on stable and compacted soils to achieve structural stability. Trail treads can be constructed from a variety of materials. Materials should be selected based on:

- User needs
- Maintenance needs
- Construction costs

Natural Surface Trails

As noted in Chapter 1 – Planning, sustainable trail design begins in the planning phase and continues through the design, construction, and management of your trail. To design a natural surface trail you must have an understanding of:

- The characteristics of the soil where you will construct the trails;
- The grades of trail;
- The watershed above your trail and its impact on the trail; and,
- The trail users and how they will impact the trail tread.

Soil Characteristics and their Impact on Sustainability

Soil scientists use a soil texture triangle to classify the texture of soil. Soil is comprised of sandy, silt, and clay. To determine a soil's texture, soil scientists analyze the soil's make-up to determine the percentages of sand, silt and clay.

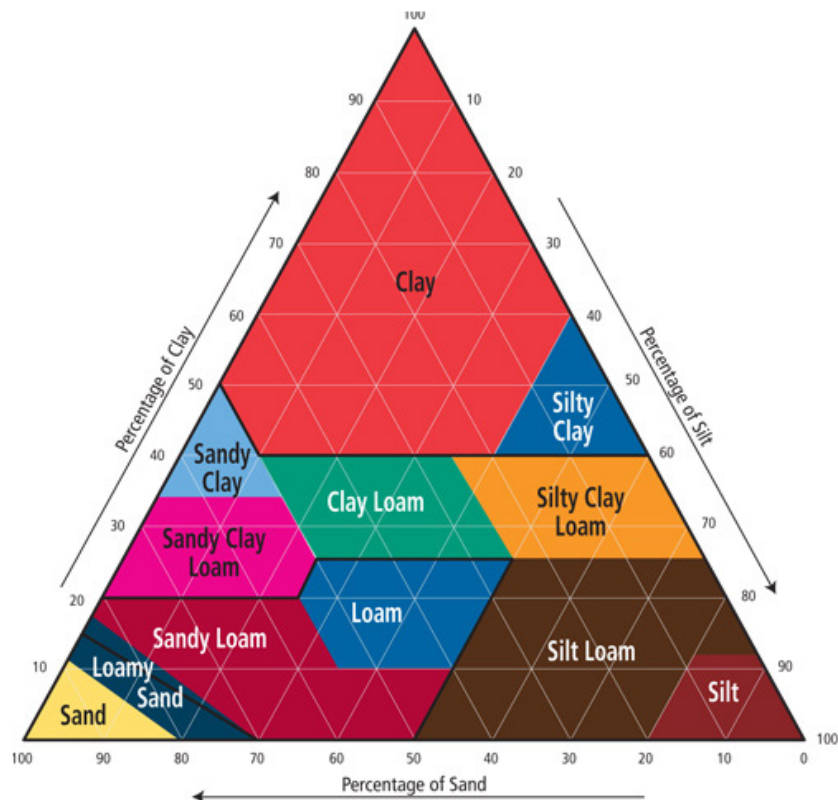
Soil Component	Particle Size
Clay	less than 0.002 mm
Silt	between 0.0002 mm and 0.05 mm
Sand	0.05 to 2 mm

Components greater than 2 mm are further designated as gravel, stone, and boulders.

- Clay compacts easily, but holds water for long periods given the small void space between its fine particles.
- Silt drains well, can be easily compacted, and easily rutted.
- Sand has large pore spaces between particles and drains well, yet it does not compact easily.

USDA Soil Texture Triangle¹

Soils are classified according to the percentage of clay, silt, and sand that they contain by plotting the percentages of each on the USDA Soil Texture Triangle.



Soils that are a combination of silt, sand, and clay are classified as loam soils. A loam soil comprised of equal parts clay, silt, and sand provides a better natural trail surface than a trail comprised of just clay, silt, or sand.

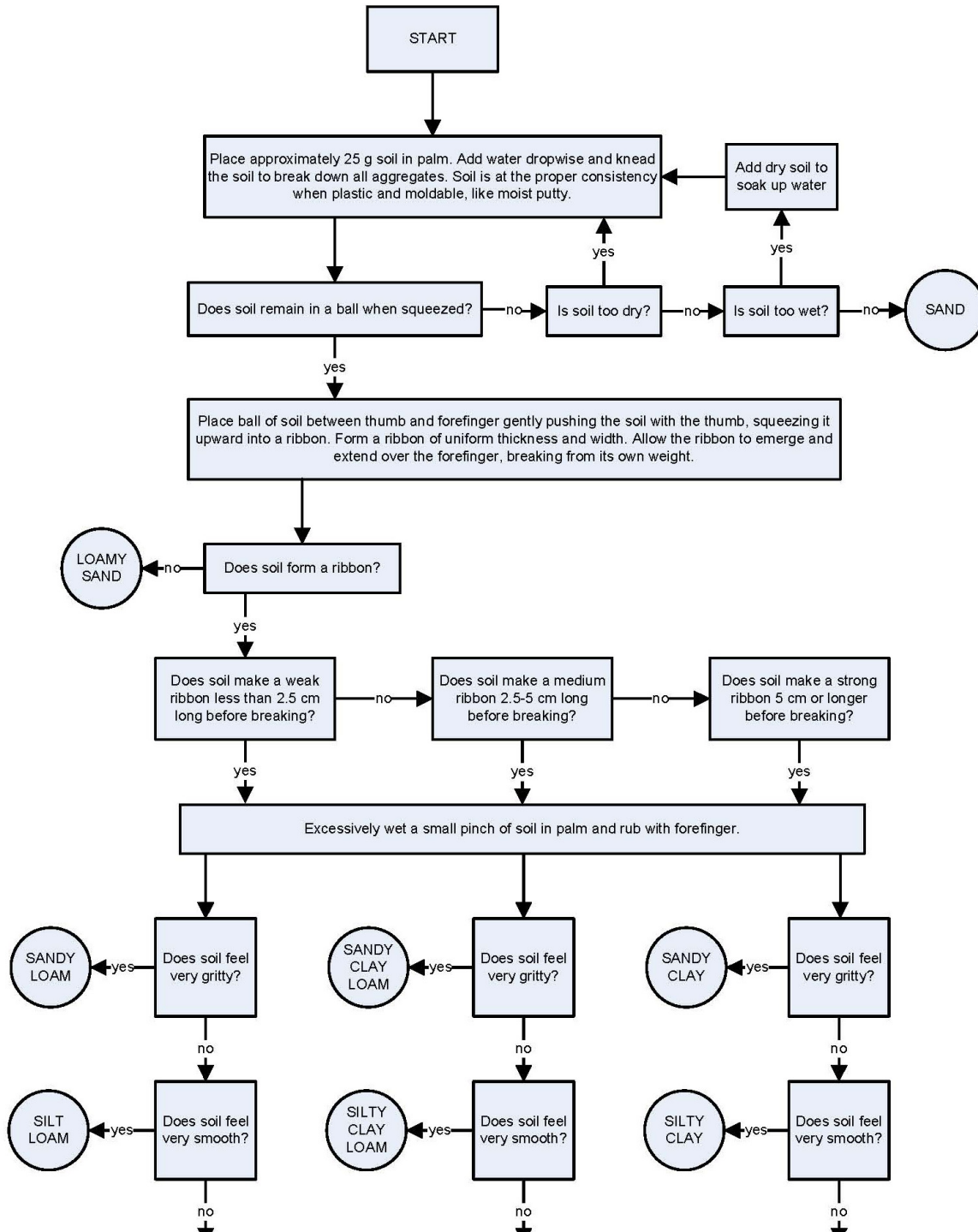
Soil texture can be estimated in several ways:

By Measurement

1. Spread soil on a newspaper to dry. Remove all rocks, trash, roots, etc. and crush lumps and clods.
2. Finely pulverize the soil.
3. Fill a tall, slender jar (like a quart canning jar) 1/4 full of soil.

¹ <http://soils.usda.gov/education/resources/lessons/texture/>

4. Add water until the jar is 3/4 full.
5. Add a teaspoon of non-foaming dishwasher detergent.
6. Put on a tight fitting lid and shake hard for 10 to 15 minutes. This shaking breaks apart the soil aggregates and separates the soil into individual mineral particles.
7. Set the jar where it will not be disturbed for 2-3 days.
8. Soil particles will settle out according to size. After 1 minute, mark on the jar the depth of the sand.
9. After 2 hours, mark on the jar the depth of the silt.
10. When the water clears mark on the jar the clay level. This typically takes 1 to 3 days, but some soils may take



: easily.

It is important for you to know the texture of your soils, so you can understand the limitations of the soils along your trail. Understanding these limitations will allow you to align the trail and design features to respond to these limitations.

The properties desired in soils as a base for trails include:

- Adequate strength
- Resistance to frost action
- Acceptable compression and expansion
- Adequate drainage
- Good compaction

Soils that do not exhibit all of these properties may still be suitable for trails if the missing properties can be supplied through proper construction methods. For instance, materials having good drainage characteristics are desirable, but if such materials are not available locally, adequate drainage may be obtained by diverting water away from the trail and by providing a base layer of aggregate. Another example is increasing low strengths in subgrade materials by increasing the thickness of overlying base materials or using geotextile products.

For example, a loam soil with high clay content compacts well. However, it also tends to hold water. Therefore, it is likely that sections of a trail located on relatively flat terrain will not be sustainable. This is because relatively flat terrain does not provide enough slope for positive drainage, and the high clay content of the soil does not allow the water to infiltrate into the ground.

Soils containing gravel and stones, combined with loam soils are very sustainable. Rocky areas are the most sustainable, but are difficult to traverse because there usually are transitions between rocks.

Compacted Aggregate Trails

A compacted aggregate trail surface is considered to be an environmentally friendly alternative to an asphalt tread for the following reasons:

- The compacted aggregate trail has a higher rate of permeability than asphalt.
- The compacted aggregate trail has greater texture, and therefore, reduces the velocity of water run-off to a higher degree than asphalt.

In addition to the environmental incentives, a compacted aggregate trail is typically less expensive to install than an asphalt cross section. Another benefit of a compacted aggregate trail is that it provides the users with a more forgiving tread due to its resiliency under foot.

A popular tread material is a compacted aggregate surface. This material can be a practical solution popular when a tread cannot be constructed from natural soils, and on trails that need to support heavy loads. Many rail trails are constructed with a compacted aggregate cross section. Over the years, many formulas have tried to achieve the perfect mix of aggregate sizes to provide a stable, firm, and high-density trail surface. The Penn State Center for Dirt and Gravel Road Studies developed, and continues to refine a Trail Surface Aggregate (TSA) specification² ideally suited for trail surfaces. For the current TSA specification visit the Center for Dirt and Gravel Roads **HERE**.

Properly placed and compacted TSA will meet the Americans with Disabilities Act requirements for a firm and stable trail surface.

2 <http://www.dirtandgravel.psu.edu/Trails/trails.html>

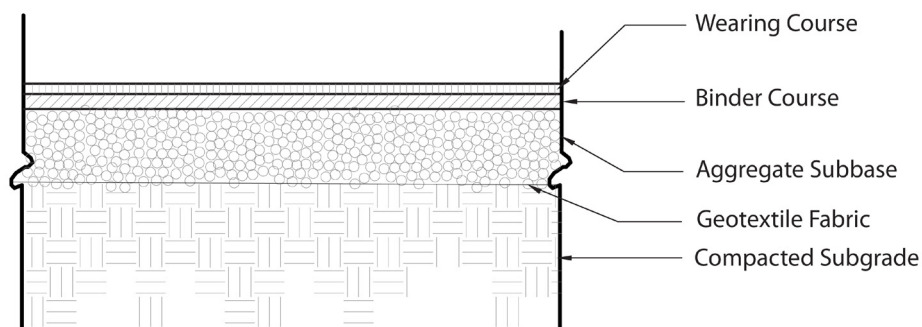
The TSA specification allows trail surfaces to achieve very high densities that withstand traffic and erosion better than traditional aggregates. The Center designed the mix by “downsizing” its successful Driving Surface Aggregate (DSA) mix for use on roads. TSA functions as wearing surface for trails. It is different from traditional materials used to surface trails such as “number 10’s.” TSA has a uniform mixture of a range of rock sizes from 3/8-inch all the way down to fine material. This uniform mix allows excellent compaction to achieve a higher in-place aggregate density than commonly used aggregates to resist wear and erosion.

Asphalt Tread

Sometimes trail managers prefer hard, all-weather pavement surfaces over those of crushed aggregate, sand, clay, or stabilized earth, since these unpaved surfaces provide a lower level of service. On unpaved surfaces, bicyclists and other wheeled users must use a greater effort to travel at a given speed compared to a paved surface. Some users, such as in-line skaters cannot use compacted aggregate surfaces. In areas that experience frequent or even occasional flooding or drainage problems, or have moderate or steep terrain, compacted aggregate unpaved surfaces often erode.

Asphalt has many benefits. It is a durable material for trail surfaces. It can be placed on slopes and curves and remains stable where native soils or compacted aggregate trails can erode. Asphalt provides a more durable surface than compacted aggregate, requiring less maintenance and less frequent resurfacing. An asphalt surface eliminates the concerns over dust which can be associated with compacted aggregate trails. Further, asphalt’s smooth surface is quieter, enhancing wildlife viewing experiences.

One of the drawbacks to consider is asphalt’s dark color. Asphalt trails absorb the sun rather than reflect it, resulting in a increase in the “heat island” effect. The heat that reflects off the pavement increases temperatures on and near the trail.



Asphalt Trail Tread

Porous Asphalt Tread

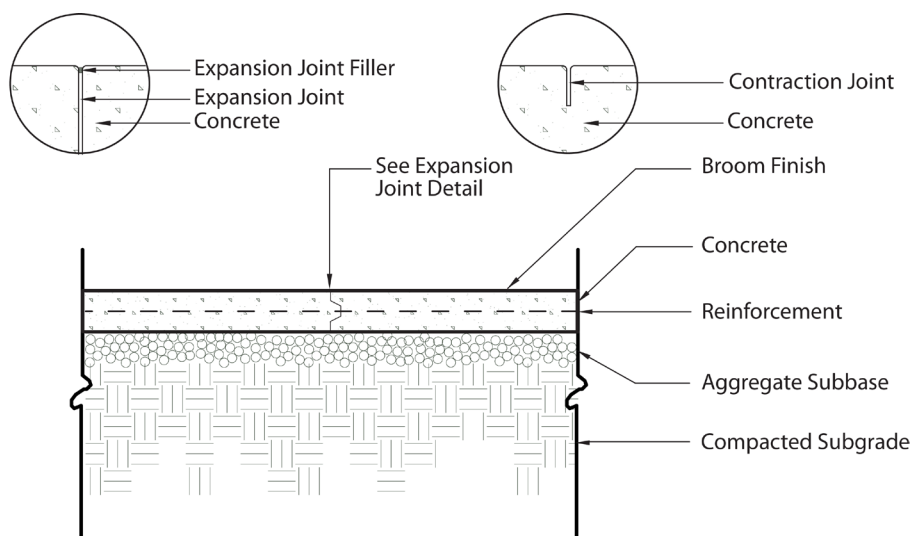
Porous asphalt is created by eliminating the smaller, graduated sizes of crushed rock and using a larger, uniform size, resulting in a rougher surface that has open voids. By maintaining pore space water will infiltrate through the tread surface instead of running off. Provided the trail’s subbase has suitable infiltration rates, stormwater is conveyed through the tread and infiltrated into the ground. If the subgrade cannot provide adequate infiltration, then porous asphalt should not be used for the trail tread. Some subgrades of old railroad berms or gravel roads may be impervious, so runoff will drain to the side of the trail rather than infiltrate under the trail surface. Avoid using porous asphalt in areas that flood or where debris will clog the voids in the pavement.

Concrete Tread

Concrete is the most durable material for trail surfaces, but it is the most costly. Concrete trail treads are used in urban environments. Advantages of concrete include longer service life, reduced susceptibility to cracking and deformation

from roots and weeds, and a more consistent riding surface after years of use and exposure to the elements. The joints in concrete trail treads can degrade the experience of using the path for some wheeled users. In addition, users can see pavement markings more easily on asphalt than on concrete, particularly at night. Concrete’s light color on a trail reflects the sun, rather than absorbing it, resulting in a reduction in the “heat island” effect.

The traditional concrete mix is impermeable. Like asphalt, porous concrete mixes are also available for consideration and have the same drainage qualities and concerns of porous asphalt.



Concrete Trail Tread

Tread Drainage

Drainage is the most important aspect of trail design, regardless of the trail tread material selected. Without sufficient drainage, a trail will require a high level of maintenance and may eventually fail. Although drainage improvements are designed on a case-by-case basis, some general rules of thumb apply.

Natural surface trails tend to catch and direct rain, as well as non-point-source runoff. When designing a trail system, it is important to consider all sources of water within the tread’s immediate watershed. Some water sources may include rain or snowfall, seeps, springs, streams, ephemeral drainages, hanging or perched water tables, or floodplains.

Water typically drains on a treadway beginning at the top of the tread’s immediate watershed and continues until water is directed away from the treadway. Therefore, the location of high points, such as crests, and dips in the tread further determine the length of the segment that drains between them. Since the locations of these features are not necessarily related to a site’s topography, a tread’s watershed size and location is flexible. Adding drainage dips, swales, waterbars, and other devices can reduce the length of drainage areas associated with the tread. The larger the drainage area and the steeper the slope above the tread, the more likely runoff will occur. A steeper slope is more likely to produce runoff.

Watershed Above the Trail and Its Impact on Sustainability

Water runoff is the one physical force that contributes most to erosion. When you design a trail to direct water away from or around the trail, you are reducing the amount of erosion potential along the trail.

Therefore, analyze and evaluate the watershed located above each segment of the trail to determine how to direct drainage away from the trail. A watershed is the land area that drains to a given location. Typically, this location is a

body of water such as a wetland, stream, or river. Traditionally designers associate the term watershed with streams. All of the land between the ridgelines on either side of a stream is located within the stream's watershed.

In the case of trails, however, look at watersheds at a much smaller and more detailed scale. For a trail, the watershed is the amount of land above the trail between a high point above the trail, and low point along the trail.

During the planning and design phases, locate the trail to take advantage of the topography. Trails located at higher elevations typically have less watershed above them. Align the trail so undulations in the landscape can serve as drainage locations for grade reversals and dips. This type of alignment utilizes the topography to limit the maximum tread length.

Flat areas with little slope in either direction are poor locations for trails. There are fewer opportunities in flat areas to direct water away from the trail tread. Therefore, the tread becomes saturated; trail users go around the saturated areas, widening the tread, reducing vegetative cover, which in turn increases compaction and reduces infiltration. This typically results in a large mud puddle on the trail.

Trail Users and Their Impact on Sustainability

The volume and type of use your trail receives will affect the sustainability of the trail. A hiking trail with steeper grades but few users can be just as sustainable as a trail with less grade but many more users. Equestrian trails with few users can be unsustainable if the trail is located on soils that cannot support the load of the horses on the trail.

Design the trail to disperse use along the length of the trail and throughout the trail network, rather than concentrate use at specific locations.

Runoff and Erosion

Tree canopy, vegetative cover, and forest litter help reduce runoff and absorb rainwater. On the other hand, bare soil and rock surfaces produce more runoff and increase runoff speed. Therefore, both the amount of vegetative cover, and the amount of trail tread are important considerations. The amount of runoff will depend on the proportions of each type of materials present in the trail corridor. Without vegetative cover, heavy rainfall will dislodge fine particles and erode part of a tread. The steeper the slope of the treadway the higher the runoff velocities and therefore the greater the erosion potential of stormwater runoff.

Weather, Climate, and Microclimate

When planning a trail consider the location's overall climate, seasons of use, and microclimates. Always assume intense rains or rapid snowmelt will occur and design trails to sustain these events. The only way to limit runoff caused by severe precipitation is to limit a tread's drainage area. On north facing slopes and in deep ravines, trails are generally cooler and wetter. These conditions affect an area's humidity, temperature, and speed of snowmelt.

Tread Grade and Length

A sustainable tread depends on its grade, length, tread texture, type, amount of use, and tread watershed factors. The steeper the tread grade, the more likely it is to erode. To prevent washouts on grades, install grade breaks into the trail alignment. Grade breaks should be integrated into the trail. The steeper the grade, the more often grade breaks are required. This further limits the continuous length of running grade on the trail reducing the tread's susceptibility to erosion. Grade breaks are described in further detail later in this Chapter.

Cross Slopes, Side Slopes, Swales, and Culverts

Every part of the trail surface should pitch water at a minimum slope of 2%. Typically, a surface pitches downhill. When the trail is constructed on land with a cross slope of 30% or greater, best practices recommend crowning the trail.

Side slopes, side swales, and culverts prevent water from reaching, and direct water away from, the trail surface and provide the water with a place to drain. Design side swales and culverts to correspond with a trail's grade and width, as well as the location's uphill watershed.

1. Where side slopes of the trail are less than 5%, the trail needs no swales unless construction occurs in a wet area.
2. Where side slopes are greater than 5% and/or when side slopes extend over 25 feet in length, these conditions typically require a swale on the uphill side of the trail to collect water, pipe it beneath the trail, and outlet the flow of water to daylight. Size all pipes to adequately contain a 10 year storm event, or as required by local ordinance.
3. Where trails are constructed on an embankment, designers need not incorporate swales, assuming trail runoff drains away from the trail.
4. When trails are constructed in cut, swales are typically required on both sides and piping installed as required to drain water to daylight.
5. Where swales are required along trails, pitch the trail surface toward the swale on the high side of the trail.

Culvert crossings take the water from side swales and crowned surfaces and route the water beneath the trail surface. Each culvert crossing should have a headwall and endwall to prevent erosion at pipe openings, prevent flowing water from damaging the trail structure, and provide structural support for the trail. Furthermore, headwalls and endwalls increase flow capacity of the pipe by reducing turbulence and directing flow, as well as visually identifying pipe openings to protect them from traffic and maintenance equipment.

Waterbars and Drainage Dips

Constructed waterbars and tread dips prove problematic and often need maintenance. Some of these problems include ponding water, clogging, and slow or poor drainage. The most sustainable dips, those requiring minimal maintenance, incorporate several key characteristics in their design. These include a wide outflow, sufficiently sized dip, substantial crest, quick drainage, minimal erosion, as well as resistance against tread compaction and displacement. If a trail lacks any number of these characteristics, the more likely the feature will fail. In short, when designing a trail ensure the dip's ability to handle both water and physical forces to minimize its need for maintenance. Further details concerning waterbars and dips follow later in this Chapter.

Contour Trails

The contour trail is the most sustainable design, but how does one lay out and create contour trails so they do not collect or channel water? As described in Chapter 1, sustainable contour trails should follow five best practices³:

1. **The Half Rule:** A trail's grade should not exceed the half grade of the hillside or sideslope that the trail traverses. If grade does exceed half of the sideslope, consider it a fall line trail that will be susceptible to erosion.
2. **The Ten Percent Average Grade Guideline:** Generally, a trail with an average grade of 10 percent or less is most sustainable. This does not mean all grades must be kept less than 10 percent. Many sections of trail will have short steep sections greater than 10 percent, and some unique situations will allow average grades of more than 10 percent.

3 Trail Solutions: IMBA's Guide to Building Sweet Single Track: International Mountain Bicycling Association: 2004

3. **Maximum Sustainable Grade Trails:** Maximum sustainable grade equals the steepest section of trail that is more than ten feet in length. When designing a trail, it is essential to determine early in the process the maximum grades the trail will be able to sustain given local conditions. Variables that impact the maximum sustainable grade include:
 - Soil Type
 - Rock
 - Annual Rainfall Amount
 - Type of Users
 - Number of Users
 - Planned Level of Difficulty
4. **Grade Reversals/Dips:** A grade reversal occurs at a spot where a climbing trail levels out and then changes direction, dropping subtly for about 10 to 50 linear feet before rising again. This change in grade forces water to exit the trail at the low point before it can gain volume, velocity, and erosive power. Other names for grade reversals include dips, grade breaks, drainage dips, or rolling dips.
5. **Outslope:** As the trail contours across a hillside, the downhill or outer edge of the trail tread should typically tilt slightly down and away from the high side. This encourages water to flow across and off the trail.

When designing sustainable trails, consider the level of trail development required based upon the location, use, and other factors. Some trails will consist of a natural surface, while others will consist of more developed surfaces.

Changes in Trail Grade

Steep changes in grade prove difficult for both trail designers and builders to tackle, especially when they occur over short distances. Climbing turns, switchbacks, and grade reversals provide unique solutions for designers to accommodate trail users on challenging terrain. It is important to locate these design features in appropriate areas to maximize both their longevity and their ability to withstand the effects of erosion.

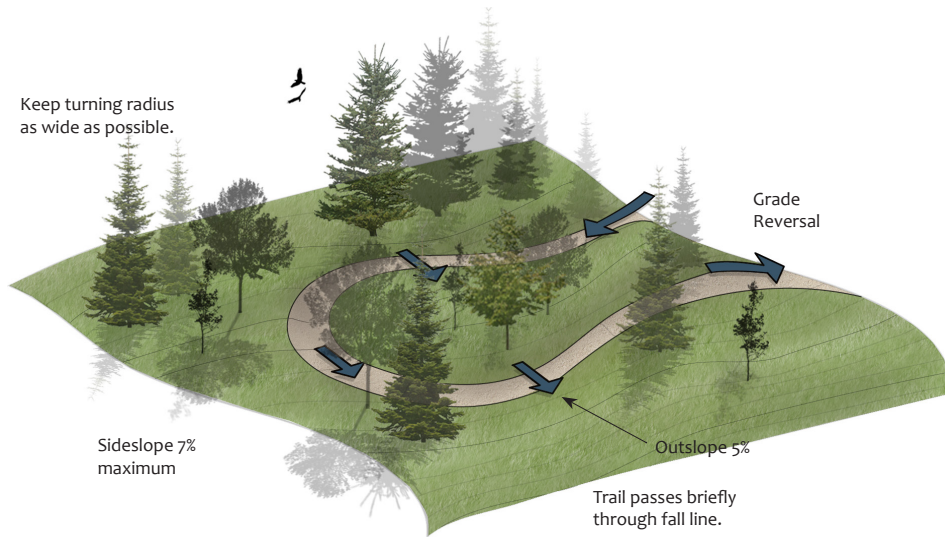
Trail Grades and their Impact on Sustainability

The grade of a trail also has a significant impact on the sustainability of the trail. As noted earlier steeper grades are less sustainable. Steeper grades also result in water runoff becoming concentrated in shorter distances, less water infiltration resulting in higher volumes of runoff, and water runoff flowing faster over the terrain. Each of these aspects contribute to soil erosion.

Climbing Turns

Climbing turns require trails to follow the fall line for a short segment. Therefore, in general, a climbing turn should only occur on cross slopes of no steeper than 7 to 10 percent. When constructing a climbing turn designers must locate a grade reversal just above, and after, a turn to divert water away from the fall line portion of the trail.

Constructing climbing turns on cross slopes greater than 10 percent typically results in erosion of the trail. This a common trail-building mistake.



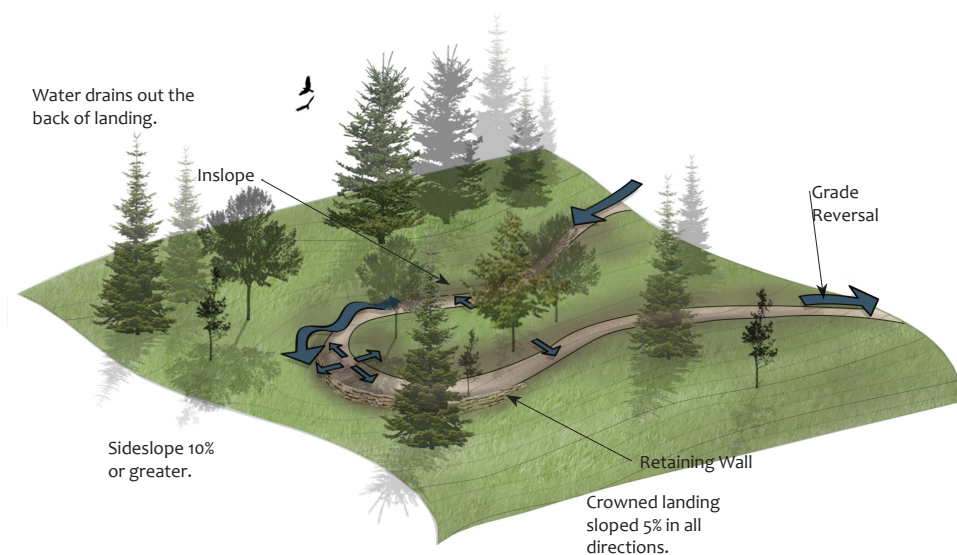
Climbing Turn

Switchbacks

A switchback reverses the trail's direction by constructing a relatively level landing between trail segments traveling opposite directions. They are difficult to build but are more durable on steep slopes than climbing turns, because the trail does not follow the fall line. Moreover, construct switchbacks in lieu of climbing turns when sideslopes of a climbing turn exceed 10 percent.

Key features to designing switchbacks:

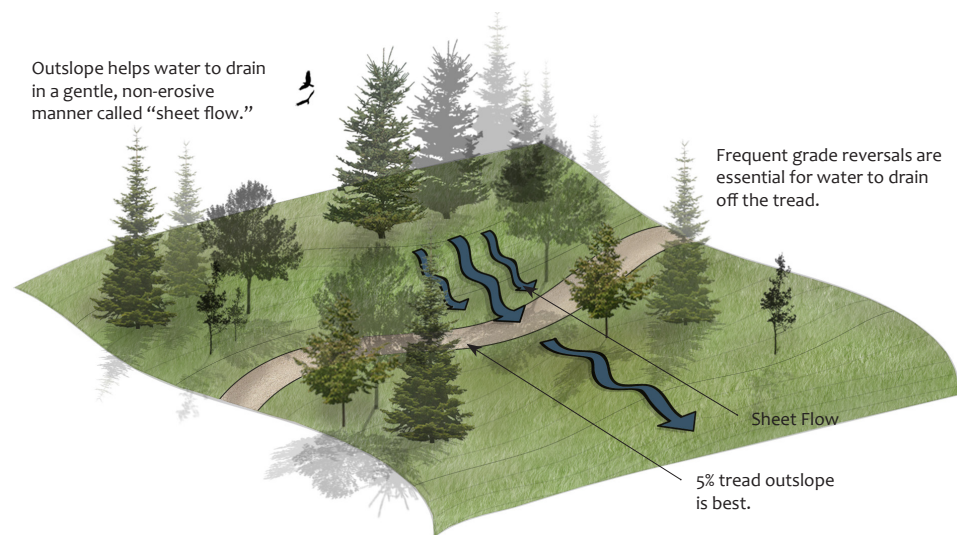
1. Drain water away from all sides of the turn.
2. Crown the platform slightly so that water drains in all directions.
3. Stay on contour for both approaches.
4. Combine bench cuts and retaining walls as needed to facilitate the change in grade.
5. Carefully construct retaining walls, when required, to ensure stability.
6. Use excavated material from the top leg as backfill behind the retaining wall along the bottom leg.
7. Inslope the upper leg to direct water away from the trail.
8. Outslope the lower leg to direct water off of the trail.
9. Design approaches to control user speed.
10. Construct grade reversals at the approaches to divert water.
11. Stagger switchbacks to prevent water accumulation.



Switchback

Outslope

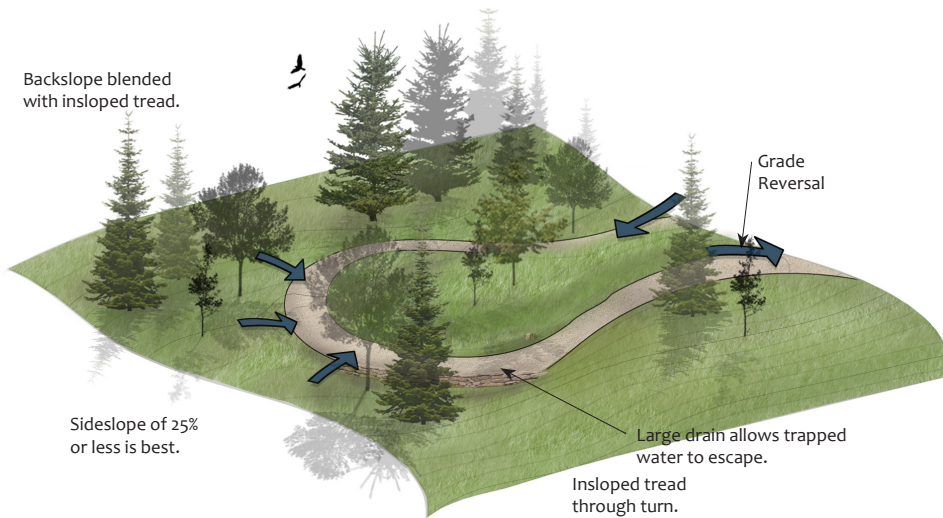
Outsloping is a method of grading the tread where the downhill edge of a trail is lower than the uphill edge of the trail to shed water. This deflection of water prevents concentration of flows that produce rilling, gullying, and rutting on trail treads. Users should barely notice the outslope which is generally between 2 and 5 percent.



Outslope

Insloped Turn

Insloped turns can be constructed on either single use or shared use trails and provide a sustainable method of stabilizing turns on natural surface and compacted aggregate trails. Insloped turns reduce tread widening and displacement that can occur on flat or outsloped turns. A 5 percent slope to the inside of the turn helps stabilize the turn. When sideslopes are steeper than 25 percent a platform and/or retaining wall may be required.



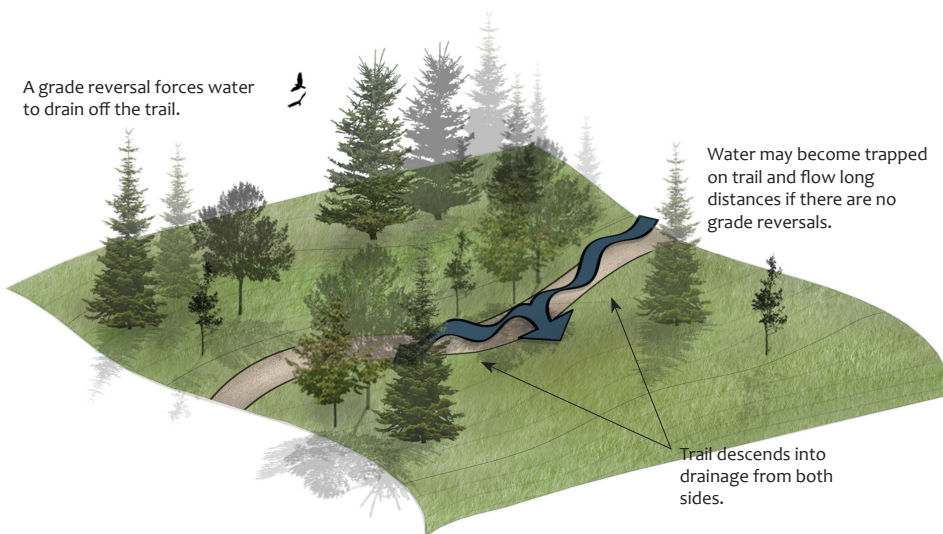
Insloped Turn

Drainage Solutions

Proper excavation, outslowing/insloping, and stabilization of a trail all contribute to create a stable treadway. However, even perfect construction cannot completely neutralize water's damaging effects on a trail over time. It is important to rely on contour trail construction to maximize a trail's sustainability. A well-constructed trail will incorporate a number of features into the construction of the trail to direct water away from and off of the trail. Consider installing more drainage than necessary to ensure proper water flow, in the event that one or more drainage methods fail.

Grade Reversals/Dips

A grade reversal is a reverse in the trail grade, usually a short dip followed by a rise, that forces water off the trail. Grade reversals are also referred to as grade dips, drainage dips, and/or rolling grade dips. Frequent grade reversals are a critical element of sustainable trail design. Most trails will benefit from grade reversals every 20 to 50 feet, depending on soil type and rainfall.



Grade Reversal

The table on the following page, adapted from *Natural Surface Trails By Design: Physical and Human Design Essentials of Sustainable Trails*⁴ provides rules of thumb for maximum tread lengths for various soil textures.

These guidelines are based on the following assumptions:

1. The trail's grade does not exceed the half grade of the hillside or sideslope that the trail traverses.
2. Water reaching the trail drains along the trail to a dip.
3. The tread is well compacted.
4. Trail receives moderate use.
5. Watershed above the trail has moderate runoff potential.
6. Little to no tree canopy above the trail tread.
7. Intense rain events are limited to a few times a year.
8. There are no other contributing water sources present, i.e. high water table, spring seeps, etc.

Maximum Tread Length between Grade Reversals/Dips by Soil Texture <i>Rule of Thumb - based on running percentage of the trail grade</i>										
Soil Texture	0%	2%	4%	6%	8%	10%	12%	14%	16%	18%
Clay Loam with high quantity of gravel and stone	215'	160'	120'	90'	67'	50'	35'	24'	16'	10'
Gravelly clay	180'	132'	96'	69'	49'	34'	22'	14'	X	X
Loam with high quantity of gravel and stone	160'	117'	83'	57'	39'	26'	17'	10'	X	X
Clay	145'	104'	74'	51'	34'	22'	13'	X	X	X
Loam	135'	90'	57'	37'	23'	14'	X	X	X	X
Crushed stone, angular particles, 3/4" or less	125'	78'	49'	30'	17'	X	X	X	X	X
Organic soil	110'	68'	39'	22'	12'	X	X	X	X	X
Sand	100'	55'	30'	16'	X	X	X	X	X	X

This Rule of Thumb is not only modified by soil texture, but should also be modified as required to respond to:

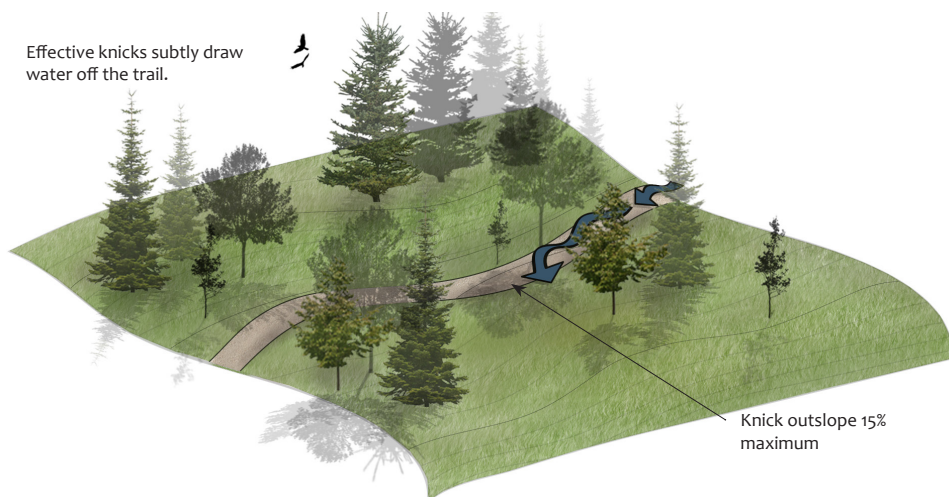
- Amount of stone and rock in the tread.
- Annual rainfall amount.
- Location and frequency of grade reversals and dips.
- Type of users and their impact on the tread.
- Number of users, more users = more impact to the tread.
- Desired level of difficulty for the trail.

Knicks

Knicks are tapered, semi-circular sections of a trail that measure approximately 10 feet in diameter. Knicks are usually built on gentle, smooth sections of a trail tread where water tends to puddle. For the knick to be effective, its center must be outsloped at least 15 percent towards an area lower in elevation so that the water will have a place to drain.

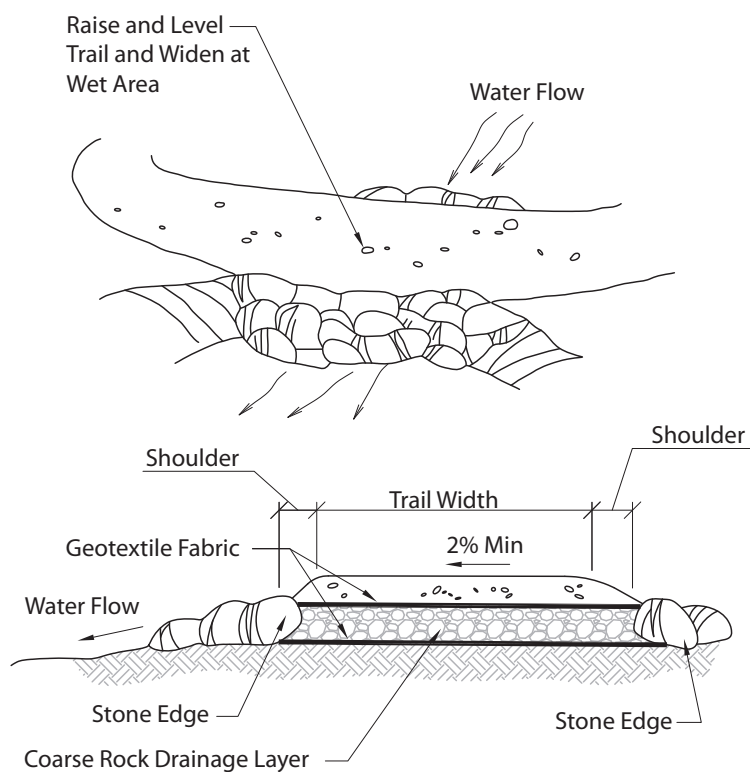
⁴ Natural Surface Trails by Design: Physical and Human Design Essentials of Sustainable, Enjoyable Trails, Troy Scott Parker: 2004

Effective knicks subtly draw water off the trail.



Drainage Lens

Low-volume water flow caused by spring seeps or cross swales can often be managed with a drainage lens. Beginning with a firm subbase, construct the drainage lens by placing large stone and progressively smaller stone capped with fine aggregate or suitable native fill. In wet areas, placing the drainage lens between two layers of geotextile material helps to stabilize the base. Perforated pipes can be placed at the base of the drainage lens to collect water that seeps through the stone, and outlet the water to daylight.



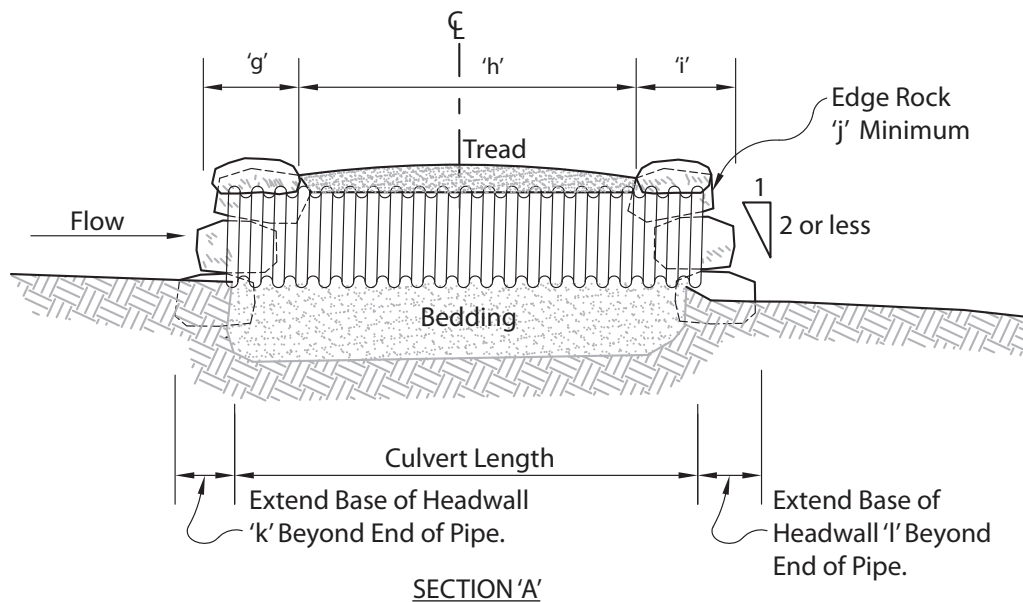
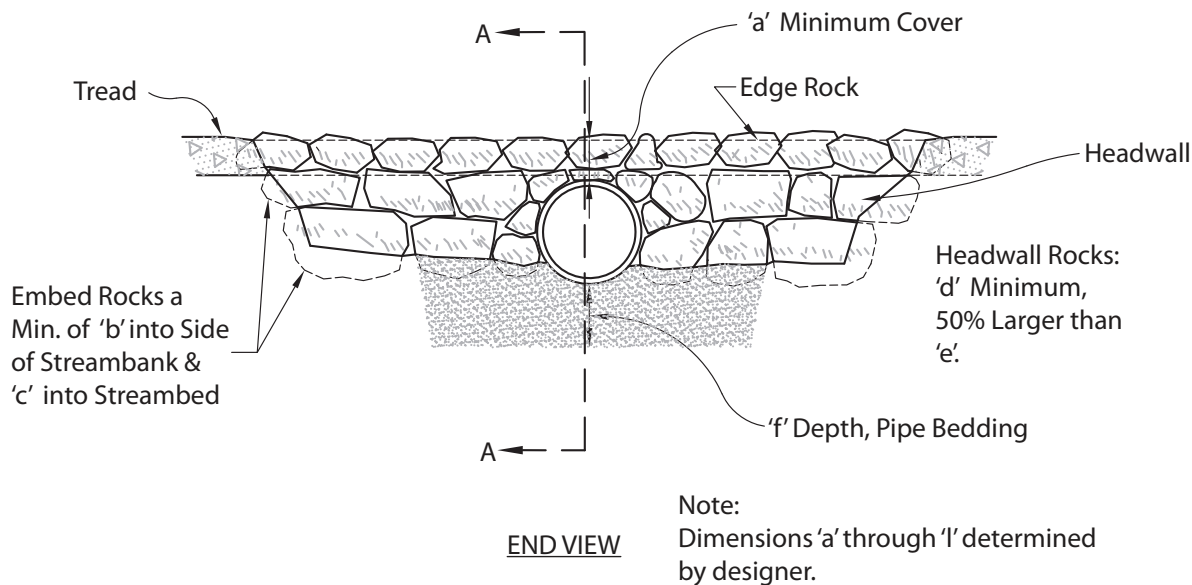
Drainage Lens

Bleeders

Bleeders are constructed swales angled to drain water off and away from the treadway. Build them by digging a shallow dip in the tread at a slant towards the outside edge of the treadway. Bleeders work best on sidehills, especially in spots where topography, roots, and rocks naturally facilitate drainage. Bleeders often work as effective backups where drainage dips will not fit. They also work well at the apex of turns and switchback corners. However, they work poorly along straight, unobstructed graded trails where they may clog with silt.

Culverts

Culverts are a form of drainage structure designed to convey water beneath a trail. Culverts can be constructed from natural rock, or plastic, metal, or concrete pipe. The fact that the trail tread extends across a culvert without interruption serves as an advantage over ditches and waterbars. They have relatively little visual impact on the trail, and are not easily displaced by trail users.



Culvert with Natural Stone Head/Endwalls

Culverts should be installed with a gentle down stream gradient of 2 percent and should be properly bedded to insure continued performance. Pipe diameters less than 12 inches may present frequent clogging and therefore are not recommended.

Tread Reinforcement and Trail Structures

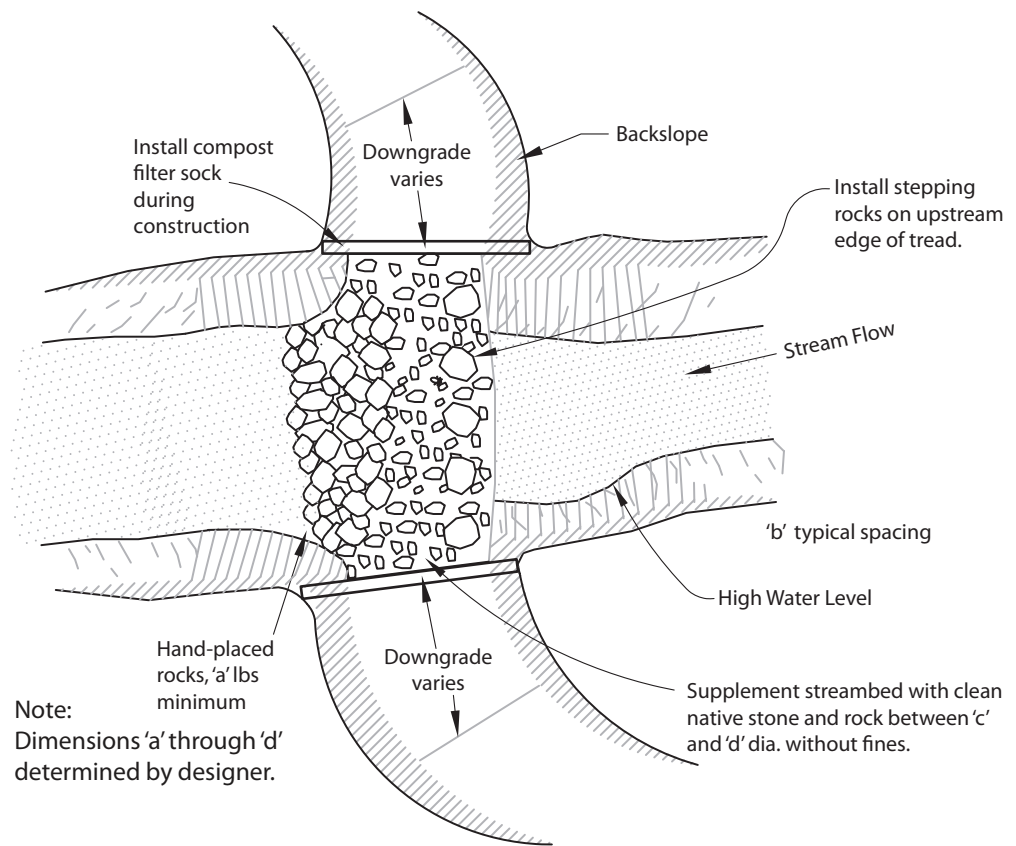
Even well designed and constructed trails may need tread reinforcement or trail structures. Since these take a lot of time and effort to construct, they should be kept to a minimum in the initial trail design. However, in any trail section where the grade is steep enough to warrant concerns about erosion, tread reinforcement or trail structures can be constructed either preventatively or as erosion issues become apparent. In some cases, tread reinforcement or trail structures are creative solutions around obstacles on certain routes.

Geosynthetics

- **Geotextiles:** Geotextiles are fabric sheets of synthetic fibers that provide separation and reinforcement between soil and gravel surfaces. A single layer of geotextile fabric provides soil separation and encapsulates free-draining gravel that trail builders cover with a gravel drainage layer. A wrapped section, with two layers of geotextile, has more strength than the single-layer section alone. With the separation created by using geotextile fabric, the aggregate remains separated from the subgrade, providing a stronger surface that requires less gravel and resists rutting.
- **Geogrids/geocells:** Geogrids/geocells are three-dimensional, expandable panels made from high-density polyethylene, polyester or another polymer material which when backfilled with stone provide a stabilized surface. Trail builders install individual cells in an excavated section, fill with gravel, and then cover with an added layer of gravel. This confinement system reinforces and restores areas easily eroded and reduces the load stresses over a unit area. Some features or benefits of the system include increased soil strength, increased soil bearing capacity, ability to vegetate, ability to utilize local soils, as well as vertical and lateral porosity.

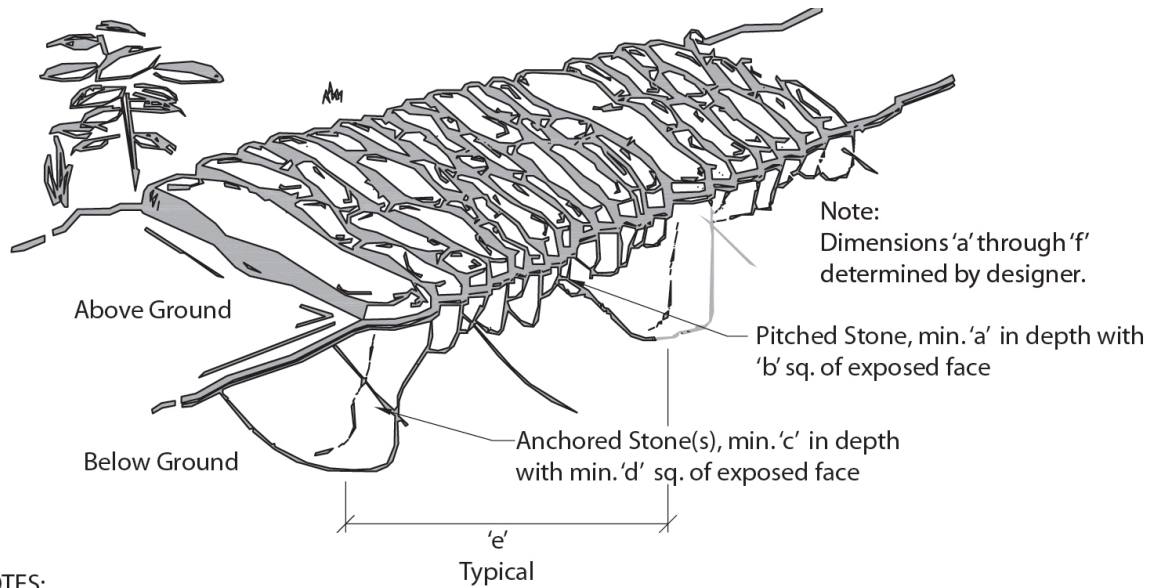
Armoring and Footpaths

- Fords and Step Stones: Fords are used on swifter flowing streams in upper watersheds with rocks available for step stones. Naturally occurring or secured stepping stones retain gravel at the ford and can provide an interesting way for hikers, mountain bikers, and equestrians to navigate a small stream. When fords are not sufficient or need to be augmented, use step stones.



Shallow Ford Crossing

- **Stone Pitching:** Stone pitching is used to create an elevated trail tread above soft terrain when no alternate route is available. Stone pitching provides a durable solution for hardening a section of a trail.



NOTES:

1. Stone for pitching shall be limestone or other clean, hard dense and durable rocks free from cracks and organic or other impurities.
2. Stone shall be hand placed with closed joints on a layer of gravel or crushed stone to a minimum finished thickness of 'f'.
3. The sides of stones shall be roughly trimmed with a spalling hammer to obtain a reasonably close fit and the interstices filled with clean coarse aggregate or gravel well rammed and wedged in the spaces. The finished pitching shall present an even surface.

Stone Pitching

Trail Maintenance Considerations

The development of a trail does not end with its construction; rather it is the beginning of a process. Proper planning and design, along with quality materials and workmanship during construction will keep the maintenance costs low. Conversely, trail degradation will occur quickly without an effective maintenance program, no matter how well you plan, design, and construct a trail. Overall, if routine maintenance does not occur, maintenance costs will dramatically increase.

It is important to document trail maintenance practices in writing to ensure you have the work force, materials, and finances to maintain your trail properly. Trail maintenance should be an ongoing activity once a trail is dedicated.

To assure the success of the trail system, local partners, agencies, and municipalities should work together to define the roles and responsibilities to maintain the trail and adopt good maintenance practices are adopted. This does not mean the municipalities perform all of the work. More often, it means coordinating the efforts of volunteer organizations and providing aid when needed. State, local, and county agencies may be available to assist groups in planning trail improvements. Further, they may also be able to provide material, equipment and/or in-kind services for trail maintenance. Volunteer efforts should be coordinated to ensure the necessary services are provided in a timely manner. Document all agreements in writing between the participating parties.

Maintenance components of your trail management plan should consider the following:

- Frequency of Maintenance
- Trail Assessments and Inspections
- Hazard Tree Identification, Inspection, and Corrective Action
- Revegetation and Restoration
- Training

The maintenance of trails is ongoing and a necessary activity that will ensure the continued use and the safety of the trail users.

Frequency of Maintenance

The frequency of trail maintenance varies depending on the type of maintenance activity being undertaken.

- Scheduled Maintenance
- Seasonal Closure and Opening
- Winter Maintenance
- Periodic Grooming
- Corrective Maintenance
- Deferred Maintenance

Trail maintenance tasks should be documented in the trail management plan and should be adopted by the agency/organization responsible for the trail. Maintenance requirements are dependent on the type of trail and amount of visitation it receives.

Scheduled Maintenance

Scheduled maintenance is the normal maintenance needed to restore a trail to its intended standard after prolonged wear and tear of normal use and exposure to the elements.

Develop an annual trail maintenance schedule using historical maintenance and known maintenance requirements from previous inspections or deferred maintenance. This living document should be adapted to the changing conditions of the trail.

Typically, scheduled maintenance tasks are as follows. This list can be altered as needed to meet the needs of the trail, its users, and the communities that a trail passes through:

- Trimming or removing vegetation, dead limbs, or standing dead trees
- Removing debris, deadfalls, or loose impediments
- Cleaning out ditches, swales and culverts
- Repairing and revegetating minor erosion on slopes or embankments
- Grooming the tread surface
- Minor repairs such as replacing missing or broken posts or signs
- Mowing
- Trimming
- Trash removal
- Pruning
- Weeding
- Invasive Removal
- Brush hog
- Signs – inspect / repair / replace
- Fence – inspect / repair / replace
- Culverts – inspect / repair / replace
- Storm Drains – inspect / repair / replace
- Gates - inspect / repair / replace
- Bridge - inspect / repair / replace
- Maintain dips
- Grade ditches
- Trail grooming
- Trail surfacing
- Landscaping
- Storm damage
- Vandalism
- Repair washouts
- Garbage pick-up at trail access points
- Mowing of berms
- Cleaning of restrooms at trailheads
- Sweeping trails with a rotary brush to remove dirt and leaf litter
- Erosion control, repair of drain pipes and cleaning of swales
- Patching, regrading, and compacting of surface
- Inspecting, repairing, replacing signs, traffic markers, bollards, and gates
- Cleaning culverts, catch basins, and other drainage structures
- Maintaining and completing preventative maintenance on support facilities
- Inspecting trail-related structures to ensure they are in a safe condition
- Plowing trailhead parking lots in the winter

The following is a typical calendar for scheduled maintenance:

Frequency of Scheduled Maintenance													
Maint. Activity	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sept	Oct	Nov	Dec	
EXAMPLE- Mowing			•	••••	••••	••••	••••	••••	••••	•••			
Mowing													
Trimming													
Trash													
Pruning													
Weeding													
Invasive Removal													
Brush Hog													
Signs - inspect/repair/ replace													
Fence - inspect/repair/ replace													
Culverts - inspect/repair/ replace													
Storm Drains - inspect/ repair/replace													
Gates - inspect/repair/ replace													
Bridge - inspect/repair/ replace													
Maintain Dips													
Grade Ditches													
Trail Grooming													
Trail Surfacing													
Landscaping													
Storm Damage													
Vandalism													
Repair Washouts													

Seasonal Opening and Closure

If seasonal closures occur along a trail, inspect and maintain portions of the trail that require maintenance. Sometimes this maintenance can be intensive, especially in areas prone to blow downs. For those trails with winter closures the tread surface may need to be graded, compacted, and or groomed in preparation for increased use during wet conditions of the spring season. Fall maintenance should focus on clearing and trimming of vegetation sufficiently to account for the next growing season. Repair and stabilize eroded areas to prevent future erosion.

Winter Maintenance

Collaborating agencies should decide and document what the winter maintenance policy will be for the given trail. Avoid plowing trails that include winter uses such as cross country skiing and snowshoeing. In urban environments,

where pedestrian and bicycle use is expected to continue throughout the winter months, consideration may be given to plowing the trail. Regardless of the decision made, it should be communicated to trail users so they know what to expect during inclement weather. This is an important issue and should be posted on a trail kiosk or rules sign.

Periodic Grooming

The frequency of periodic grooming of the tread surface is dependent on the level of trail use and the amount of surface displacement. Simple grooming may require re-grading and compaction of the in-place tread surface materials. More intensive grooming may require placement and compaction of additional tread surface materials to address minor rutting or erosion.

Corrective Maintenance

Corrective maintenance is necessary for the restoration of areas or structures severely damaged or destroyed by overuse, inadequate scheduled maintenance, abuse, vandalism, or unexpected natural events. Corrective maintenance is usually unexpected and may require more planning or design than scheduled maintenance. Corrective maintenance includes:

- Reinforcement and replacement of trail subbase and tread surface
- Stabilization of severely eroded or sloughed embankment
- Reconstruction of grade dips, or other water control structures
- Replacement or major repair of culverts, bridges, or retaining walls

Regardless of the level of planning and effectiveness of the scheduled maintenance program, the unexpected will occur. Address unexpected emergencies by establishing a contingency line item in the annual maintenance budget. Ideally, a long-term capital improvement budget should be in-place to repair/replace major structures.

Deferred Maintenance

Deferring maintenance is a deliberate decision to delay maintenance due to a lack of labor, budget considerations, or specific conditions. Deferring routine and scheduled maintenance can make funds, maintenance personnel, or equipment available to perform corrective maintenance. For example, scheduled maintenance for grading and re-compacting may be deferred to make a crew available to perform corrective maintenance to address a liability. Reschedule deferred maintenance when resources become available. Never defer corrective maintenance that is safety-related unless that section of trail can be bypassed or closed.

Maintenance of Signs

Incorporate a regular maintenance program for signs into your trail management plan. Sign maintenance is important from a safety and liability perspective. Further, signs are highly visible and their maintenance or lack of maintenance leaves the visitor with a positive or negative impression about the trail. Well-maintained signs convey a sense of pride and reduce vandalism while poorly maintained signs may contribute to a diminished visitor experience, including disorientation of trail users.

The following guidelines are recommended:

- Maintain a record of all signage, including location, GPS coordinates, type of sign, and photo.
- Inspect signs regularly, especially after each winter season, for weathering and visibility.
- Repair or replace damaged or missing signs as soon as possible.
- Secure loose or tilting signs in an upright position.
- Clear vegetation from around signs to maintain visibility.
- For signs mounted on living trees, loosen fasteners as necessary to accommodate growth of the tree.

- Review signage content to ensure continued relevance and accuracy.
- Obsolete, damaged, or surplus signs should be reused or recycled whenever possible.
- When signs have been weathered or otherwise damaged or destroyed, consider the reasons for the damage. If the sign was eaten by wildlife, consider less palatable materials. If weather or natural events damaged the sign, consider stronger materials, a different location, or a different system for mounting the signs. If the sign is damaged by water or decay, consider applying a sealer or preservative (assuring compatibility with color, aesthetics, and environmentally sustainable practices) or replacing the sign with a more water-resistant material. When signs are damaged due to vandalism, managers should consider a different location or temporary signage that is not expensive to replace.

Priorities for sign maintenance are:

1. Signs required for user safety
2. User restrictions and advisory signs
3. Destination and identification signs, blazes, and trail logos, and
4. Informative and interpretive signs

There is a fine balance between providing good information and diminishing the trail experience with too much signage. An abundance of signage can also be a burden on the trail managers and those responsible for maintaining the signs.

Maintenance of Road Crossings

Best practices for maintaining road crossings include:

- Conduct an annual inspection after the winter season to determine the condition of the trail crossing signs, pavement markings, and associated gates or other trail signs.
- Inspect and repair any damaged gates, bollards, delineators, fencing, or signs used for your trail at the crossing.
- Repaint or reapply trail crossing markings as they fade, in accordance with the approved trail crossing plan. Depending on traffic volume, pavement markings last at least two to seven years before noticeable fading occurs.
- Replace signs at trail crossings if damaged or heavily faded. Straighten the sign post if leaning or reinstall if knocked over. Typically signs are manufactured to last fifteen years or more without losing reflectivity. Stop signs, however, lasts only about seven years before fading, depending on sun exposure.
- Examine the vegetation and foliage at the crossing to ensure sight distance requirements are met and the signs are not blocked from view. Do this once each summer with full foliage present.
- Examine and fill in any portion of the trail that has settled where it meets the roadway. If there are ADA accessible ramps examine them and make sure they are in good repair.
- Contact the agency responsible for the road, either the municipality or PennDOT, if any shoulder washouts or roadway damage occurs and ask them to repair those areas.
- In the end your trail crossing should look like it does on the approved trail crossing plan.

Unless there is major damage or vandalism year to year there really isn't much to do. A quick annual inspection should be all that is needed and maybe minor tweaks. Of course if you defer this maintenance more work would need to be done.

On state roads PennDOT will typically take care of the following maintenance items:

- The entire asphalt road surface and paved or unpaved shoulders
- All traffic signs other than those specifically associated with the trail crossing.
- All pavement markings not specifically associated with the trail such as double yellow lines, edge lines, curve warning, etc.
- Drainage structures associated with the roadway.

Trail Assessments and Inspections

Trail Assessment and Inspection Forms (TAF) provide a means of recording basic information for current and future trail planning, design, construction, and maintenance. TAFs document current trail conditions and help identify subsequent work required to satisfy current trail standards. A sample TAF is at the end of this section.

After completing a TAF, a trail's intended use, overall condition, and necessary maintenance can be determined. Trail sponsors/managers should be responsible for reviewing TAFs and ensuring that any required maintenance on a trail or trailhead be addressed. A review of completed TAFs will help trail managers identify areas or sections of trails that require maintenance attention. In areas that require more maintenance than expected or are too costly to maintain, trail redesign or improvements may be considered. TAFs should be updated if the management intent for the trail, special considerations, or other factors change.

The instructions below explain the significance of each field on the TAF worksheet:

Overall Trail Information

- **Trail Name:** Specify the official trail name, double-checking for correct spelling.
- **Trail Location and County:** Specify the trail location and county.
- **Trail Length:** Specify the length of the trail in miles. Mileage accuracy recorded on the TMO should correspond to the method of collection: wheel, GPS, map, or unknown.
- **Trail Beginning and Ending Segment:** Specify the location of the trail's beginning and ending trail segment.
- **Name and Date:** Specify the name of the person who conducted the assessment.

Designed Use Objectives

- **Designed Use:** Specify the prescribed use for the proposed trail. The designed use is necessary to establish the standards for which the trail is designed, constructed, operated, and maintained.
- **Season of Use:** Specify the season(s) the trail will be open for use.
- **Level of Difficulty:** Specify the prescribed level of difficulty for a specific trail based on its corresponding level of difficulty standards.

Trailhead and Access Points

- **Name:** Specify the name of all trailheads and/or access points.
- **Location:** Specify the location of each trailhead and/or access point.

Trail Tread/Surface

- **Condition:** Specify the current condition of the trail tread or surface.
- **Materials:** Specify the type of materials used to create the trail tread.
- **Average Width:** Specify the average width of the trail tread. Identify the minimum and maximum width observed along the trail.

Drainage

- **Drainage:** Specify the drainage conditions of a trail. Identify any and all drainage issues that need to be addressed.
- **Bridges and Culverts:** Specify the level of condition of bridges and/or culverts along the trail corridor.
- **Dips:** Specify the level of condition of dips along the trail corridor.

Road/Railroad Crossings

- **Condition:** Specify the level of condition of road and/or railroad crossings intersecting with the trail.
- **Sight Line:** Specify the level of condition of sight lines to and from road and/or railroad crossings intersecting with the trail corridor.
- **Accessible:** Specify if there are accessible road and/or railroad crossings intersecting with the trail corridor.

Adjacent Land Uses

- **Adjacent Land Uses:** Specify all current land uses that are adjacent to the trail corridor.
- **Historical and Other Structures:** Specify the level of condition of all historical and/or other structures along the trail corridor.

Signage

- **Blaze/Marking Color or Style:** Specify the blaze and/or marking color and style at trailheads and along the trail corridor.
- **Overall Condition:** Specify the overall condition of blazes and/or markings at trailheads and along the trail corridor. Identify the condition of specific blazes and/or markings where applicable.
- **Replace Signs:** Specify all areas at trailheads and along the trail corridor where blazes and/or markings need to be replaced.

Inspection Procedures

A complete inspection of the trail should be a routine scheduled event, performed by trained personnel/volunteers familiar with the trail. Perform trail inspection in conjunction with scheduled maintenance or as a separate action to determine the need for additional work.

Inspectors should review the trail management objectives for a section of trail before inspecting the trail. It is also helpful to review the previous inspection and maintenance records. The inspector should determine the current condition of the physical features of the trail and document deficiencies, change of conditions, and the need for corrective maintenance.

Trail inspectors should carry a trail map, inspection checklists, and tools for minor maintenance relating to safety. Photographing current trail conditions is an excellent way to document and monitor changes in conditions. Inspectors should identify deficiencies that create safety concerns and hazards to the trail users.

Items to look for include:

- Erosion
- Failure of water diversion features
- Trail degradation
- Vegetation or materials extending into the horizontal or vertical clear area
- Deadfalls, dead limbs, or standing dead trees that could fall within the clear area
- Loose impediments on the treadway (that exceed the level of difficulty)
- Sloughing or erosion of embankments
- Missing or damaged regulatory or warning signs and other signage
- Vandalism

After identifying and repairing safety hazards, the second highest priority is repairing damage from improperly functioning drainage features. The inspector should inspect the inlets and outlets of all culverts, ditches and swales, to ensure they are free of debris and functioning properly. Evidence of a breakdown of drainage includes erosion, ponding of water, wet areas, and rutting of the trail tread. Correction of improperly functioning drainage may be a matter of maintenance or may require trail improvements or re-routing. Allowing a trail to continue to degrade from poor drainage quickly leads to costly corrective maintenance or trail closure.

The inspector should also be attentive to evidence of heavy use and trail tread condition requiring immediate maintenance. Record the general condition of the tread throughout various sections of the trail.

The frequency of inspection depends on the maintenance history of the trail, sustained level of use, and special events. Special events include acts of nature, as well as planned events such as organized club events or poker runs. Inspections should be frequent enough to correct potential problems before they become a safety issue or lead to more costly corrective maintenance.

An experienced and licensed professional engineer should be used to inspect structural facilities such as bridges and retaining walls. Schedule the frequency of structural inspections based on the age and condition of the structure.

Using Volunteers to Perform Inspections

The trail management plan should specify who is responsible for conducting trail inspections and the frequency. Either paid staff or trained volunteers can conduct trail inspections.

Regardless of who completes the inspection, results should be documented and retained in case a liability claim is filed by a trail user. By following the policies and procedures documented in the trail management plan, the risk of liability can be reduced. Volunteers should be trained in performing inspections and recording information on the TAFs. TAFs can be adapted to meet your trail's specific needs.

Trail Assessment Form

Trail Name _____ *Begin Segment* _____ identified by mileposts ☐
Location _____ *End Segment* _____ or coordinates ☐
County _____ *Total Trail Length* _____ *Segment Length* _____
Conducted by _____ *Date* _____

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Designed Use ☐ Hike / Pedestrian ☐ Bike ☐ Mountain Bike ☐ Equestrian
☐ Cross Country Ski ☐ Snowshoe ☐ ATV ☐ Snowmobile
☐ Others, _____

Level of Difficulty ☐ Easiest ☐ More Difficult ☐ Most Difficult

Trailheads & Access Points *Name* _____ *Location* _____ identified by milepost ☐
Latitude N _____ or coordinates ☐
Longitude W _____

Notes

Trail Tread / Surface *Condition* ☐ Good ☐ Fair ☐ Poor ☐ Needs Improvement

Materials _____ *Average Width* _____, min. _____, max. _____

Grade _____% *Cross Slope* _____%

Notes

Drainage ☐ Drains properly ☐ Draining onto or across trail surface
☐ Water staying on trail ☐ Needs drainage structure

Bridges and Culverts ☐ Good ☐ Fair ☐ Poor ☐ Cleanout

Dips ☐ Good ☐ Fair ☐ Poor ☐ Cleanout

Notes

Road / Railroad Crossings

Condition ☐ Good ☐ Fair ☐ Poor ☐ Needs improvement

Sight Lines ☐ Good ☐ Fair ☐ Need to prune ☐ Unsafe

Accessible (Note Exceptions) _____

Notes

Trail Assessment Form

Trail Name _____ *Begin Segment* _____ identified by mileposts ☐
Location _____ *End Segment* _____ or coordinates ☐
County _____ *Total Trail Length* _____ *Segment Length* _____
Conducted by _____ *Date* _____

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Adjacent Land Uses (Check all that apply)

☐ Forest ☐ Farm ☐ Residential ☐ Commercial ☐ Industrial ☐ Encroachment

Notes

Historical and Other Structures

Condition ☐ Good ☐ Fair ☐ Poor ☐ Needs Improvement
☐ Needs to be replaced ☐ Needs to be cleared out

Notes

Signage (includes trailhead and reassurance markings, blazes, etc.)

Blaze / Marking Color or Style _____

Overall Condition ☐ Good ☐ Fair ☐ Lacking ☐ Needs Maintenance

Regulatory ☐ Good ☐ Fair ☐ Lacking ☐ Needs Maintenance

Wayfinding ☐ Good ☐ Fair ☐ Lacking ☐ Needs Maintenance

Interpretive ☐ Good ☐ Fair ☐ Lacking ☐ Needs Maintenance

Wooden / Routed ☐ Good ☐ Fair ☐ Lacking ☐ Needs Maintenance

Reassurance Markings ☐ Good ☐ Fair ☐ Lacking ☐ Needs Maintenance

Intersections ☐ Good ☐ Fair ☐ Lacking ☐ Needs Maintenance

Pavement Markings ☐ Good ☐ Fair ☐ Lacking ☐ Needs Maintenance

Others (fiberglass, etc.) ☐ Good ☐ Fair ☐ Lacking ☐ Needs Maintenance

Replace Signs:

Notes

Trail Assessment Form

Trail Name _____ *Begin Segment* _____ identified by mileposts ☐
Location _____ *End Segment* _____ or coordinates ☐
County _____ *Total Trail Length* _____ *Segment Length* _____
Conducted by _____ *Date* _____

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Other Notes and Summary

Please return this form to



PASHEK ASSOCIATES

LANDSCAPE ARCHITECTURE | DESIGN | PLANNING