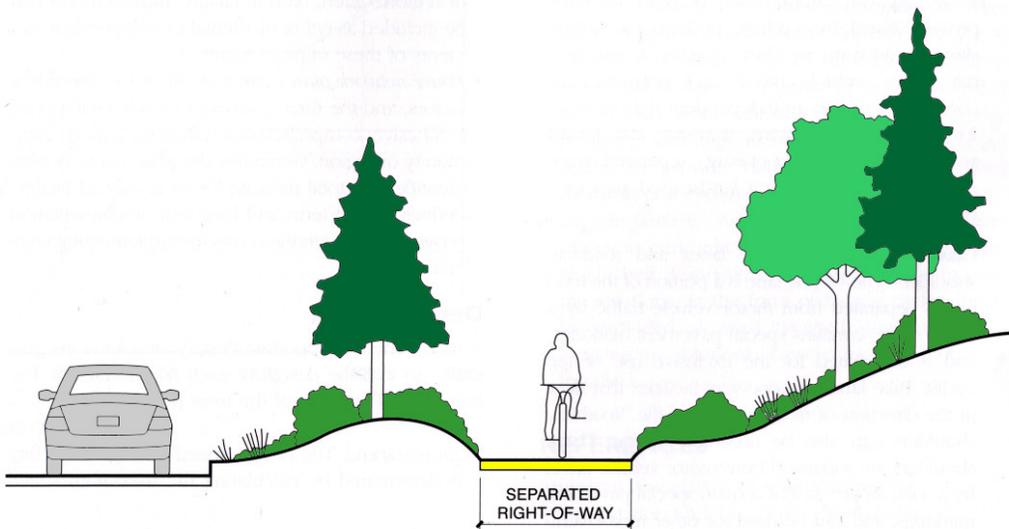


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Trail Types – Descriptions

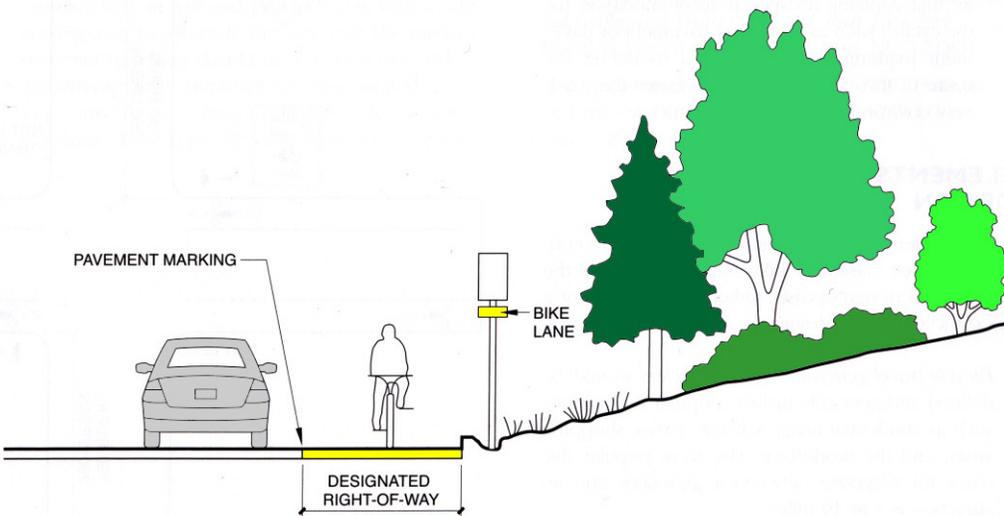
Bikeway Classifications

The following are nationally recognized bikeway classifications as per the American Association of State Highway Transportation Officials (AASHTO). These classifications are specific to bicycle transportation routes and do not include other pedestrian facilities such as sidewalks and off-road hiking trails which are described later in this chapter.



BICYCLE PATH (CLASS I)

Class 1 Bikeways are completely separated from the roadway. They are also known as ‘off-road trails’, ‘greenways’, ‘shared use paths’, and/or ‘multi-use paths’.



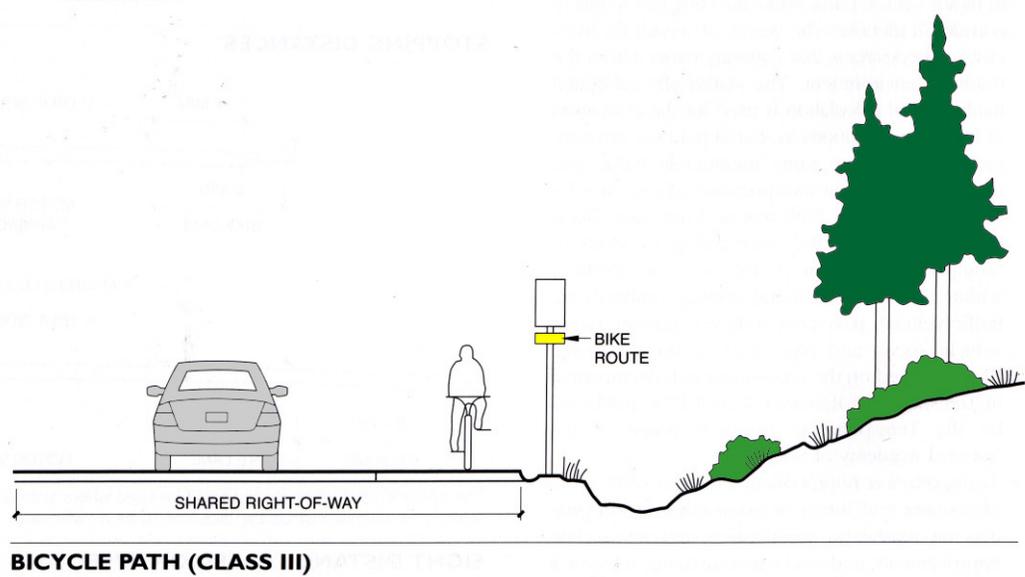
BICYCLE PATH (CLASS II)

Class 2 Bikeways are designated bicycle lanes within a roadway for exclusive use of the cyclist and contains special pavement markings and signage. Bike lanes are one-way in the direction of motor vehicle traffic. The common standard width for a bike lane is five (5) feet.

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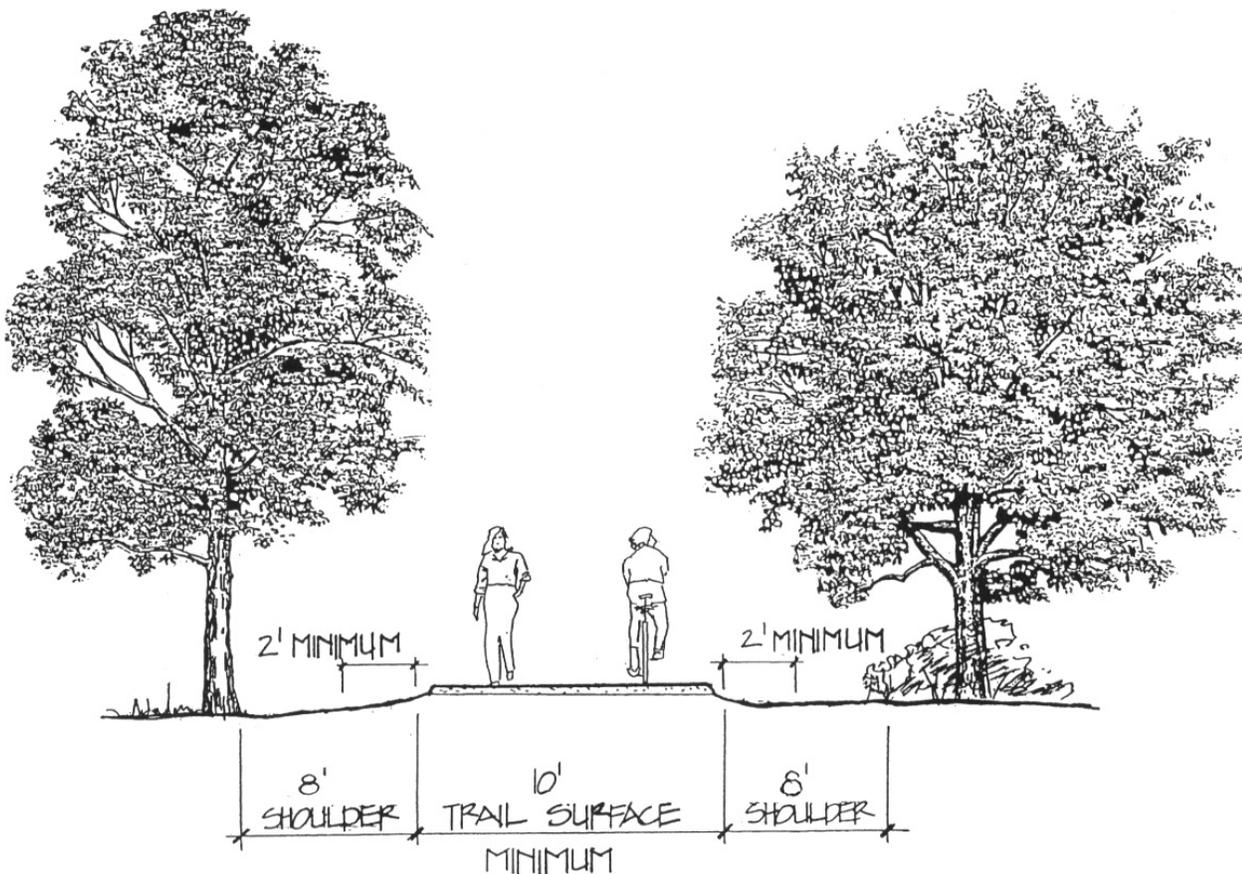
Class 3 Bikeways

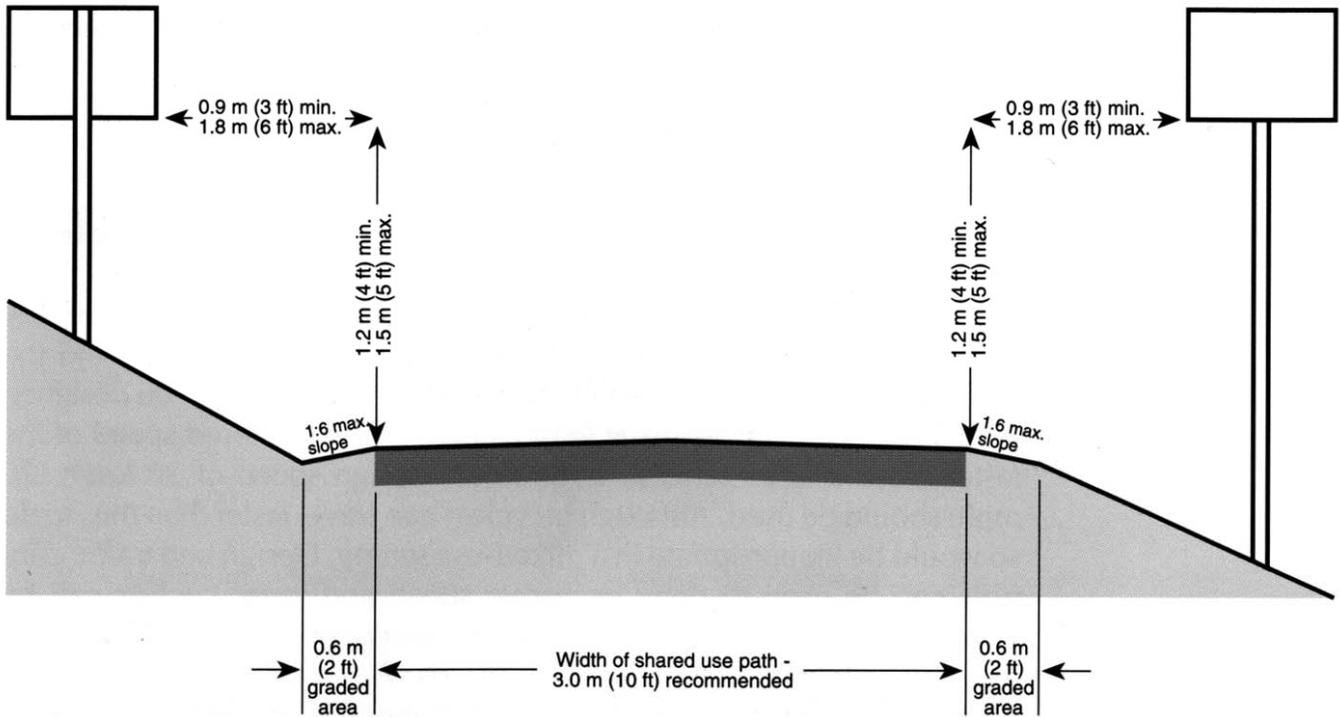
are also known as 'Bike Routes'. These offer no special accommodations for the cyclist within the road right-of-way. Signs are used to define the route and the cyclist shares the roadway with vehicular traffic.



(Source: AASHTO - *Guide For Development of Bicycle Facilities*)

Multi-Use Trail (Off-Road)





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

The trail type that provides for the largest population of users is a Multi-Use Trail, also known as Class 1 Bikeways (as described above). The following paragraphs provide a nationally recognized definition of a Multi-Use Trail and its typical design criteria.

The American Association of State Highway and Transportation Officials (AASHTO) defines a Multi-Use Trail or Shared Use Path as: *a bikeway physically separated from motorized vehicular traffic by an open space or barrier and either within the highway right-of-way or within an independent right-of-way. Shared use paths may also be used by pedestrians, skaters, wheelchair users, joggers, and other non-motorized users.*

As the definition suggests, this trail type provides for a variety of trail users, depending on the trail surface paving and available right-of-way width. Another general trait of multi-use trails is universal accessibility for those with disabilities. This is due to gentle slopes, adequate widths, and smooth surfaces. Parking areas for multi-use trail segments should provide facility access in accordance with the Federal Americans with Disabilities Act (ADA) guidelines to provide for trail users with disabilities.

Both the Rails-to-Trails Conservancy (RTC) and AASHTO recommend a multi-use trail to be ten feet (10') wide, with the minimum width for a two-way trail at eight feet (8'), and for a one-way trail at five feet (5'). Depending on the user

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volume, widths of twelve feet (12') or fourteen feet (14') are recommended to avoid potential conflicts. An additional two-foot (2') shoulder is recommended on either side of the trail surface to provide clearance from trees, poles, walls, fences or any other lateral obstruction. Site conditions may warrant additional safety measures such as fencing and increased shoulder widths.

Hiking Trails

A hiking trail may be defined as a recreational trail that does not meet the design requirements of a multi-use trail such as width, slopes & surfacing. An advantage of hiking trails is that they can allow for access and recreational use of the land quickly at a relatively low cost. A disadvantage of hiking trails is that they generally limit the number and type of trail users due to their minimal width, steeper slopes, and softer surfaces, and generally do not meet ADA requirements.



Hiking Trail example.

Trail Surface Types

Asphalt or macadam surfaces provide for the widest variety of trail users including bicyclist, walkers, joggers, wheelchair users, and in-line skaters. Initial installation costs are relatively high compared to other trail surface types. However, long term maintenance costs will remain lower than others if properly installed and maintained.

Crushed limestone surfaces can accommodate all trail user types with the exception of in-line skaters. Initial installation costs for this trail surface are relatively low, however long term maintenance costs increase due this surface's higher susceptibility to erosion, especially if not properly installed with swales and cross drains. A crushed limestone surface can also serve as base material for an asphalt surface if trail use increases or funds become available for a surfacing upgrade.

Compact earth surfaces are the least expensive to install, however they limit the types and number of trail users. Compact earthen surfaces are primarily used for hiking only or horse trails adjacent to multi-use trails that receive significantly less trail user volume. Hiking trails may be considered as an

alternate means to reach the more environmentally sensitive areas found within the floodplain area to provide routes to the river for environmental education, bird watching, or fishing access.

Trails and many other recreational facilities are commonly developed within floodplains to take advantage of the relatively flat land. These trails may require additional maintenance to remove debris deposited by a flood event. If a trail is placed where flood waters will have a significant erosion effect, asphalt surfaces are recommended. Trails should not be located within a river's floodway, which is where the most significant flood damage occurs.

Sources:

- Guide For Development of Bicycle Facilities, American Association of State Highway and Transportation Officials (AASHTO), 1999;
- Trails for the Twenty-First Century: Planning, Design, and Management Manual for Multi-Use Trails, Rails to Trails Conservancy (RTC), 1993.
- Statewide Bicycle & Pedestrian Master Plan, *Bicycling & Walking in Pennsylvania – A Contract for the 21st Century: Bicycle Guidelines*, Commonwealth of Pennsylvania Department of Transportation

Bicyclist Types



Advanced bicyclist.

The American Association of State Highway and Transportation Officials (AASHTO), and the Pennsylvania Department of Transportation (PennDOT) both classify bicyclists into one of the following three groups:

Group A – Advanced Bicyclists – These riders generally use their bicycles as they would a motor vehicle. They are riding for transportation, convenience, and speed and want direct access to destinations with a minimum of detour or delay. They are typically comfortable riding with vehicular traffic. They prefer a sufficient operating space on the travel way or shoulder to eliminate the need for either themselves or a passing motor vehicle to shift position.

Group B – Basic Bicyclists – Less confident adult riders may also be using their bicycles for transportation purposes, e.g., to get to the store or to visit friends, but prefer to avoid roads with fast and busy motor vehicle traffic unless there is ample roadway width to allow easy overtaking by faster motor vehicles. Thus, basic riders are comfortable riding on neighborhood streets and shared use paths and prefer designated facilities such as bike lanes or wide shoulder lanes on busier streets.

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Group C – Child Cyclists – Riding on their own or with their parents, child cyclists may not travel as fast as their adult counterparts but still require access to key destinations in their community, such as schools, convenience stores and recreational facilities. Residential streets with low motor vehicle speeds, linked with shared use paths and busier streets with well-defined pavement markings between bicycles and motor vehicles, can accommodate children without encouraging them to ride in the travel lane of major arterials.

It is estimated that only 5% of bicyclists overall would qualify as Group A or Advanced Bicyclists, therefore 95% fall into either Group B or C.

(Source: AASHTO - *Guide For Development of Bicycle Facilities*)

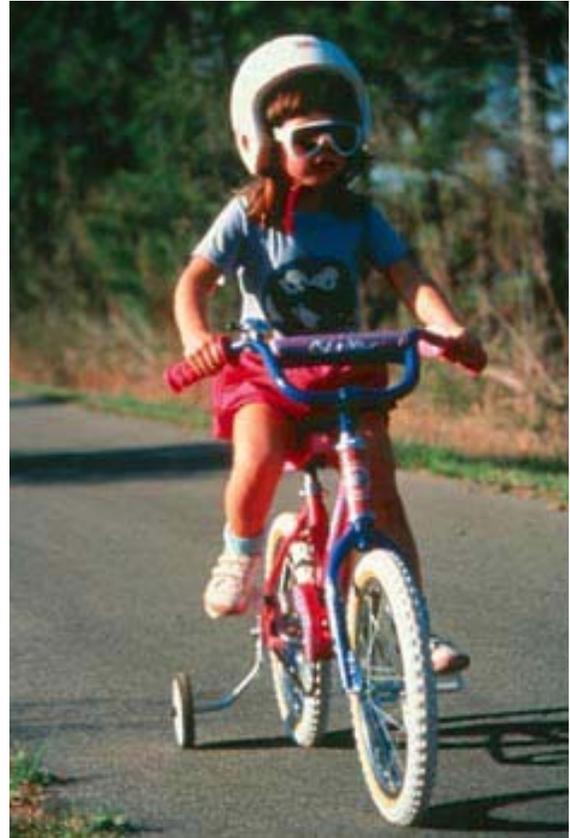
Preliminary Trail Alternatives

The first step in the analysis and development of a Greenway trail plan is to inventory all possible alignment alternatives. The majority of alignment alternatives were identified in the Township Comprehensive Plan. These proposed alignments included both on-road and off-road connections. Additional proposed alignments for study were suggested by the project committee and the public. Other alignments were added as part of the base mapping analysis and site reconnaissance performed by the consultant.

The initial alignment alternatives were compared to the information found within the GIS database, including parcel ownership and detailed aerial photography. This detail of base information was not available when the previous plans were developed, and allowed for a more site-specific approach to determining the actual effects each proposed alignment might have on its surroundings. The following section provides a description of the general criteria considered to analyze the initial alignments.

Alignment Selection Criteria

The following criteria were used to determine whether or not a proposed alignment could or should be included in a Township-wide trails system.



Child cyclist.



Neighborhood with existing sidewalks.

Safety

All of the recommended alternatives studied are considered to have the potential to safely be included in the proposed system. Each of the on-road routes were cross referenced to existing traffic volumes and field verified for the actual roadway conditions. Some off-road connections were not field verified due to the inability for the consultant to investigate conditions on private property. These alignments should be checked at a later time for safety with respect to slopes and other miscellaneous conditions that would deem an alignment unsafe. This evaluation should be done by the Township where potential alignments can be investigated with permission of the private landowner.

Connectivity / Continuity / Level of Service

Each of the recommended alignments need to be capable of being part of a larger system and/or provide a level of service worthy of its development. An individual trail segment that does not provide a connection between destination points or does not plug into a larger system is not recommended.

Existing Sidewalks

Many of the Township neighborhoods have existing sidewalk systems. These neighborhoods were inventoried and identified on the trail mapping. This inventory of existing sidewalks was used to determine if a proposed pedestrian alignment was necessary or if it would simply be duplicating an existing facility.

Private Property Impacts

Parcel boundaries and ownership information within the GIS database provide a level of information that was not readily available in previous planning efforts. By reviewing the property ownership along any potential off-road alignment, the approximate number of potential impacts can be identified, assessed, and calculated to determine whether or not an alignment should be pursued.

Environmental Impacts

Trail alignments that have the potential for significant environmental impacts such as clearing of wooded areas, requiring significant grading, or disturb wetlands and/or any other sensitive ecosystems should be generally avoided.

Constructability / Cost

Engineering can provide solutions to almost anything; however the costs associated with providing an engineering solution may be unreasonable or cost prohibitive. Alignments that require significant engineering efforts and abnormal construction costs should be generally avoided - unless it is the only solution possible for a critical trail linkage.

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Proposed Greenway Connections

Through the existing conditions analysis, the public participation process, and discussions with the Study Committee, it became apparent that the Township needs to take advantage of the possibilities associated with new land developments and roadway improvements to provide the bicycle and pedestrian connections that are lacking between many of the destinations described herein and the Township's residential communities.

Many of the Township's newer communities have existing sidewalks, while some of the older ones do not. Some roads have adequate width to allow for bike lanes or bike routes, and others do not. This plan proposes to fill those missing links between communities and destinations by recommending the following improvements.

The "Neighborhood" improvements will establish a network for connectivity at the community level within a ½ mile walking radius of destinations, while the "Township" development of trails and/or bike routes will connect the Township to other systems on the regional level. In combination, these proposed improvements will serve the immediate needs for the majority of Township residents looking for safe recreational and transportation alternatives to local destinations and then provide future connections to other systems located outside Township boundaries.

Each of the following improvements is represented on the mapping in both the Township-wide exhibit found at the end of this chapter and in more detail within the Implementation Area exhibits found in Chapter 4: Implementation.

Neighborhood - Off-Road

These off-road alternatives are intended to provide safe local connections outside of the road rights-of-way between neighborhoods and destinations. These connections are relatively short in length and proposed to be located within publicly-owned land or rights-of-way or within new land developments. Some of these segments may already exist on an informal basis, or begin within Township-owned lands as hiking trails. If the demand and physical conditions warrant, these connections should be developed as full Multi-Use Trails or Class 1 Bikeways.

Each of these proposed segments was estimated for costs as a Multi-Use Trail option. Construction requirements for these sections include site preparation & vegetation clearing, earthwork & drainage improvements, and a compacted limestone dust surface – at an estimated cost of \$40 per linear foot. Asphalt surfacing would incur an additional \$10 per linear foot.

Neighborhood - On-Road

These proposed connections will provide for both pedestrian and bicycle facilities within existing public rights-of-way and be geared for the Group B and

C cyclist community that comprises the majority of Township residents. The on-road bicycle facility should be developed as a Class 2 Bikeway that includes designated bike lanes where the existing right-of-way width will permit. Developing these routes as Class 3 Bikeways - or Bike Routes would be the next best option if dictated by the right-of-way space requirements.

Construction requirements for the on-road improvements will include shoulder improvements and additional paving where necessary, lane striping & signage, and bicycle-safe grates. The estimated cost for these improvements averages \$15 per linear foot.

The pedestrian component to these proposed routes is a five foot (5') wide sidewalk to be located within the public right-of-way. The walkway is proposed to be constructed of concrete and is estimated to cost \$35 per linear foot.

Walkways

These proposed walkways will provide the necessary pedestrian linkages between neighborhoods and their destinations and be located within the public rights-of-way. The walkway is proposed to be constructed of concrete and is estimated to cost \$35 per linear foot.

Township - Off-Road

These long term connections are proposed to provide a safe off-road recreational and transportation alternative on a Township-wide level and eventually extend to and connect with regional bicycle and pedestrian facilities located outside of Township boundaries. Some of the proposed routes will only provide localized connections, but are designated as "Township" improvements because they are not immediate priorities to provide necessary connections within the ½ mile walking radius of destinations. Township improvements will eventually interconnect the priority areas into a larger continuous system capable of establishing regional connections.

Construction requirements for these sections include site preparation & vegetation clearing, earthwork & drainage improvements, and a compacted limestone dust surface – at an estimated cost of \$40 per linear foot. Asphalt surfacing would incur an additional \$10 per linear foot.

Township - On-Road (Cyclist Routes)

The final phase of the bicycle and pedestrian improvements is geared towards the Group A or advanced bicyclists within the community. The roadways suggested for this network have the existing right-of-way available to provide for a comfortable riding experience for the advanced cyclist and would require only minimal improvements in most cases. Due to the traffic volumes associated with many of these roads, it is not envisioned that the Group B or C cyclists will feel comfortable on these routes even with the proposed improvements. Some of the roadways, Nyes Road for example, will require significant roadway improvements to provide a safe space for the Group A

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cyclists. The Township will need to ensure that provisions for these routes be included in the roadway improvement design process.

Construction requirements for the Township cyclist routes are minimal, and include striping, signage, and bike safe grates at an estimated cost of \$3 per linear foot.

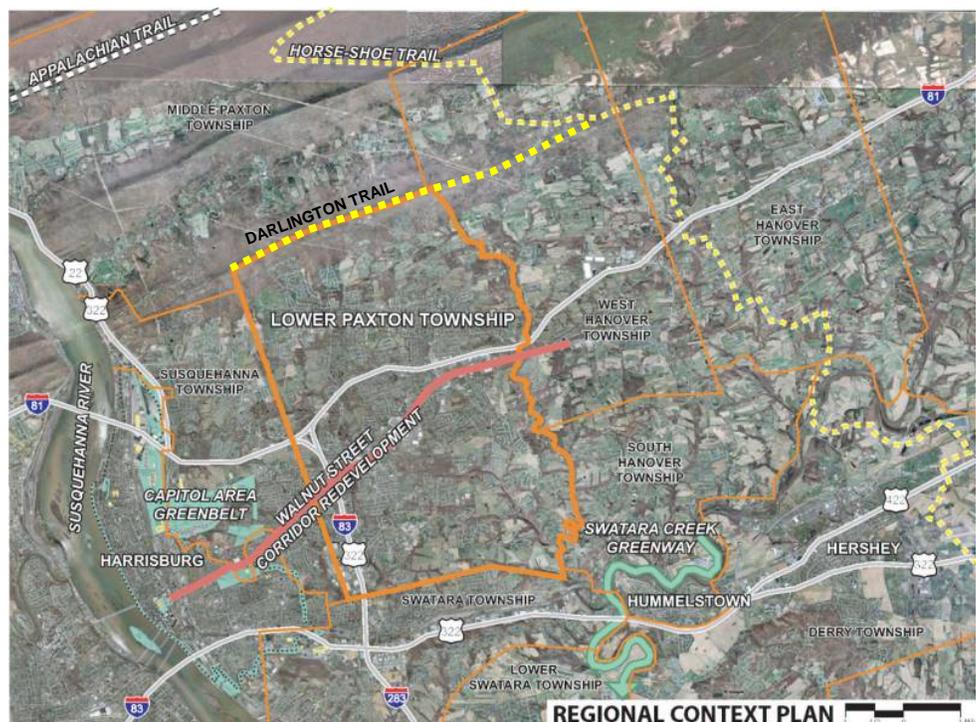
Intersection Improvements

Intersections requiring improvements for the safe passage of bicyclists and/or pedestrians were identified through site reconnaissance, by the study committee, and through the public participation process. There may be additional intersections not identified in this plan that will require improvements and be identified during the design development process. Each of those intersections are identified in the mapping found at the end of this chapter and in the Implementation Area exhibits found in Chapter 4: Implementation.

Construction requirements for these intersection improvements may include crosswalk striping, pedestrian signalization, and/or additional signage. Because the existing conditions vary widely among these intersections, costs associated with these improvements are generally estimated at \$10,000 per intersection. Additional information relative to safe pedestrian and bicycle improvements at intersections can be found at the 'Safe Routes to School Guide' website: <http://www.saferoutesinfo.org/guide/index.cfm>

Regional Connections

There are many existing and planned bicycle and pedestrian facilities located within relatively short distances outside of the Township boundaries. These connections include the Swatara Creek Greenway via the Nyes Road corridor, the Capital Area Greenbelt via the proposed Walnut Street Corridor improvements, and the Darlington and Horseshoe Trails via the proposed routes to the top of Blue Mountain.



Legal Feasibility

Impacted Properties

This plan recommends the use of public and utility-owned land and/or rights-of-way and avoids trail alignments that would impact privately owned land wherever possible. However, where friendly agreements can be reached, some alignments will require the acquisition of right-of-way through either fee simple purchase, easement if possible, or by donation from a private landowner. While there are some potential short term off-road trail connection alignments identified in the mapping that affect privately-owned land, the majority of the possible private property impacts can be found within the potential long term off-road connection alignments. Some proposed alignments follow along existing sewer rights-of-way that do not currently have legal provisions to allow trail use. The Township will need to renegotiate such existing easement agreements with each of the landowners along these sewer rights-of-way before trail use can be permitted for public use.

Easements that will be used for public trails are eligible for both state and federal funding – provided that there is a minimum 25 year term of use in the legal agreement. The acquisition of the easements would require an eligible entity – either a unit of government such as a municipality or county, or a competent non-profit organization partner.

Properties potentially impacted by proposed trail alignments can be identified utilizing the Township’s GIS system and the existing parcel boundaries and property ownership information found within the GIS database.

The cost to acquire easements is difficult to estimate. The best method for determining what these costs may be would be to ascertain the average per acre real estate value of the land within which the proposed trail segment lies, multiply it by the amount of acreage to be purchased, and adjust it for the projected time of purchase. Easement values will likely differ from fee simple acquisition costs. The Township will only negotiate Greenway trail improvements with private property owners who wish to engage in specific agreements.

A model trail easement agreement has been developed by the Pennsylvania Land Trust Association that can be used by the Township as a starting point document for creating easement agreements where necessary. A copy of this model easement agreement can be found in the report appendix. Other trail and land conservation related tools can be found on the Land Trust’s website: <http://conserveland.org/>.

General Liability Issues

Questions are often asked about the potential liability a landowner may have when located adjacent to a publicly used trail. The Pennsylvania Recreational Use Statute protects landowners who ease their property for trail use from

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general liability if their property is infringed upon as a result of the public use of the trail. This act does not prevent a landowner from being sued, however it does provide protection that has been upheld numerous times by Pennsylvania courts. A copy of this statute can be found in the report appendix.

Boundary Surveys

Boundary surveys will be required for all proposed easements and/or purchases. The extent of each survey will be a matter of negotiation between the land owner and the Township.

For purposes of preparing construction documents, a centerline survey with cross sections of the trail alignment every fifty to one-hundred feet, (depending on topography and existing site features), will be the minimum necessary. All proposed bridge structure locations will also need to be completely surveyed.

Art on Trails

The following was submitted to the Township's Greenway Committee by the Lower Paxton Township Arts Council on May 2, 2007:

The Lower Paxton Township Arts Council respectfully requests the inclusion of Art in the plans, designs and budgets for the township's trails and greenways.

Art and artists enhance trails and greenways. Art related to the design and building of trails makes them more interesting, enjoyable, and exciting. Art can be added to existing components of the trails such as benches, drinking fountains, signs, bridges, walls etc. in the form of murals, sculptures, etc. Art can also be added to stand on its own on the trails.

Artful Ways, a trails collaboration between the National Park Service and the National Endowment for the Arts recently conducted a survey of individuals on the art benefits for trails. It discovered that about 86% of those surveyed confirmed that art enhanced public appreciation of the trail environment as well as attracted positive public attention and increased trail use.

The Lower Paxton Township Arts Council will assist the Greenway Committee on ideas for incorporating art, on securing the services of artists and looking for possible sources of funding for art on trails.

Some examples of how art can be added to our trails:

- *Adding murals to any barrier fences, walls or any flat surface including the trail itself;*
- *Adding artwork to benches;*
- *Utilizing the resources of the township such as native birds for an "identify the birds" on the trail "exhibit." This could be an interactive, educational stop and go activities for all. Other themes could work, too;*

- *Using recycled materials such as old street signs or bicycle parts, artists can make murals and sculptures;*
- *Memorial benches;*
- *Artistic fencing;*
- *Bicycle Racks;*
- *Trash Cans;*
- *Keeping some large stumps of trees that may need to be cut down during the construction of these trails, artists can make them into pieces of art; and,*
- *Any of the above ideas could be part of a community project led by professional artists. This could be residents young and old for an intergenerational project;*
- *Add a representative of the Arts Council to the Greenway Committee to ensure that art is incorporated onto the trails.*

Riparian Corridor Protection

Riparian corridors within the Township are exposed to ever increasing stress as new developments provide increased stormwater runoff. In addition to providing protection to the existing watercourses, riparian corridors or buffers also serve as wildlife corridors for the migration of birds and animals. Within the report appendix is an article entitled “*Introduction to Riparian Buffers*” which provides further explanation relative to the importance of riparian buffers, and how they can be repaired, created, and maintained.

The existing ‘Conservation’ overlay district provides performance zoning measures that allow for flexibility in the site design to provide protection for many environmental features, but it does not provide a specific geographic location for where those measures need to be applied within a site. To provide direct protection to the Township’s existing riparian corridors, an overlay district will need to be geographically tied to these corridors.

The establishment of a Riparian Corridor Conservation overlay district will provide added protection to all known tributaries found within the Township’s watersheds. This overlay district can be spatially defined as a 160’ wide (75’ to either side of the 10’ wide tributary) minimum buffer to any and all mapped tributaries as defined by the Township GIS system. There are two (2) separate zones found within the corridor, each with its own set of permitted and conditional uses. Zone #1 consists of the first 25 feet from the stream bank and provides the most restrictions on use. Zone #2 is the outermost 50 feet of the overlay and allows for recreational trail use.

Refer to the Riparian Corridor Conservation exhibit at the end of this chapter for a complete list of permitted and conditional uses and other information defining this corridor.

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