Cynwyd Spur Trail Feasibility and Planning Study

February 2015

Submitted to Lower Merion Township

Prepared by

Michael Baker INTERNATIONAL

Michael Baker International – Philadelphia and Horsham, PA
With support from Toole Design Group

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Acknowledgements

Michael Baker International would like to thank the following representatives for their time and effort in assisting with this study.

Study Committee

Barrett Dunigan, Friends of the Cynwyd Trail
Kitty Rapalyea, Friends of the Cynwyd Trail
Scott Zelov, Lower Merion Township Commissioner
David DeAnglis, Lower Merion Township Parks and Recreation Dept.
George Manos, Lower Merion Township Commissioner
Bill Cook, Lower Merion Township Resident
Donna Heller, Lower Merion Township Parks and Recreation Dept.
Chris Leswing, Lower Merion Township Building and Planning
Liz Gabor, O'Neill Properties
Lindsay Taylor, Lower Merion Township Parks and Recreation Dept.

Study Consultants

Chris Stanford, PE, PMP,PTOE, Michael Baker International
Sara Patterson, Ph.D., LEED AP, Michael Baker International
Bryan Spangler, PE, Michael Baker International
Cassie Caloe, Toole Design Group

Special Thanks

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Additional appreciation is due to Lower Merion Township Commissioners and staff for their support of this study.

Introduction

The purpose of the study is to conduct a feasibility study and develop a master plan for the Cynwyd Spur Trail, which is part of the 37-acre Cynwyd Heritage Trail greenway. The plan will suggest innovative creation of passive open space, including providing emergency access, constructing multi-purpose trails that will link the Cynwyd Heritage Trail and the Schuylkill River Trail, address management issues and consider recommendations contained in the Cynwyd Heritage Trail Master Plan.

Schuylkill River Trail

The Schuylkill River Trail (SRT) is a multi-use recreational path following the Schuylkill River and stretching 128 miles from the southernmost foothills of the Appalachians to tidal lands in Philadelphia. As a regional connector knitting together four counties and numerous communities, it is a strong driver of heritage and recreation tourism. Poised to become the region's first green transportation corridor, the SRT is increasingly utilized by commuters as an alternative transportation route in some urban areas. In Philadelphia and its suburbs, "demand" for the trail has markedly increased with 670,000 people using the SRT last year and with bicycle traffic on the trail doubling in the last year alone. Stakeholders and planners alike see the trail connecting business districts, transit options, parks, green space, and other communities up and down the trail.

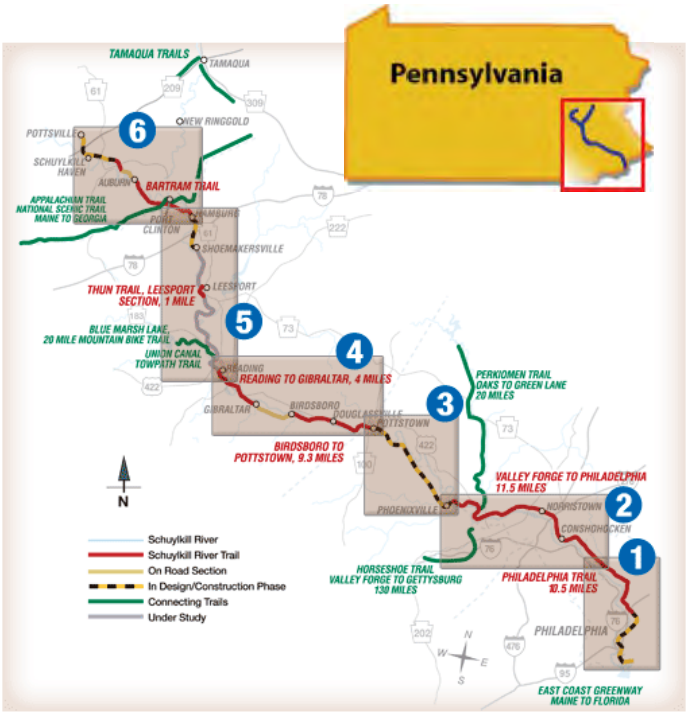


Figure 1 - SRT Map, http://www.schuylkillrivertrail.com/

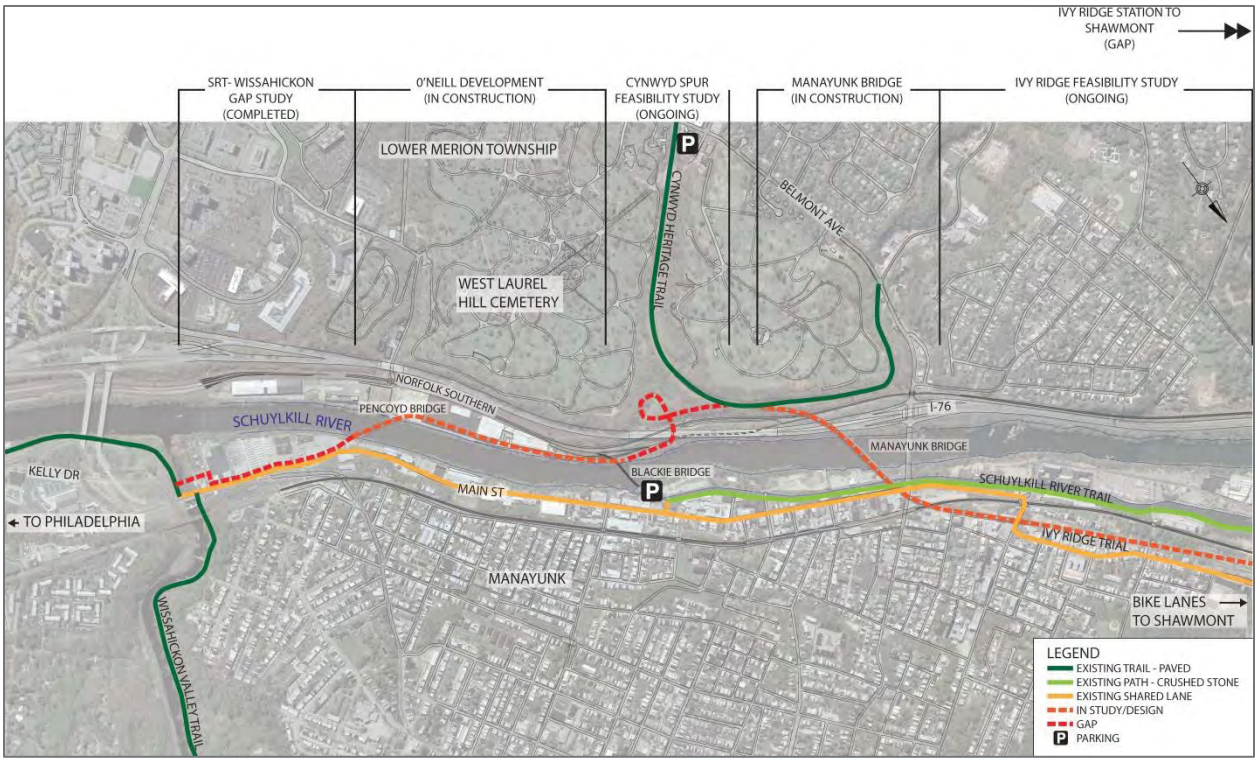


Figure 2 - Status of SRT Projects

The SRT currently parallels the east side of the Schuylkill River partially on-road on Main Street, Manayunk, and partially as a soft-surface trail on the old towpath alignment. With the completion of this trail in addition to two other projects that are currently in construction, the SRT will be a completely off road, paved, trail across the Manayunk Bridge, on the Cynwyd Heritage Trail and Cynwyd Spur, and then through a private development across the Pencoyd Bridge. The developer of the private property, O'Neill Properties, is currently completing a 10'-12' wide paved trail along their riverfront, rehabilitating the Pencoyd Bridge and adding pedestrian facilities.

Goals

There are a number of goals for this project, listed in order of importance, that were considered in the development of this study:

1. Close the gap in the Schuylkill River Trail
2. Create a regional transportation connection that supports new development as outlined in the Township Comprehensive Plan
3. Connect to SEPTA Ivy Ridge Station, Wissahickon Transportation Center and Cynwyd Station
4. Provide access to natural areas and access to the river
5. Create walking and bicycling connections to Manayunk, East Falls, Wissahickon Trails, River Trails, Fairmount Park, Forbidden Drive Trail

Many of the goals are complementary, but some require balancing needs of a number of different stakeholders.

Scope

The scope of the study includes the following tasks:

- Existing site analysis
- Planning alternatives analysis
- Preliminary trail plan/recommendations
- Public meetings
- Master Plan for Cynwyd Spur Trail
- Financial feasibility
- Implementation plan

This study will summarize the results of the investigation completed as well as recommendations for advancing the completion of this trail connection.

Meetings

The following table explains meetings that were held as part of this study. Refer to Appendix C for a detailed summary of each meeting and all meeting documents.

Date	Meeting	Topic
November 18, 2013	Kickoff Meeting	Discuss scope and responsibilities
January 24, 2014	Steering Committee Meeting	Preliminary alignments and feasibility
March 6, 2014	Public Meeting	Design workshop and public involvement
April 30, 2014	Schuylkill River Trail Coordination	Discuss primary route for SRT
July 16, 2014	PennDOT Coordination	Easement feasibility, PUC involvement
October 3, 2014	Steering Committee	Feedback on recommendations, next steps
November 17, 2014	Public Meeting	Recommendations
January 23, 2015	Norfolk Southern Meeting	Easements and Coordination

Existing Conditions

The study area for the Cynwyd Spur can be thought of as two areas. The first area, the Connelly Tract, is primarily a triangular shaped, steep wooded area bounded by the West Laurel Hill Cemetery to the southeast, West Minster Cemetery/Cynwyd Heritage Trail (CHT) to the west, and the Schuylkill Expressway (I-76)/Norfolk Southern Railroad to the north. The Connelly tract was donated to the Township several years ago. The second part of the study area, the riverfront, is a narrow strip of land between the Schuylkill Expressway and the Schuylkill River. The proposed Righter's Ferry residential development is the east edge of the study area.

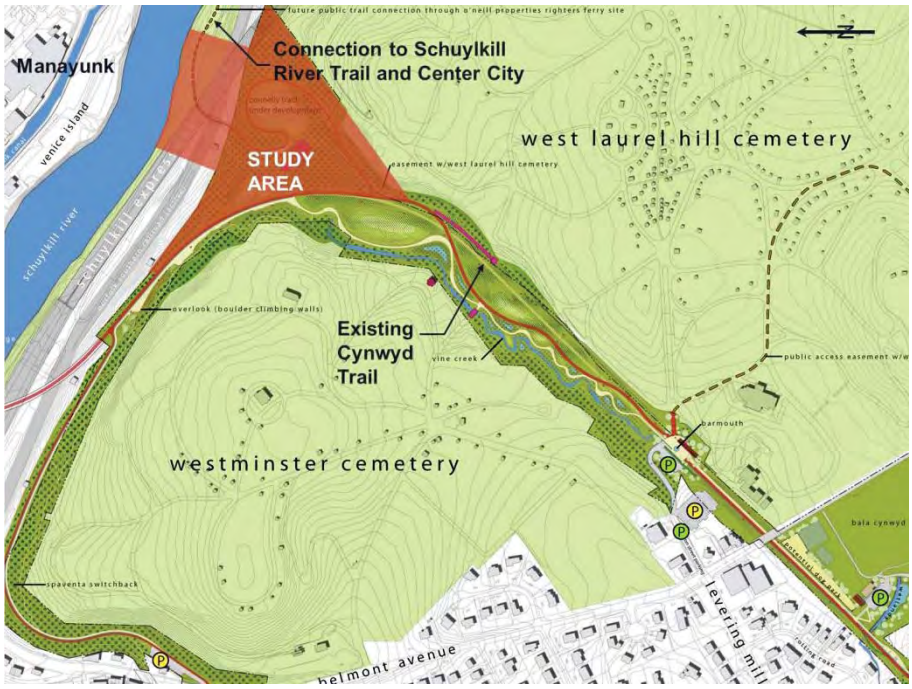


Figure 3 - Study Area Context

Connelly Tract

Within the Connelly Tract, there are two existing boy-scout maintained nature trails that intersect at a large outfall for the culvert that carries Vine Creek. The outfall leads directly into a second stoen arch culvert that carries Vine Creek to the Schuylkill river.

Figure 4 - Existing Nature Trail

There is an 80'-100' grade differential between the riverfront and the Cynwyd Heritage Trail. The 80' grade change exists at the northern point of the study area and increases as the CHT goes south.

This area used to house the Cleggs Cotton Mill. There are some remnants of the old mill scattered throughout the site. An historic map, from 1886, was obtained from the Lower Merion Historical Society that shows the location of the old mill in relation to the old railroad tracks.

Figure 5 - Culvert Outfall

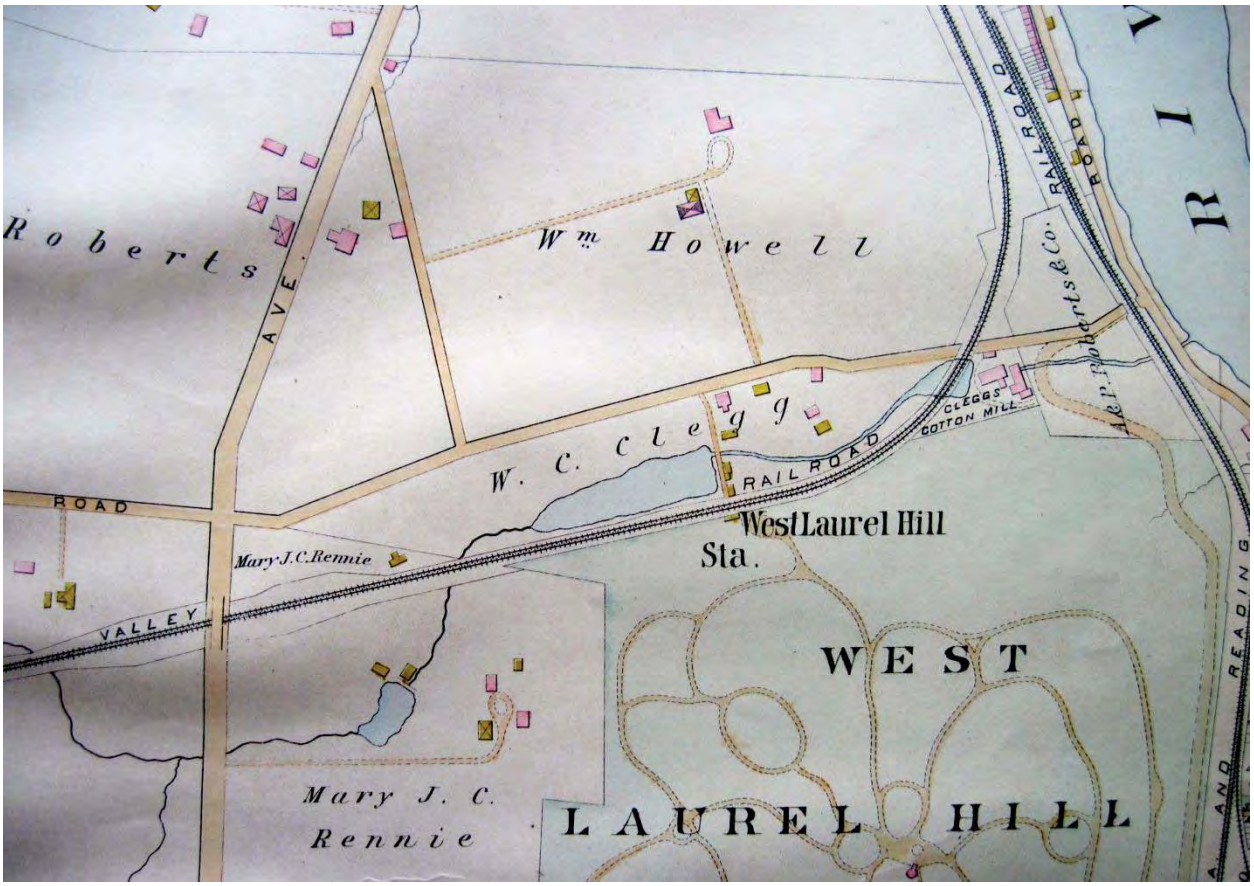


Figure 6 - Historic Map, 1886

Riverfront

The riverfront area consists of an access road for the railroad and I-76 and a wooded area along the river banks. Unused railroad sidings wind their way through the area dotted with railroad relics including an old railroad flat car.

Figure 7 - Access road (left) and railroad flat car (right)

Between the two areas, there is a bridge for Norfolk Southern and the viaduct section of I-76. The opening under the railroad bridge currently measures at 15' wide and 13'-5" tall on the river side, and 14'-11" wide and 10' tall on the hill side. PennDOT plans show 14' of vertical clearance, so it is assumed that sediment has built up over time to account for the differences in vertical clearance. On the south side of the overpass, there is a stone retaining wall on the east side of the trail.

The Schuylkill Expressway passes over sections of the site well above the existing grade. Alongside and underneath the expressway, there is a maintenance access road for the railroad. An existing billboard is currently accessed using this maintenance road.

Figure 8 - Railroad bridge

Figure 9 - Area under I-76

Figure 10 - Existing Conditions

Challenges

This study focused on challenges that may hinder the completion of this project during final design or construction. Some of the main challenges of the site include the following:

- Steep topography and cliffs
- Crossings of I-76 / Viaduct Area under I-76
- Crossing of Norfolk Southern Railroad
- Retaining wall adjacent to the Norfolk Southern Railroad bridge

Steep topography and cliffs impact the cost of construction and accessibility for users with mobility disabilities. There are a number of options to construct a trail on a sloped site which will have different cost, land, and accessibility impacts. Switchbacks are one option, but they could be very costly and will greatly impact the unique aspects of the site that should be maintained and highlighted. If the trail were to parallel the slope, significant grading would be required to stabilize the slope. Other options include retaining walls on both sides of the trail, or a boardwalk that is built above the slope. These options greatly reduce site impacts, but also increase cost.

Coordination with PennDOT is required throughout design and construction to ensure no safety or site access issues. A meeting was held with PennDOT on July 16, 2014 to discuss issues with crossing under PennDOT limited access right-of-way of the elevated section of the Schuylkill Expressway (I-76). Right-of-way fence will be required along the trail to prevent access to I-76. Current PennDOT policy indicates

that trails are not permitted to run parallel to a roadway in limited access right-of-way, but are allowed to pass under grade separated structures within limited access right-of-way. PennDot agreed that a Shared Use Path Crossing Agreement was feasible to allow the trail cross under I-76. Coordination will be required on appropriate right of way fence locations.

Crossing under Norfolk Southern railroad tracks and through their property will require significant coordination to provide safety for trail users, prevent access to the tracks, and to obtain an easement to connect to the Righters Ferry property. A 33' easement currently exists from the edge of the Connelly tract, under the railroad bridge, and to the riverfront. The distance between the easement and the Righters Ferry property is approximately 260'.

The existing NS railroad bridge requires some minor improvements to accommodate the future trail connections. The improvements are not structural, but are related to the surface condition and aesthetics of the bridge. Also, the retaining wall adjacent to the railroad bridge requires some maintenance, but does not need to be removed or replaced. A detailed explanation of the bridge wall condition can be found in the appendix.

A meeting was held with NS railroad staff on site on January 23, 2015. NS indicated that roof canopies will need to be constructed on either side of the railroad bridge to protect trail users from any failing objects from the railroad. Maintenance access will be required to allow NS access to the bridge and billboard. The Township agreed to work with NS on an agreement for NS access. NS indicated that safety fencing along the railiroad will likely be required. In addition, NS requires a written request for the trail easements and canopy installation from the Township.

Opportunities

There are opportunities to maintain, improve, or adaptively re-use unique aspects of both the Connelly Tract and riverfront portions of the site. Utilizing these opportunities will create a distinctive recreational space surrounding the a important link in the SRT. Opportunities within the site include the following:

- Culvert outfall that serves as a water feature for the site
- Railroad flat car, railroad tracks, other railroad infrastructure that is physical evidence of former land uses
- Views to the Schuylkill River, Manayunk Bridge, Blackie Bridge, Venice Island and Manayunk
- Connection to river front trail under development by adjacent private development
- Existing earth walking paths

The culvert outfall creates a gathering point and a destination for this site. Providing visual access without allowing physical access to the outfall is one of the issues that will be dealt with during final design.

There are a lot of opportunities for adaptive re-use of railroad remnants. The railroad car could be used as a gathering space or for play. The old railroad tracks could become part of a nature trail along the riverfront, or used to create artwork along the trail.

One of the main goals of this project is to create access to the river for trail users and local residents. Reuse of the steel I-beams above the culvert outfall for Vine Creek into a river overlook or other river side structure should be explored in preliminary design.

Property Ownership

Currently, the study site is not entirely owned by Lower Merion Township. The Connelly Tract, where most of the trail will be constructed, was granted to Lower Merion Township in 2005. There is an existing 33' wide easement between the Township property and river that passes under the Norfolk Southern railroad bridge. Ongoing coordination with Norfolk Southern will be required to obtain an easement connecting the existing easement and the trail on the adjacent O'Neil property. At this point only one easement with NS Railroad appears to be required to complete the project.

Figure 11 – Property line map

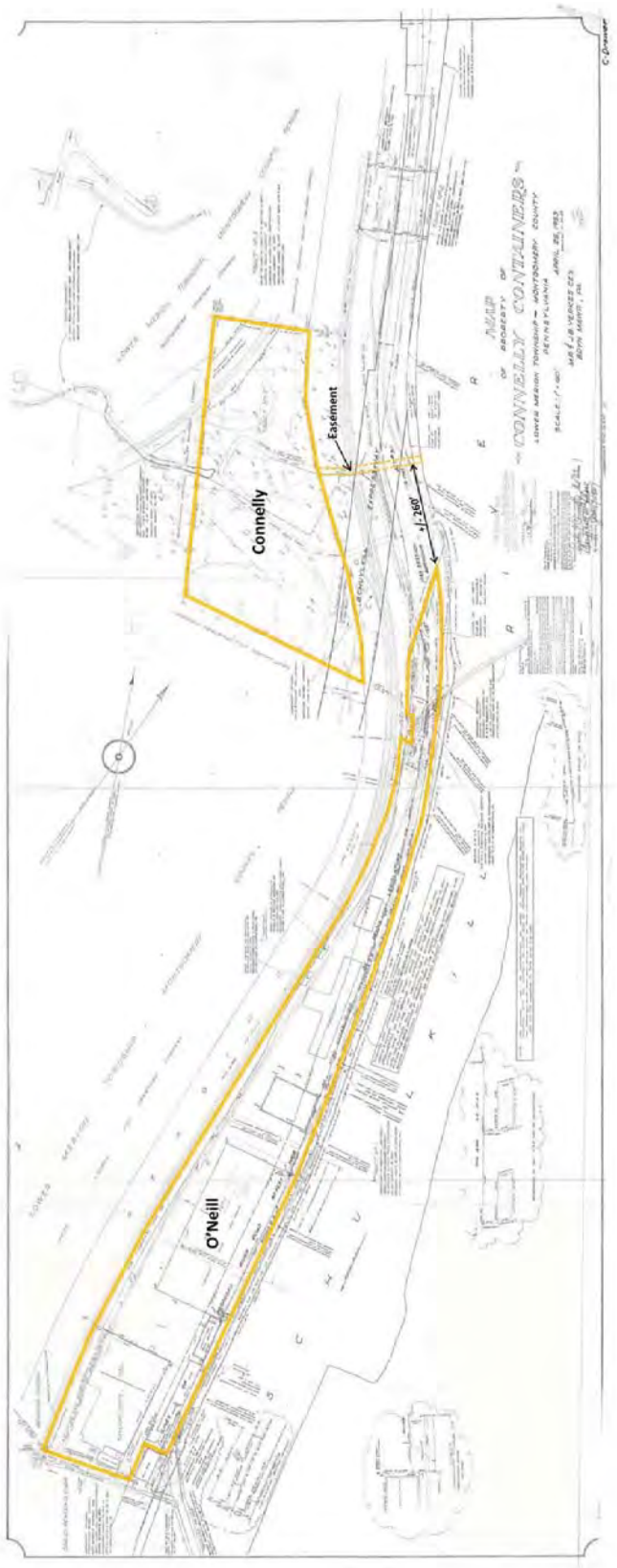


Figure 12 - Study site property lines

Alignment Options

With a focus on the unique challenges and opportunities of the site, alignment options for the main stem of the Schuylkill River Trail were developed. One of the primary concerns for the alignment of the main stem was accessibility by cyclists and pedestrians of all abilities. Therefore, all study alignments meet ADA requirements for trails.

Two general alignment options were studied, each with a number of options. Both alignment options use the access road and pass under the railroad bridge to access the Connelly Tract. Once in the Connelly Tract, the first alignment follows the existing nature trail alignment and connects to the CHT at the southern end of the study area. The second alignment, the jug-handle option, loops around the retaining wall, bridges over the valley, and connects to the CHT at the northwestern corner of the study area. Shown below are three alignment options. The first option shows the multi-use trail following the existing nature trail alignment, and the second two show the jug-handle options with different bridge crossing points to take advantage of flat areas in the site. Options 2.1 and 2.2 maintain the existing nature trail (shown in blue).

ADA requirements

The United States Access Board is currently re-writing the accessibility requirements for shared use paths which will be included under "accessibility guidelines for pedestrian facilities in the public right-of-way."[1] The proposed rulemaking was released in February 2013, and it has not been adopted into law yet. The US Access Board defines both trails and shared use paths and has different accessibility requirements for each:

Shared Use Path. A shared use path is a multi-use path designed for both transportation and recreation purposes. Shared use paths typically are separated from motorized vehicular traffic by an open space or barrier, either within a highway right-of-way or within an independent right-of-way.

Trail. A pedestrian route developed primarily for outdoor recreational purposes. A pedestrian route developed primarily to connect elements, spaces, or facilities within a site is not a trail.[2]

Based on those definitions, the proposed facility is a shared use path. The only requirement that will be difficult to meet for the shared use path is the maximum 5% grade when in independent right-of-way. The proposed rulemaking states that "where compliance with R302.5.1 or R302.5.2 is not practicable due to existing terrain or infrastructure, right-of-way availability, a notable natural feature, or similar existing physical constraints, compliance is required to the extent practicable."[3]

The existing terrain does not provide a practicable way to achieve the required grade, so the trail accessibility requirements are used as a guideline for creating accessible alignments. The trail requirements have less strict grade guidelines and provide guidance on the length of steep segments in between rest areas:

[1] Federal Register/Vol. 78, No. 30/Wednesday, February 13, 2013/Proposed Rules
[2] Federal Register/Vol. 76, No. 59/Monday, March 28, 2011/Proposed Rules
[3] Federal Register/Vol. 78, No. 30/Wednesday, February 13, 2013/Proposed Rules

Running Slope of Trail Segment[4]		Maximum Length of Segment
Steeper than	But not steeper than	
1:20 (5%)	1:12 (8.33%)	200 feet
1:12 (8.33%)	1:10 (10%)	30 feet
1:10 (10%)	1:8 (12%)	10 feet

AASHTO's Bike Guide has a number of suggestions for mitigating excessive grades including

- *Use higher design speeds for horizontal and vertical curvature, stopping sight distance, and other geometric features.*
- *When using a longer grade, consider an additional 4 to 6 ft (1.2 to 1.8 m) of width to permit slower bicyclists to dismount and walk uphill, and to provide more maneuvering space for fast downhill bicyclists.*
- *Install the hill warning sign for bicyclists (W7-5) and advisory speed plaque, if appropriate, per the MUTCD.*
- *Provide signing that alerts path users to the maximum percent of grade as shown in the MUTCD.*
- *Exceed minimum horizontal clearances, recovery area, and/or protective railings*
- *If other designs are not practicable, use a series of short switchbacks to traverse the grade. If this is done, an extra 4 to 6 ft (1.2 to 1.8 m) of path width is recommended to provide maneuvering space.*
- *Provide resting intervals with flatter grades, to permit users to stop periodically and rest.*[5]

While it may not be practicable to meet all the proposed rulemaking requirements for shared use paths, the trail will be as accessible as possible by using a combination of the trail grade requirements and AASHTO recommendations.

[4] Table 1017.7.1 from Architectural Barriers Act Accessibility Guidelines; Outdoor Developed Areas
[5] AASHTO Guide for the Development of Bicycle Facilities, Fourth Edition, 2012

Alignment Option 1

This alignment option includes the following elements:

- **12' wide paved, shared use path**
- **Shared use path horizontal alignment follows the existing stone access road near the river, under the existing NS railroad bridge and follows the existing earth walking path (shown in yellow on figure below)**
- **Connects to the existing CHT at the south edge of the study area approx. 1900' from the Manayunk bridge**
- **Vertical alignment consists of several 200' long grades at 8.3% with rest areas at 2%**
- **Total elevation change from the NS bridge to the connection point is 97'.**

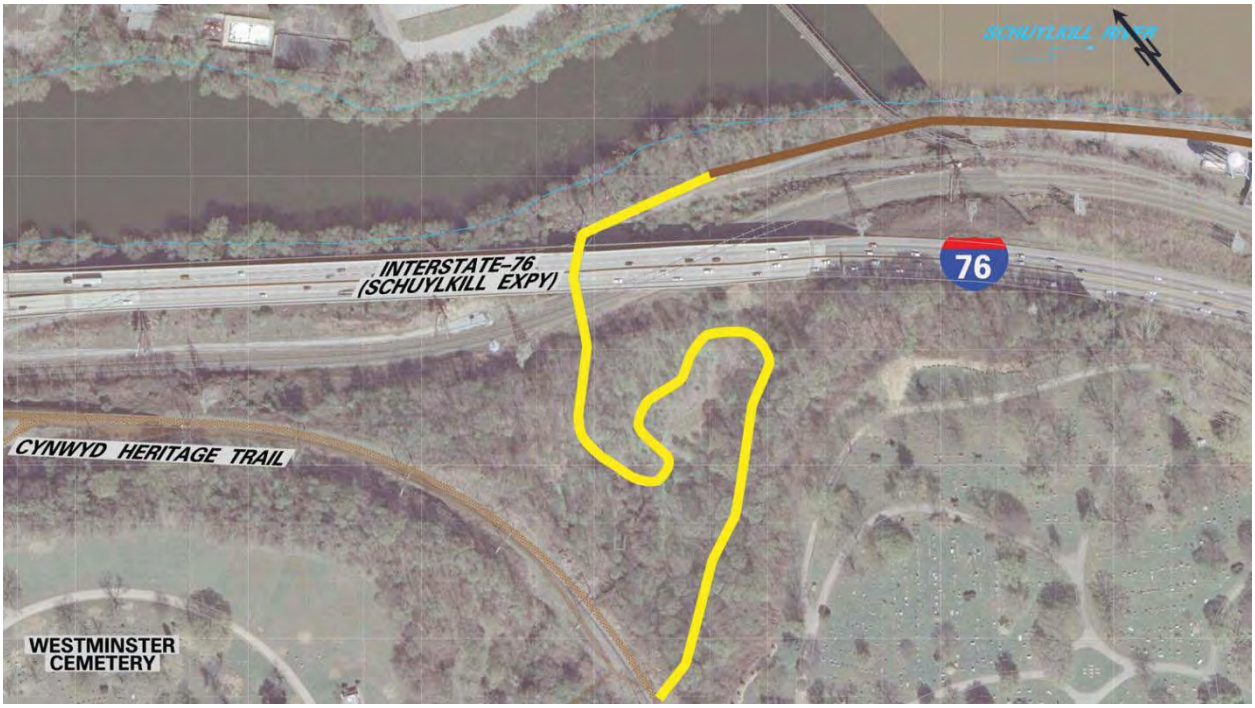


Figure 13 - Alignment Option 1

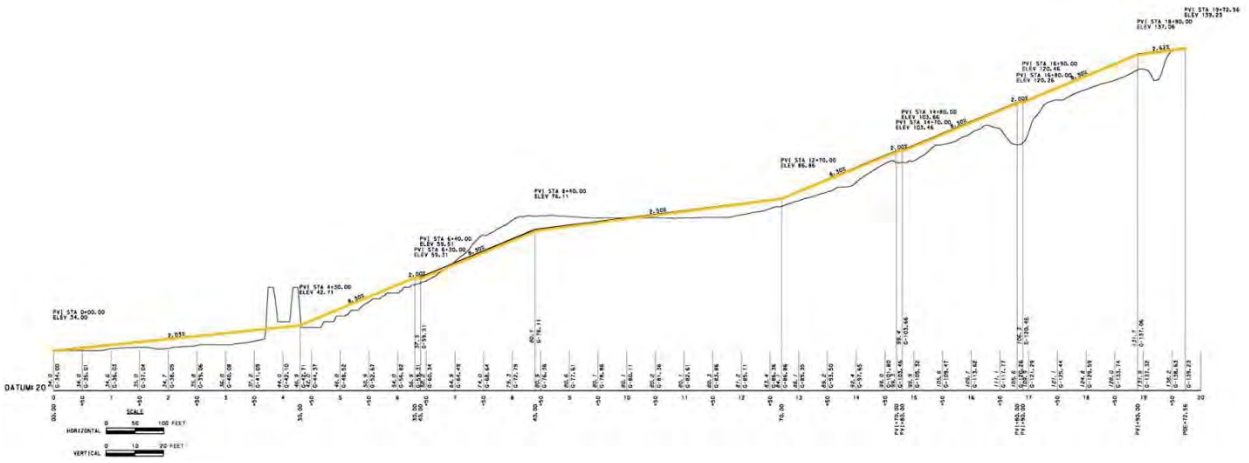


Figure 14 - Option 1 Vertical Profile (proposed grade in yellow)

The following are the general advantages and disadvantage of this alignment option:

Advantages

- Least expensive
- More direct connection for Township residents
- Preserves wooded area in northern portion of the site

Disadvantages

- Not a direct connection for SRT users
- Removes existing nature / walking trail
- Walls and/or significant earthwork required
- No separate nature area or walking path
- 20’ additional vertical climb
- Not as user friendly
- Conflicts between faster bicycle riders and CHT walkers

Alignment Option 2

This alignment option includes the following elements:

- **12' wide paved, shared use path**
- **Shared use path horizontal alignment follows the existing stone access road near the river, under the existing NS railroad bridge, jug handle curve over the existing retaining wall, across a new pedestrian bridge, shared use path on the side slope of the hillside (shown in dark blue on figure below)**
- **Improved walking path (shown in light blue)**
- **Approx. 150' pedestrian bridge and approx. 500' long retaining wall or boardwalk**
- **Connects to the existing CHT at the west edge of the study area approx. 600' from the Manayunk bridge**
- **Vertical alignment consists of several 200' long grades at 8.3% with rest areas at 2%**
- **Total elevation change from the NS bridge to the connection point is 75'.**

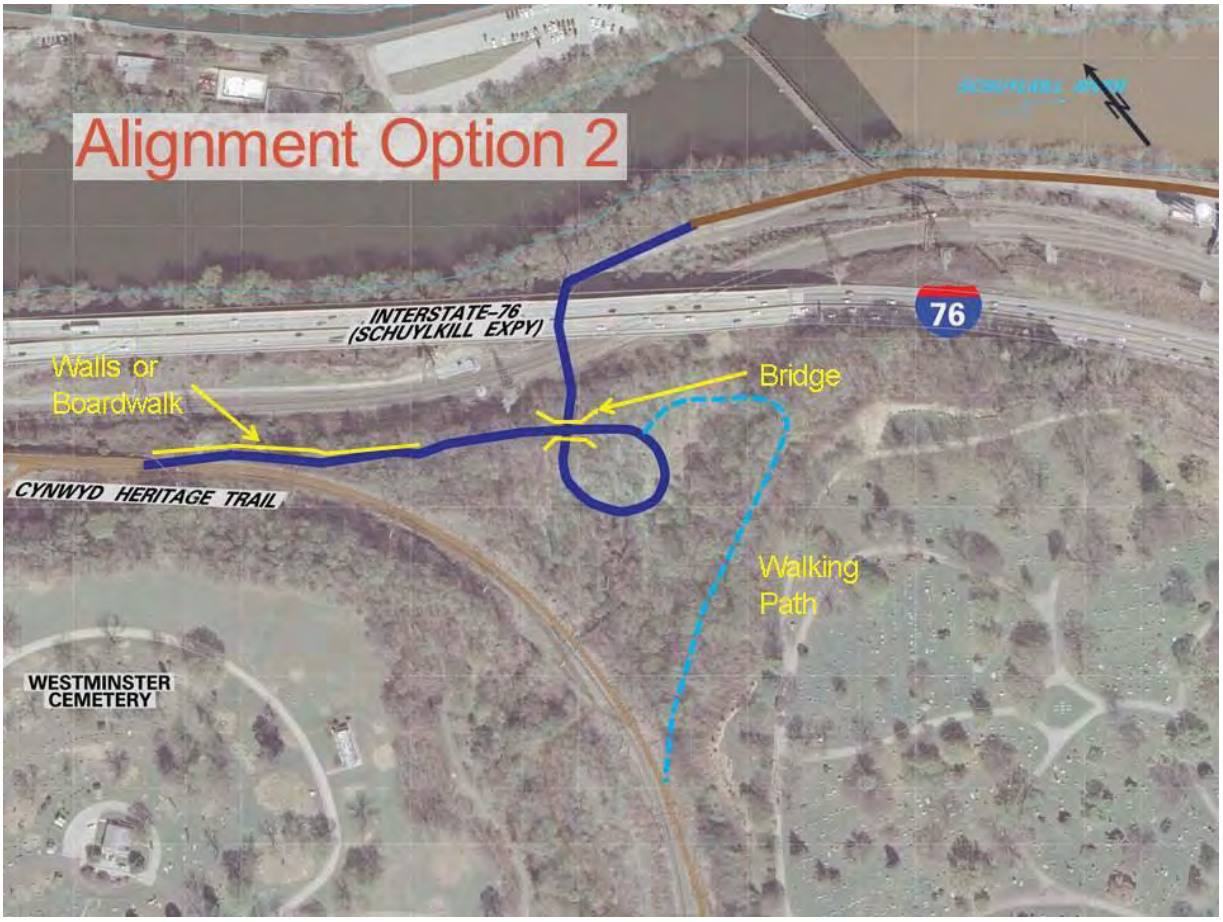


Figure 15 - Alignment Option 2

Figure 16 - Option 2 Profile (proposed grade in yellow)

The following are the general advantages and disadvantage of this alignment option:

Advantages

- Direct connection for SRT users
- Maintains nature / walking trail
- Opportunity for separated nature / adventure area

Disadvantages

- Added expense of a bridge
- Requires more retaining walls than Option 3
- Impacts to wooded area in north west portion of the site

Alignment Option 3

This alignment option includes the following elements:

- **12' wide paved, shared use path**
- **Shared use path horizontal alignment follows the existing stone access road near the river, under the existing NS railroad bridge, jug handle curve over the existing retaining wall, across a new pedestrian bridge, shared use path on the side slope of the hillside (shown in orange on figure below)**
- **Improved walking path (shown in light blue)**
- **Approx. 150' pedestrian bridge and approx. 500' long retaining wall or boardwalk**
- **Connects to the existing CHT at the west edge of the study area approx. 600' from the Manayunk bridge**
- **Vertical alignment consists of 200' long grades at 7.5- 8.3% with rest areas at 2%**
- **Total elevation change from the NS bridge to the connection point is 75'.**

This option is very similar to Option 2 but, has a slightly larger jug handle curve and is located down the slope slightly to the north to take advantage of an existing benched area in the side slope. This option allows for a slightly more gradual vertical profile.

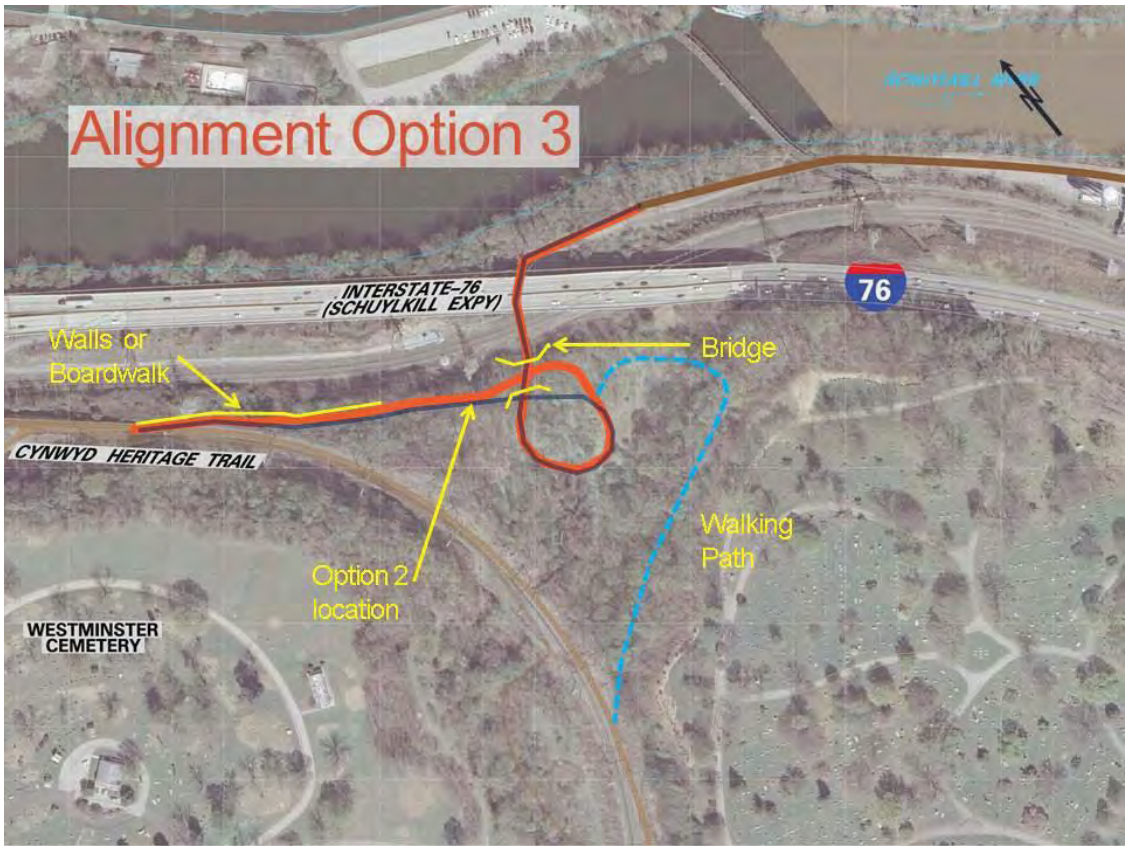


Figure 17 - Alignment Option 3

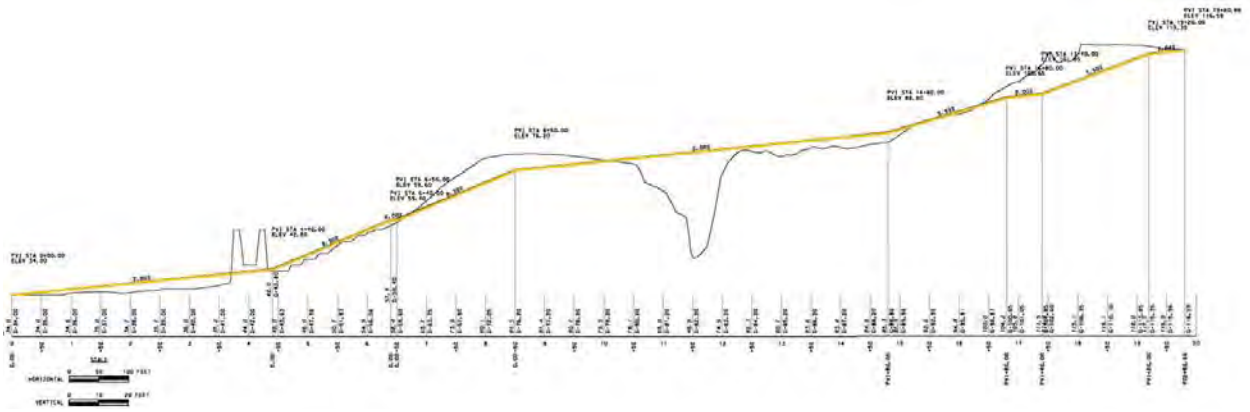


Figure 18 - Option 3 Profile (proposed grade in yellow)

Advantages

- Direct connection for SRT users
- Maintains nature / walking trail
- Separated nature / adventure area
- Requires less retaining walls
- Most gradual slopes

Disadvantages

- Added expense of a bridge
- Impacts to wooded area in north western portion of the site

Recommendations

The proposed trail will be 12'-14' wide and paved. The trail will likely have significant traffic on it at peak times on weekends in the warmer months. These users will have a range of abilities and speeds. To accommodate all anticipated users, the trail will need to be wider than the minimum in some areas. For example, the width in some steeper sections will likely be wider than the rest of the trail to allow enough space for people to walk their bikes if they prefer.

An alignment option was chosen based on site visits, study committee and public meetings, estimated costs, and constructability of each option. There were two primary reasons for not choosing Option 1: a 20' vertical difference between Option 1 and Options 2 and 3, and many residents preferred to preserve the existing nature trails. Options 2 and 3 are similar, but Option 3 is preferred for cost and constructability reasons. The alignment will be refined during final design, but Baker recommends that the shared use path follow the access road to the railroad bridge, and then parallel the existing retaining wall up to the culvert outfall. The shared use path loops around and crosses over the existing retaining wall, and along the slope up to the CHT.

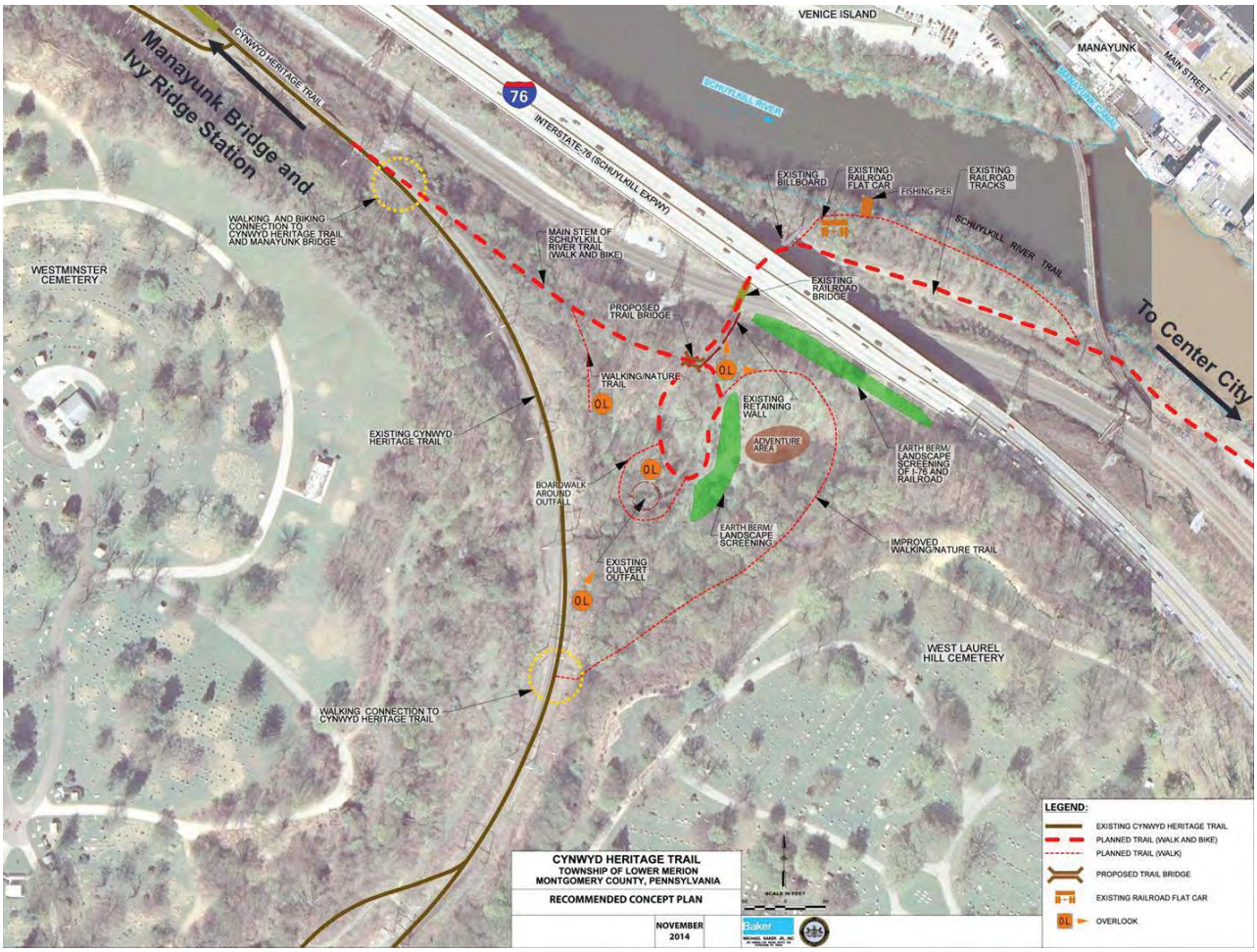


Figure 19 - Concept Plan

Option 3 provides space for a natural area along the riverfront and in the southeastern portion of the site where the existing nature trail is. This option balances the wants and needs of the through-traffic on the SRT and the local residents. The through-traffic is looking for direct access to the rest of the SRT, and local residents want a natural area that provides access to the river.

Constructability

There are a number of challenges related to the construction of the proposed alignment including access to the site, stability of the soil, and the existing grade. These issues will be further investigated during final design, but recommendations are made here based on preliminary design.

Construction vehicles will have to access the site from the riverfront under the railroad bridge. It will likely be possible to remove some layers of sediment from underneath the railroad bridge to increase vertical clearance to the height stated on the PennDOT plans: 14 feet. A mandatory pre-bid meeting at the site is recommended to show potential bidders the access issues to reduce the number of surprises when construction starts. The pedestrian bridge will be the most difficult element to deliver to the site. If a prefabricated bridge is used, it will need to fit under the railroad bridge, and cannot be too long that

it gets stuck between the bridge and the adjacent slope. Another option worth exploring is the possibility of bringing the bridge to the sight using the NS railroad line.

No soil testing was done as part of this study. The stability of the soil remains unknown but will have an impact on how this trail will be built. Based on site visits and what is known about the site's history, there could be unsuitable fill built up in many locations.

The existing grade has an impact on the vertical profile of the trail, and also has an impact on the construction method and cost of the trail. Near the culvert outfall, the trail will be cut into the existing slope because it is too steep to build the trail at-grade. In the north western section of the site, the trail will parallel the slope. Using the maximum slope on each side of the trail, there will be significant cut above the trail, and significant fill below.

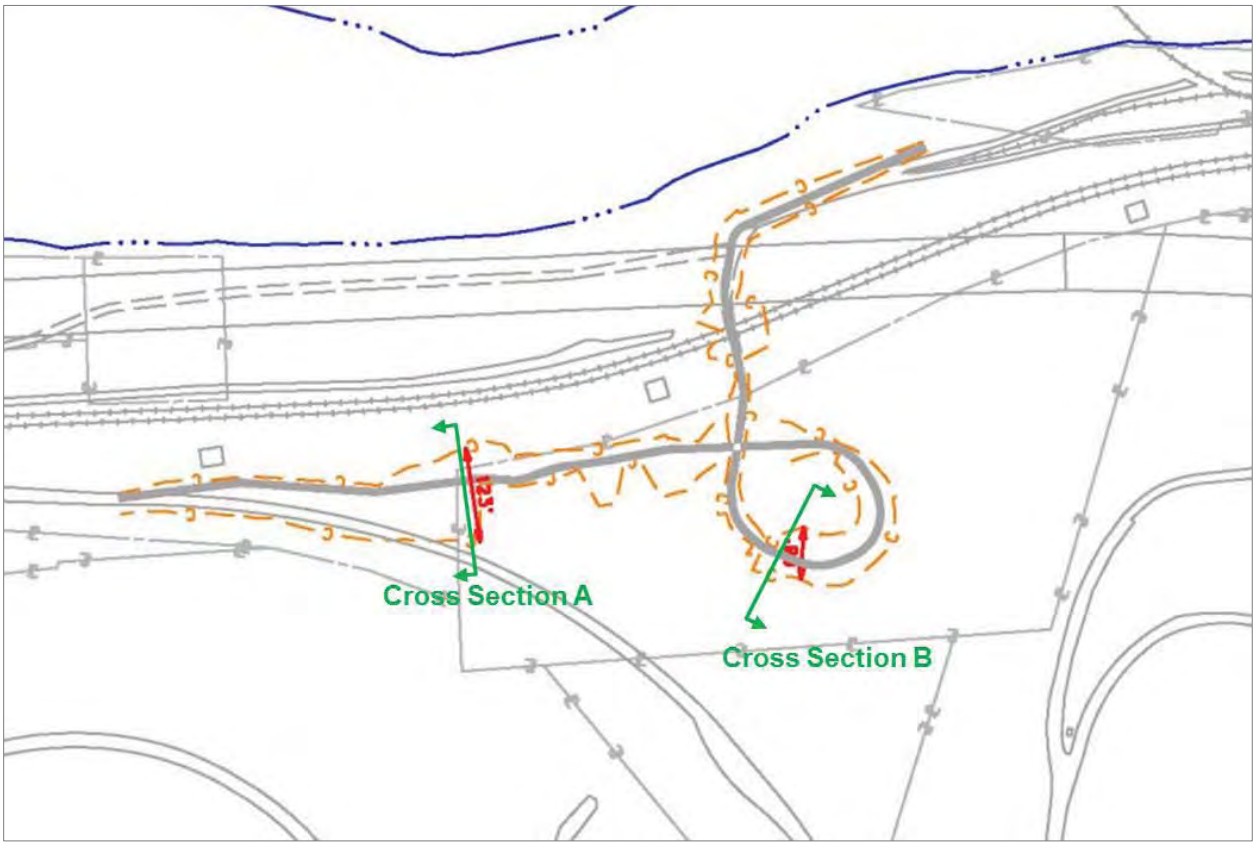


Figure 20 - Cut/Fill Boundary

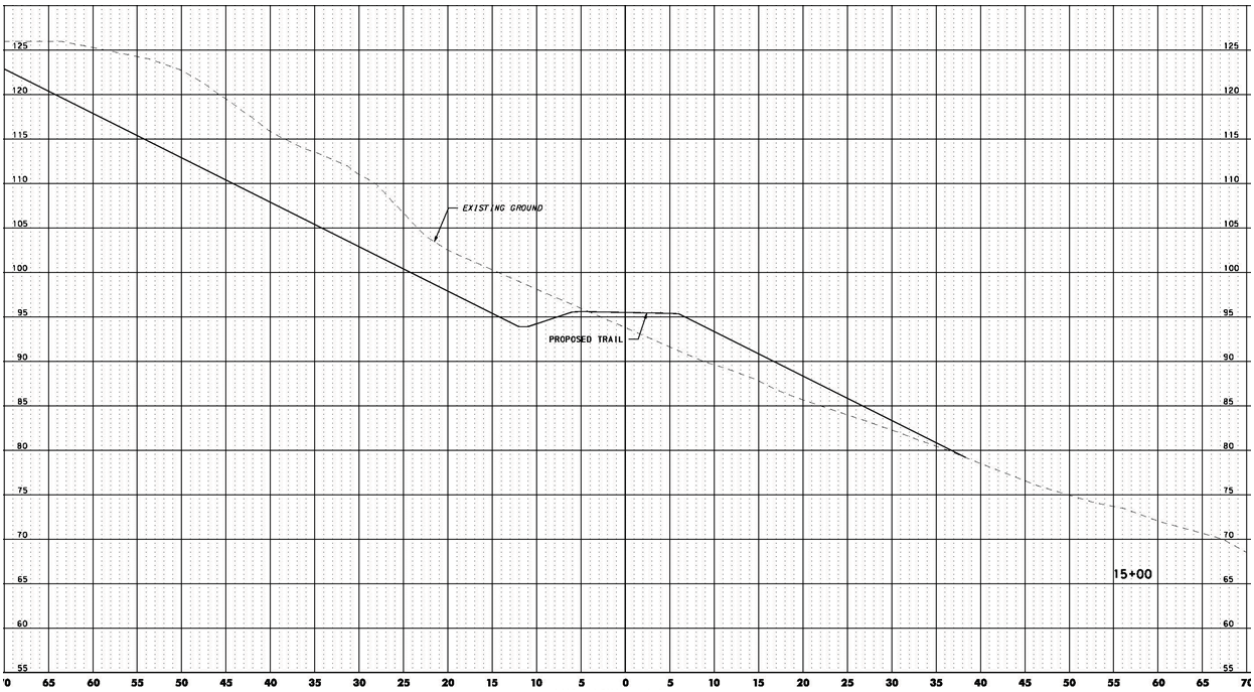


Figure 21 - Cross Section A

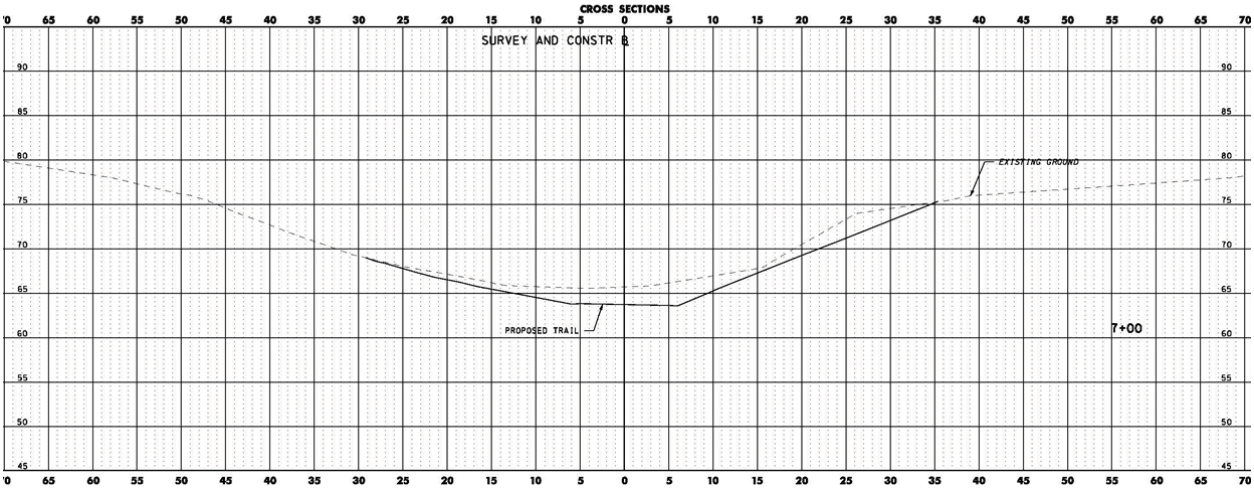


Figure 22 - Cross Section B

To reduce the impact to the site, there are two alternatives to grading large swatches of land in areas of cut and fill. In areas of cut, one option is to use small retaining walls. In many areas of cut, two short retaining walls could be used instead of grading an area over 60' wide. In areas of cut and fill, dual retaining walls could be used, or a boardwalk could be built on top of the slope. These two options are more expensive than using grading, but the site impacts will be greatly reduced.

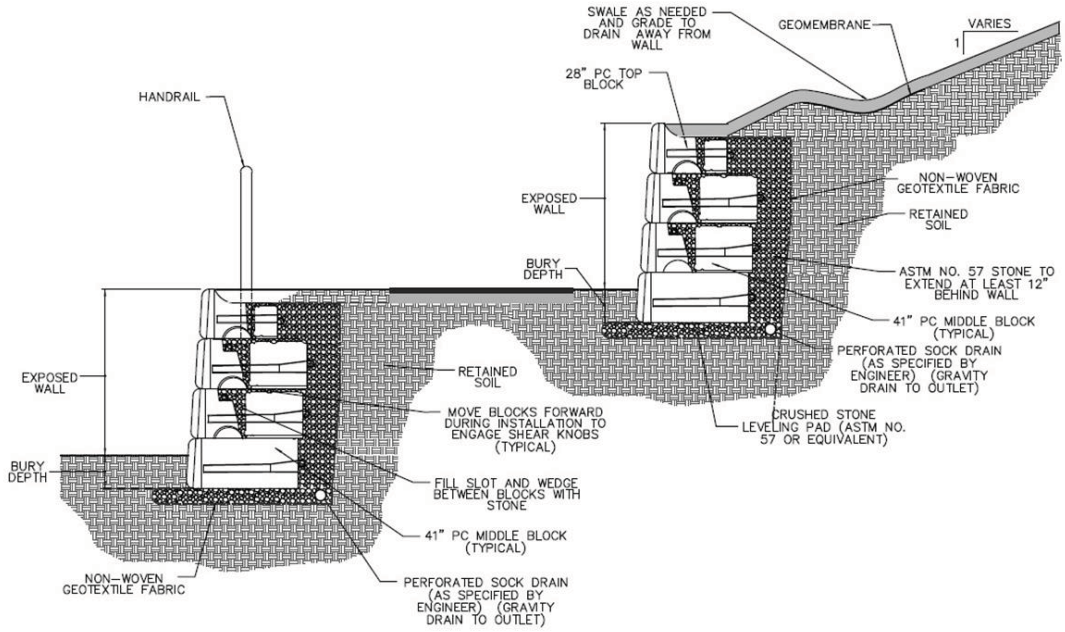


Figure 23 - Dual Retaining Wall Detail

5Figure 24 – Example of boardwalk built into slope

Landscaping

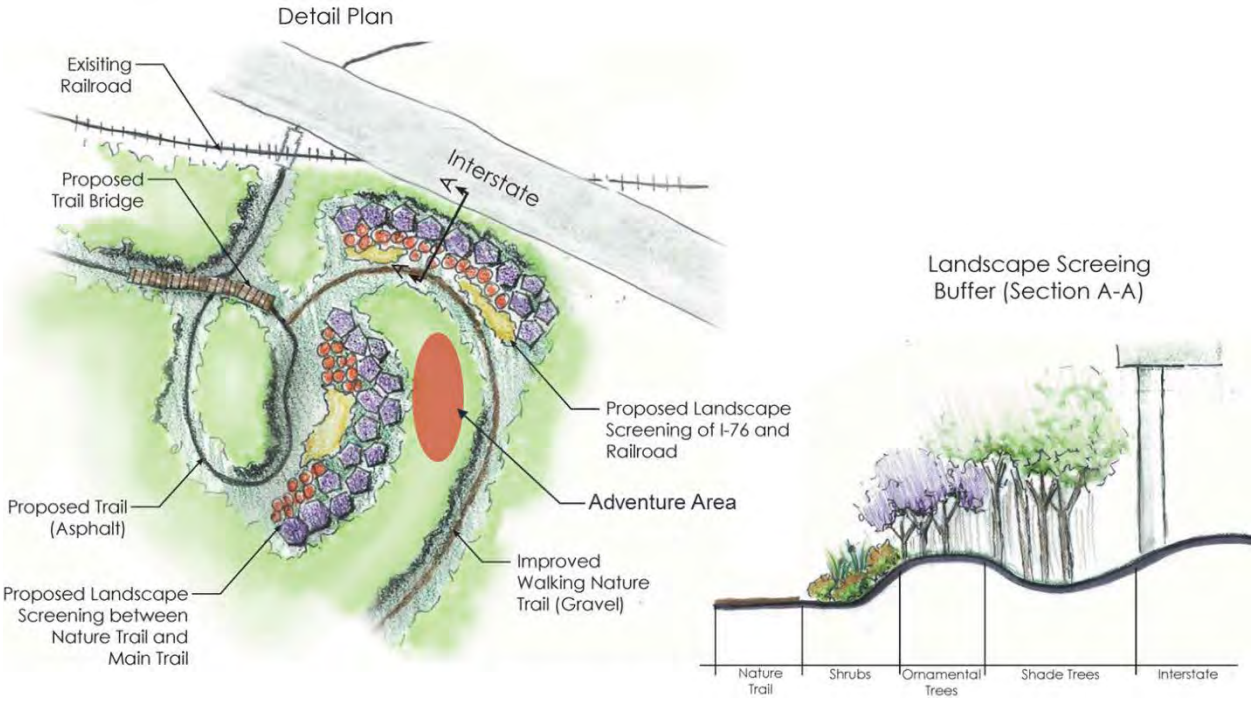


Figure 25 - Connelly Tract Landscape Plan

The conceptual landscape plan enhances the existing vegetation and infrastructure to buffer or highlight existing site features as the trail meanders through the forest and along the Schuylkill Riverfront.

Proposed vegetation and earthen berms are utilized to provide visual and noise barriers from the railroad and I-76. Ornamental and shade trees are used to highlight existing site features and to frame views. In key locations, removal of existing vegetation is proposed to open up views to improve trail aesthetics and safety. Disturbed areas are planted with low shrubs, grasses, and wildflower seed mixes along the paved and stone trail edges. Existing site infrastructure provides an interesting background to the proposed structures.

Users are led along the existing retaining wall as they approach the new pedestrian bridge which provides users a connection to the west. An elevated boardwalk wraps around an existing culvert and offers a forested overlook of the site, while a waterfront overlook visually connects users to the river.

The railroad bridge is the only link between the two parts of the site. Every trail user, main stem or nature trail, will pass under this bridge. Based on its importance to the site, visually buffering parts of the bridge and enhancing others were focused on during the development of the landscaping plan.

The railroad bridge will need to be repaired to make it safe for trail users and reduce the maintenance that would be required if nothing is done. Fencing will need to be installed along the tracks to prevent trail users from accessing the tracks and prevent any ballast from falling off the bridge. In addition to these improvements, there is an opportunity to introduce some native plants, trees and climbing vines for example, to beautify the area under the railroad bridge and under I-76.

Figure 26 - Railroad bridge before

Figure 27 – Rendering of NS Railroad bridge after with NS required Canopy

There is a large area along the riverfront that has the ability to become a natural area with places to walk, play, and sit by the river. The area is currently overgrown with a number of remnants from the railroad scattered along the old railroad sidings.

Figure 28 – Area under I-76 - before

The main stem will be constructed on the access road, leaving a significant amount of space along the river for a nature trail, seating areas, and natural play areas.

Figure 29 – Rendering of area under I-76 - after

Project Features

There are many opportunities on the site that can be used to create a "sense of place" instead of just creating a trail through the woods. This site offers a number of things that no other site in Lower Merion offers including a large natural landscape, access to the river, and an interesting history. Additionally, the trail is surrounded on two sides by cemeteries that provide a large buffer between the site and more developed areas to the southeast and southwest. The existence of the train tracks and I-76 do reduce the feeling of the natural secluded setting, but additional landscaping and earth berms will help provide visual, and some noise, separation from those facilities. To highlight the natural setting and provide a connection to the river, two separate nature trails connecting to the main stem are proposed. The trails will have a soft surface, will be built on the existing grade, and will be more narrow and adventurous than the main stem. A crushed stone surface with edging is anticipated.

Figure 30 - Nature Trail Example

The outfall culvert is the focal point of the Connelly Tract. From site visits, it is clear that people congregate around the outfall, and a number of people have gone into the culvert as evidenced by the trash found at the site and the graffiti in the culvert. This is a safety issue for the township, and it would be better if users could see, but not easily access, the culverts. One option is to build a boardwalk around the outfall and provide aesthetically pleasing fencing to restrict access.

Figure 31 - Culvert before

Figure 32 - Culvert after

The trail will cross itself above the retaining wall. The bridge will be visible from the majority of the site and is a great opportunity to have a signature bridge as a landmark for the site. There are many options for prefabricated bridges that are very attractive and can be made to fit this setting. Another option would be to reuse a historic bridge that is being removed from another location. Bridges are for sale by Pennsylvania Department of General Services.[6]

[6] http://www.portal.state.pa.us/portal/server.pt/community/state_surplus_property_program/1395/bridge_marketing/1634385

Figure 33 - Retaining wall area - before

Figure 34 – Rendering of retaining wall area – after

At the public meetings, there was strong support for maintaining natural areas of the site and providing an adventurous play space. There is a flat area surrounded by the nature trail and the landscaped buffer that is an ideal space for natural play equipment (e.g. logs and boulders).

Figure 35 - Natural play area examples

Connection to the River: One of the primary goals of this project is connect the residents with the river. Since the site is not very close to parking, it is not an ideal location for a boat launch. There is an opportunity to construct a river overlook with benches and a fishing platform above the existing outfall. The existing steel beams from a former railroad siding over the existing culvert outfall could be repurposed for the river overlook. With some selective tree trimming, the river overlook will provide beautiful views of Venice Island and downtown Manayunk, the Manayunk Bridge, the Blackie Bridge and miles of the river itself. The river overlook will be connected to the main stem of the Schuylkill River Trail by a crushed stone, walking trail that parallels a portion of the river.

History and Public Art: Interpretive signing is recommended at strategic locations on the site. It is recommended that the local historic societies be used as a resource for placement and information for these signs. Artifacts of the former industrial and railroad uses of the site that are found during construction could be re-used as public art.

Figure 36 - River overlook before

Figure 37 - River overlook after

Safety

The current site is very secluded and there are a number of hazards including holes in the landscape and the culvert outfall that is large enough to walk into. The seclusion makes the natural area feel more separate from the surrounding area, and that feeling should be preserved. To improve visibility, but still maintain the secluded feeling, trees will be selectively cleared to provide a visual connection from the CHT to the nature trail. Overlooks will be provided in certain areas along the trail to make much of the trail visible.

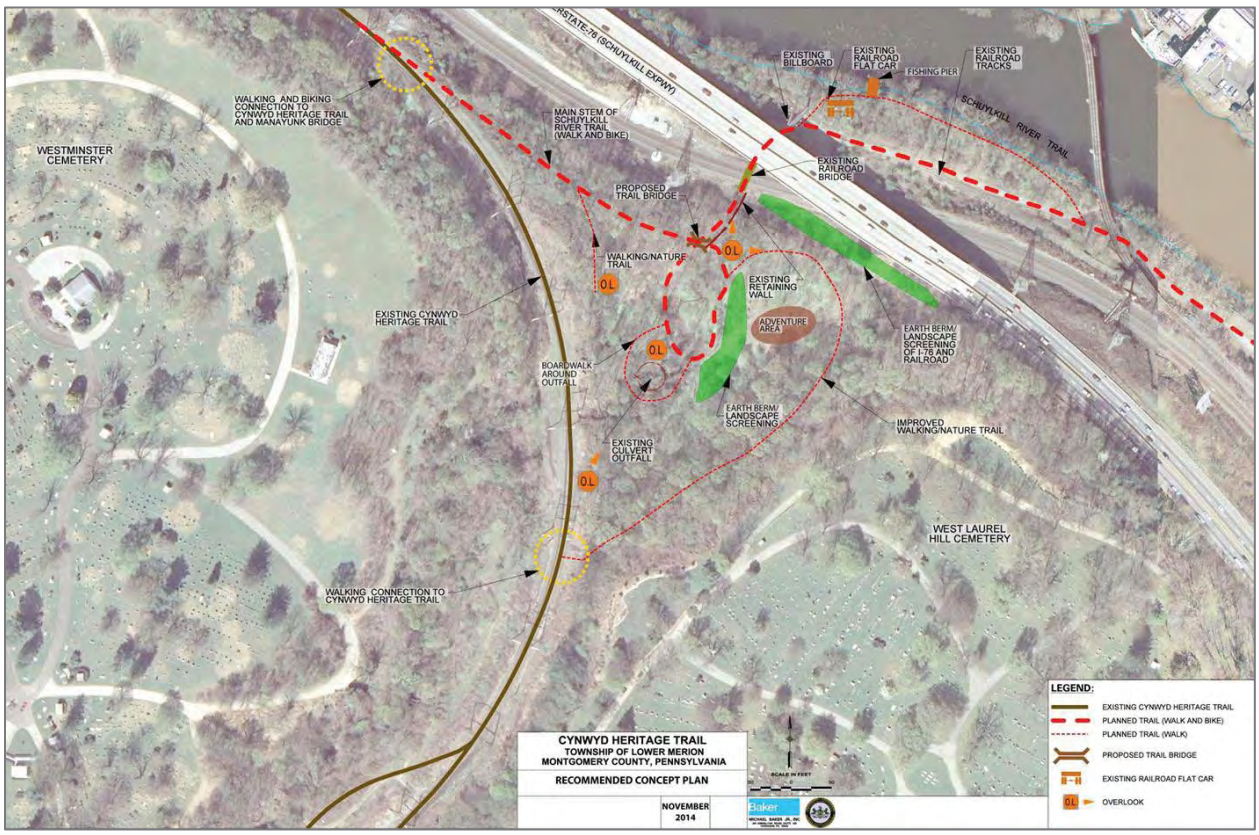


Figure 38 - Trail overlook locations

Emergency vehicles will be able to access the entire shared use path if there is a need. Other vehicular access will be restricted using collapsible bollards or gates at the entrances. Mile markers are planned along the trail to give a trail user's location in the event of an emergency. The location can be linked to a database that describes the location and an access point to emergency responders.

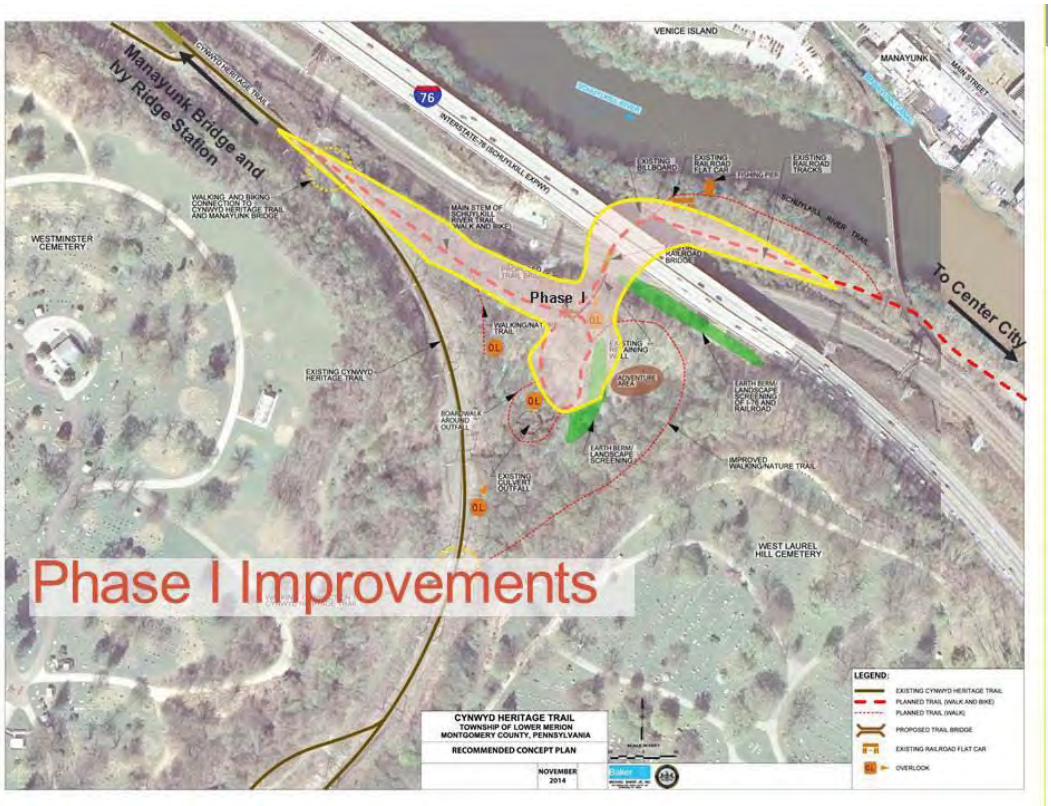
The Cynwyd Spur is anticipated to have significant traffic along the main steam during the warmer months. Traffic will be lighter at other times, but there will likely be people on the trail most of the time. The safety of the site will be greatly increased from its current condition simply by increasing traffic through the site. Additional safety measures can include regular patrols by the township's bicycle police and partnering with Friends of the Cynwyd Trail to be "trail ambassadors." Ambassadors could visit the trail at scheduled times to provide support or to just be present.

Implementation Strategies

At time of construction, the main stem of the trail will connect a completed facility, the Manayunk Bridge, to a completed facility (O'Neil trail) and will be an important gap to fill once the Pencoyd Bridge is complete. It would be difficult to split the main stem of the trail into separate projects because one section will not complete the gap, and there are no intermediate destinations to connect to. Although the main stem should not be broken into smaller sections, the whole project can be split into separate projects to apply for funding and for ease of construction. The main stem portion of the trail includes the paved trail, the pedestrian bridge, the necessary retaining walls or boardwalks, and the bridge rehabilitation work. The nature trails, river overlook, landscaping, and adventure area can be split into separate projects. The Connelly Tract nature trail could be completed now, or any time before or after the main stem is complete. Once the right-of-way is acquired along the riverfront, the river overlook could be completed. Most of the landscaping and the riverfront nature trail will have to be constructed after the main stem is complete to maintain construction access for the main stem. A graphic and summary of each construction phase is as follows:

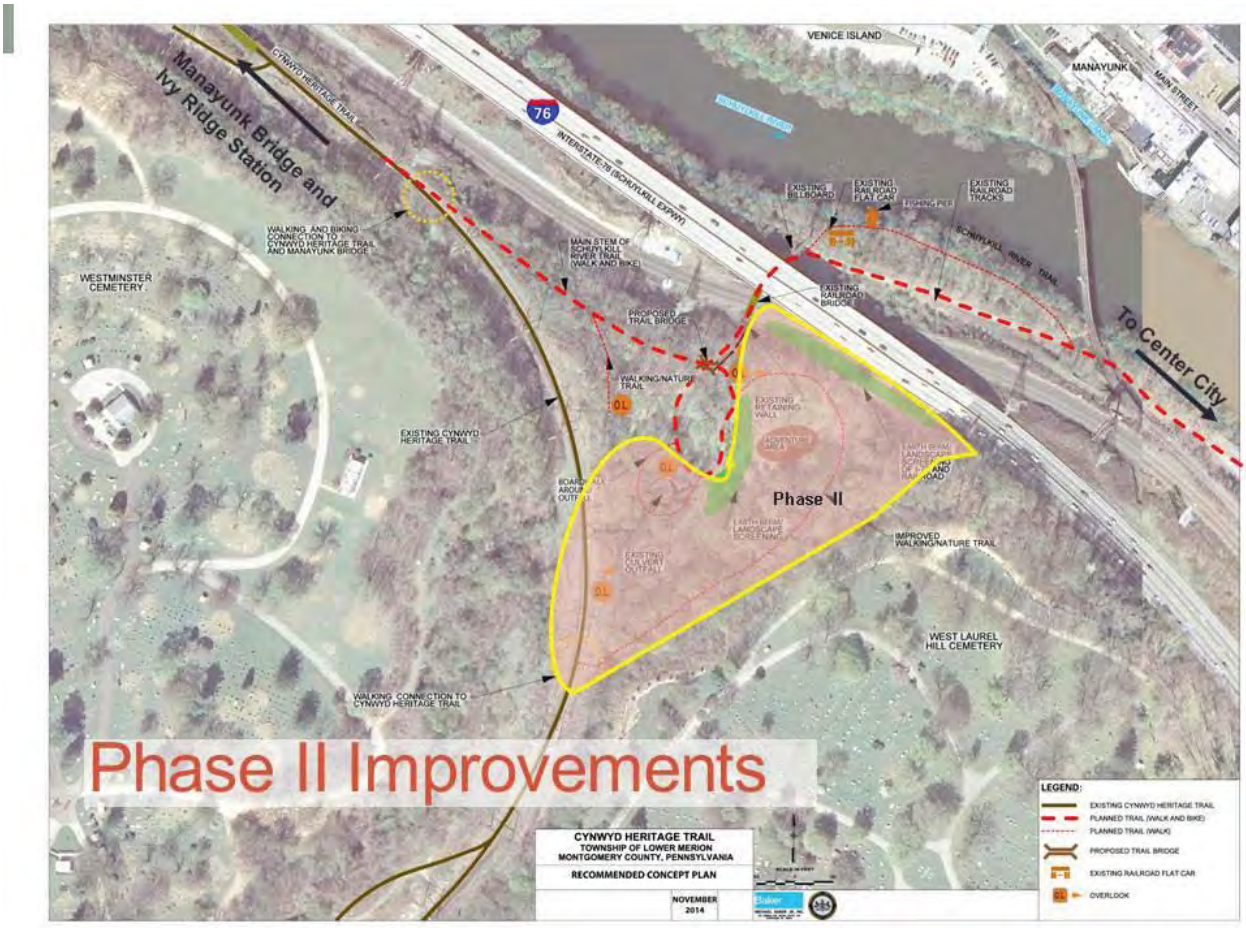
Phase 1 Construction project includes the following (shown in yellow area):

- Main paved trail section of the SRT –connecting CHT to proposed trail on O'Neil property
- Trail bridge
- Retaining walls along the main trail
- Norfolk Southern Railroad bridge rehabilitation work and required trail canopies



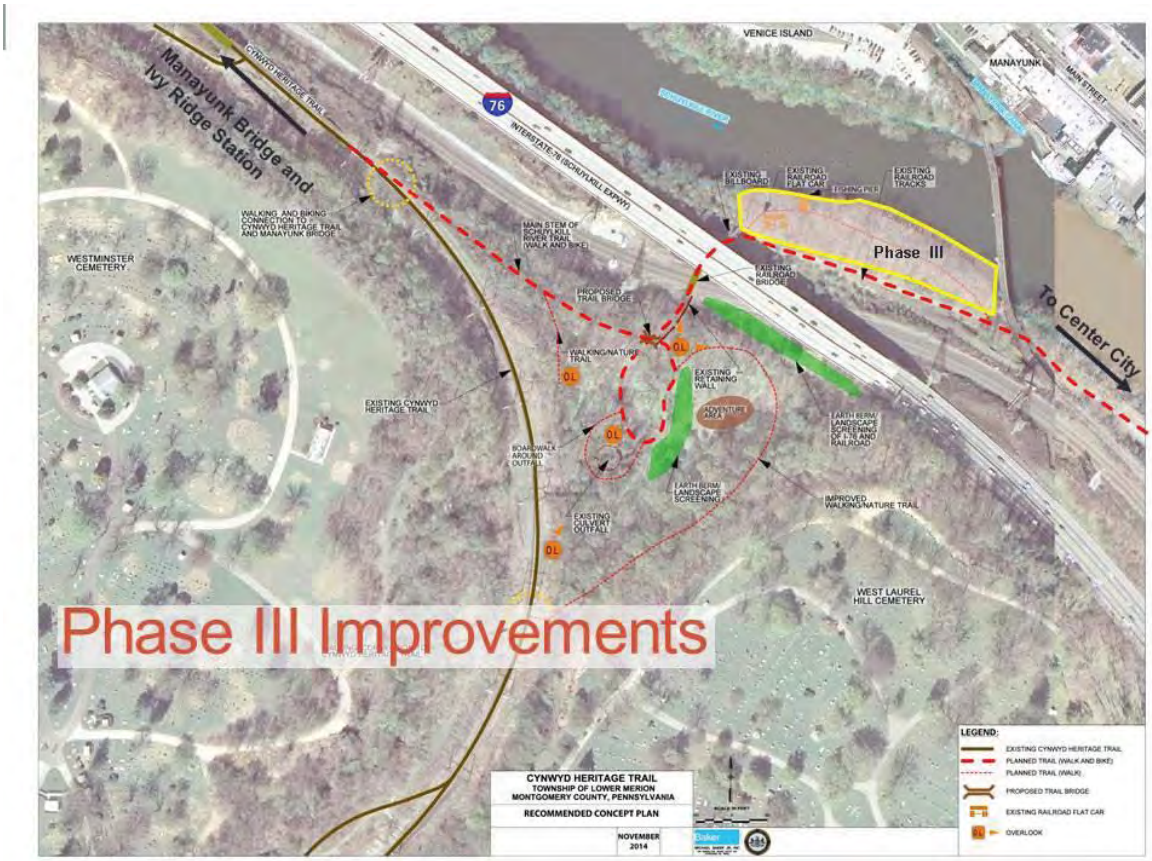
Phase 2 Construction project includes the following:

- Connelly tract nature trail
- Boardwalk/fencing around culvert outfall
- Nature play area
- Earth berms and landscape screening



Phase 3 Construction project includes the following:

- Riverfront walking trail
- Riverfront overlook structure



Cost Estimate and Funding

The total cost of the project, including design and construction, is estimated to be between $2.85 -$3.28 million. The main stem of the trail is estimated to cost between $1.8 million if retaining walls are used and $2.5 million if the boardwalk option is used. The nature trail, culvert boardwalk, and other amenities are estimated to cost approximately $900,000. A detailed cost estimate for each option is located in Appendix A.

Project Costs Assuming Prefabricated Retaining Walls

Task	Cost
Design (Phase I and II)	$430,000
Phase I construction (main trail stem and bridge)	$1,520,000
Phase II construction (Connelly tract nature trail, berms, play area, amenities)	$500,000
Phase III construction (Riverfront nature trail and riverfront overlook structure)	$400,000
Total Construction Cost	$2,850,000

Project Costs Assuming Boardwalk

Task	Cost
Design (Phase I and II)	$500,000
Phase I construction (main stem and bridge)	$1,880,000
Phase II construction (nature trails, additional amenities)	$500,000
Phase III construction (Riverfront nature trail and riverfront overlook)	$400,000
Total Construction Cost	$3,280,000

Funding Opportunities:

There are a number of ways that this project can be funded by using the township's recreation/open space funds as match for a number of grants that can cover design or construction. The current funding options include the following:

PA Department of Conservation and Natural Resources – Keystone Grant Program and Recreational Trails Program

Established on July 1, 1995, the Pennsylvania Department of Conservation and Natural Resources is charged with maintaining and preserving the 117 state parks; managing the 2.1 million acres of state forest land; providing information on the state's ecological and geologic resources; and establishing community conservation partnerships with grants and technical assistance to benefit rivers, trails, greenways, local parks and recreation, regional heritage parks, open space and natural areas.

Local governments, county governments and non-profit organizations can apply for Community Conservation Partnerships Program (C2P2) funding to assist them with addressing their recreation and conservation needs as well as supporting economically beneficial recreational tourism initiatives.

http://www.dcnr.state.pa.us/applyforgrants/index.htm

DCED Act 13 Grants: 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 using the Greenways, Trails and Recreation Program (GTRP). Application deadline is July 21, 2014.

http://www.newpa.com/find-and-apply-for-funding/funding-and-program-finder/greenways-trails-and-recreation-program-gtrp

PennDOT Multimodal Transportation Fund

The PennDOT Multimodal Fund provides grants to ensure that a safe and reliable system of transportation is available to the residents of the commonwealth.

http://www.dot.state.pa.us/internet/web.nsf/Multimodal?OpenFrameSet

Commonwealth Financing Authority Multimodal Transportation Fund

Department of Community and Economic Development's Multimodal Transportation Fund distributes grants for transportation facilities that encourage economic development and ensure safe and reliable transportation is available to residents. Funds can be used for development, rehabilitation, and enhancement of transportation assets

http://www.newpa.com/find-and-apply-for-funding/funding-and-program-finder/multimodal-transportation-fund

Pennsylvania Transportation Alternatives Program

There will be one solicitation for two years of TAP funding totaling $7.5 million in the DVRPC Pennsylvania counties (Bucks, Chester, Delaware, Montgomery and Philadelphia) for bicycle and pedestrian facilities, conversion of abandoned railway corridors to trails, and stormwater management projects. Concurrently the statewide TAP will have $26 million available for all eligible project types. There will be one application and projects may be selected as either regional or statewide priorities. Local governments, regional transportation authorities, transit agencies, natural resource or public land agencies, school districts, local education agencies, or schools, and tribal governments are eligible to apply for the competitive TAP funds.

http://www.dvrpc.org/TAP/

PennDOT Transportation Improvement Program

The TIP is a regionally agreed upon list of priority transportation projects that will use available federal funding and state transportation funds.

http://www.dvrpc.org/TIP/fy15-PA.htm

Other funding may be available including Montgomery County Open Space Funds, the William Penn Foundation, private sponsorships, and local fundraisers.

Timeline

The following timeline starts with the completion of this feasibility study in early 2015. Fundraising and grant writing is anticipated in 2015. Design activities, permitting and acquisition of easements are anticipated to take approximately 18 months and will extend until the middle of 2017. If the project moves forward in a timely manner, construction could start as early as fall of 2017 and be completed by middle to late 2018.

Early 2015	2015	2016	2017	2018
Feasibility Study	Fundraising / Grant Writing	Design & right-of-way →	Construction →	

Recommended Grant Applications

The following is a recommended strategy for pursuing grant funding for this project in the near future:

- Acquire design costs from DCNR or use local funding to advance design
- Acquire 50% of the Phase 1 construction costs from DCED Greenways and/or DCED Multimodal grants
- Acquire second 50% of the Phase 1 construction costs for PennDOT Multimodal program and/or PennDOT TAP grants
- Also, pursue DVRPC Regional Trails Phase 4 funding or funding through the PennDOT TIP line item for the Circuit.
- In 2016, apply for DCNR, DCED and PennDOT Multimodal grants again to fund Phase 2.

The following is a chronological list of grant applications that could be complete in the near future:

1. DCNR C2P2 Program – Design and construction costs are eligible. Control of the right of way is required to acquire construction
    - Required match 50% (cash and/or in kind services)
    - Due Date- April 16, 2015
    - Recommended grant request amount $430,000 (Twp. match = $215,000)

   A commitment of construction funding on the PennDOT TIP may be required to receive “design only” funding.

2. DCED Greenways, Trails and Recreation Program - Design and construction costs are eligible. There is a 10% maximum for design/engineering costs.
    - Required match 15% cash match
    - Maximum grant amount is $250,000
    - Due Date- June 30, 2015
    - Recommended grant request amount $250,000 (Twp. match = $37,500)

3. PennDOT Multimodal Fund - Design and construction costs are eligible. There is a 10% maximum for design/engineering costs.
    - Required match 30% cash match (of no-federal share of project costs)
    - Maximum grant amount is $3,000,000
    - Due Date- June 30, 2015 (anticipated)
    - Recommended grant request amount $500,000 (Twp. match = $150,000)

4. DCED – Multimodal Transportation Fund - Design and construction costs are eligible. There is a 10% maximum for design/engineering costs.
    - Required match 30% cash match (of no-federal share of project costs)
    - Maximum grant amount is $3,000,000
    - Due Date- July 31, 2015
    - Recommended grant request amount $500,000 (Twp. match = $150,000)

5. PennDOT Transportation Alternatives Program – Construction costs only are eligible.
    - Required match is All design/preconstruction costs are
    - Maximum grant amount is $1,000,000 (soft cap)
    - Due Date- 4-4-2016 (anticipated)
    - Recommended grant request amount $520,000 (Twp. match = preconst. costs)

Maintenance

Similar to any other recreation or transportation facility, periodic and regular maintenance of the trail will be required. The costs associated with these activities should be incorporated into the township's long range budget. The following is a list of the key maintenance activities and the anticipated effort involved:

- Shared-use path Surface (Paved) – repaving every 10-12 years
- Bridges – inspected every two years by a certified professional
- Retaining wall – inspected every two years by a certified professional
- Boardwalk – surface cleaning, sealing/painting. Foundation and column inspecton on a regular basis
- Drainage structures – cleaned annually
- Mowing of trailside areas – minimum of 4 times / year
- Tree Trimming – annually
- Litter Pickup/Trash Collection – biweekly and as needed
- Signage/Gates/Bollards – repair/replace as required

Based on our experience and data from other existing trails, annual maintenance costs range from approximately $5,000-$10,000 per mile. Once the trail is open, future budgets should be based on actual costs from the first few years of operation.

Research on existing trail facilities has shown that safety, vandalism and liability have not been significant problems. However, certain basic measures should be taken to safeguard against potential issues. The following is a brief list of recommendations for the safe and efficient operation of the trail:

- Design the trail according to accepted engineering standards such as AASHTO and PENNDOT
- Provide measures to allow regular patrolling by law enforcement and access by emergency vehicles
- Provide regular safety inspections and maintenance
- Provide emergency contact numbers and information at kiosks and on trail maps
- Provide greenway rules at kiosks and on trail maps
- Provide appropriate warning signs along the trail

It is anticipated that the greenway will be maintained by Lower Merion Township's Parks and Recreation. Coordination should continue with Friends of the Cynwyd Heritage Trail for maintenance and support of the Spur.

Rules

The existing rules and etiquette signs developed for the Cynwyd Heritage Trail will be used for the Spur as well. They will be posted at each of the entrances to the main stem of the trail.

Figure 39 - Lower Merion trail rules and etiquette

Conclusion: As a result of this study, we believe that the Cynwyd Spur Trail is feasible and it will fill a critical gap in the Schuylkill River Trail between the Manayunk Bridge and the river front trail being constructed by O'Neil development project. It will also become a value recreational asset for the Township and help connect residents to natural open space and to the river.

Appendix A - Cost Estimates