Jim Thorpe Trail Connection

Master Site Development Plan

Prepared for:
Jim Thorpe
Carbon County, PA

Draft - December 2016

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CHAPTER 1

Introduction

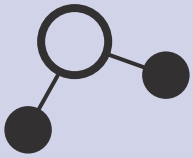
Purpose for Study

Carbon County commissioned this Master Site Development Plan to plan for a new trail route through the County-owned parking lot in Jim Thorpe, PA. On the south end of the approximately half mile trail gap is a new pedestrian bridge over the Lehigh River, scheduled to be constructed by 2018, that will route additional pedestrian and bicyclist uses through the County lot. This route will connect to the Lehigh Gorge section of the Delaware and Lehigh Heritage Corridor Trail (D&L) at the northern end of the site.

This plan seeks to create a safe and accessible trail segment where there is currently a gap between the new pedestrian bridge and the Lehigh Gorge section of the D&L Trail. The plan establishes County goals for the design, analyzes existing site conditions, offers three trail alignment alternatives (each with assets and constraints), and suggests an implementation strategy.

Plan Goals

The goals of the Jim Thorpe Trail Connection Master Site Development Plan are too:



Provide a formal connection between the new pedestrian bridge at the southern end of the parking lot and the Lehigh Gorge section of the D&L Trail at the northern end of the site.

Safely conduct all users, including vehicular, pedestrian, and bicyclists, through the parking lot.

Minimize the loss of existing parking spaces, and explore alternate designs that preserve the existing number of parking spaces.

Create a year round amenity that brings additional tourists to Jim Thorpe and the Carbon County parking lot.

Provide scenic views of the surrounding landscape.

Protect and enhance the Lehigh River riparian zone and floodplain.

Public Participation

In September 2016, Carbon County selected Simone Collins (SC) to lead a team of consultants to complete the Jim Thorpe Trail Connection Master Site Development Plan. The consultant team included Hanover Engineering Associates. A Steering Committee, comprised of County staff and concerned residents, provided ideas to guide the design process. As part of the public involvement process, the consultants led a steering committee meeting and two public meetings.

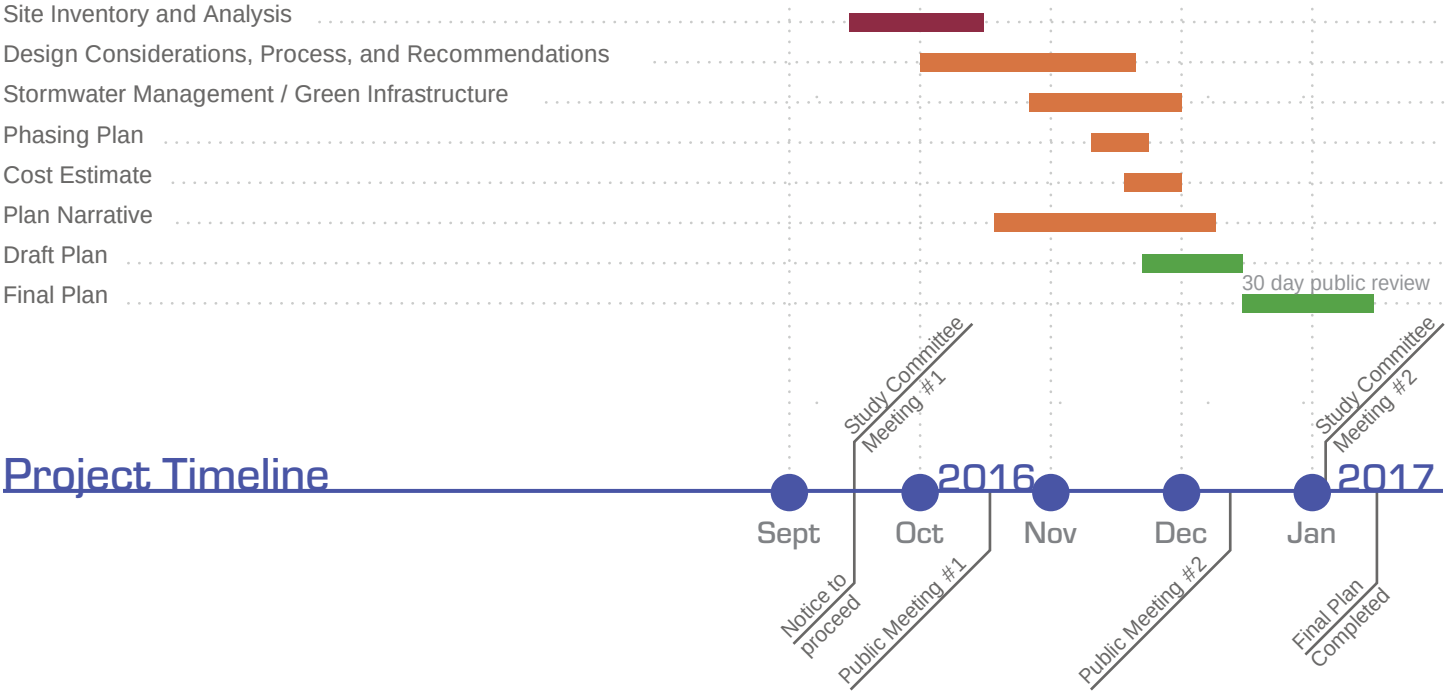
September 15, 2016 - Steering Committee Meeting #1

Steering Committee meeting #1 focused on collecting background information and discussing initial design ideas. The Steering Committee and consultants attended a presentation by the PA Eastern Trails and Greenway Summit at the site of the new D&L pedestrian bridge. Following the presentation, the Steering Committee and consultants walked the length of the Carbon County Parking lot and discussed project goals, site constraints, and design ideas. The meeting minutes are found in the appendix of this report.

October 18, 2016 - Public Meeting #1

The first public meeting introduced the project team and provided an overview of the project. The consultants discussed an inventory and analysis to familiarize meeting participants with the project area. Two preliminary concepts were presented that explored both on-road and off-road trail alternatives through the parking lot. The meeting concluded with a brainstorming session that gathered public input on project goals, site and area facts, concept ideas, and potential partners.

Scope of Work



Project Timeline

Several comments supported an off-road trail that would function as an amenity for Jim Thorpe residents and visitors. Loss of parking spaces was stressed as a major design constraint by the County Commissioners. The meeting presentation and minutes are found in the appendix of this report.

December 6, 2016 - Public Meeting #2

The draft plan was presented at the second public meeting. The consultants provided a brief review of the inventory and analysis before presenting three alternative designs. The presentation included cost estimates for the three alternative designs and an implementation strategy for funding proposed improvements.

The presentation concluded with comments from the public. The meeting presentation and minutes are found in the appendix of this report. The draft plan was then subject to a 30 day public review.

Data Collection and Methodology

Elements for the plan were compiled using the best available information. This information included Geographic Information System (GIS) mapping, aerial photography, and information gathered from previous and ongoing planning efforts. Information was derived from multiple sources and methods including GIS information provided by Carbon County and the State of Pennsylvania, field reconnaissance, and public meetings.

CHAPTER 2

Inventory & Analysis

General Site Description

The Jim Thorpe Trail Connection Master Site Development Plan (MSDP) is contained within a 12.30 acre site that stretches approximately 0.4 miles from the Mauch Chunk confluence in the south to the old Route 903 bridge in the north. The site contains approximately 107,148 square feet (2.46 acres) of paved surface parking, 31,578 square feet (0.72 acres) of gravel parking, and 31,176 square feet (0.72 acres) of exposed rock by the boat launch. There are approximately 289 existing striped parking spaces, which include perpendicular and parallel parking.

To the west of the site is US 209 that connects south to Lehighton (US 209 North) and west to Tamaqua (US 209 south). PA Route 903 crosses the Lehigh River just north of the site and runs northeast to Lake Harmony. The Lehigh River runs along the entire eastern edge of the site. The Mauch Chunk Creek flows subsurface under Jim Thorpe to a confluence with the Lehigh River at the southern end of the site.

Use

The project site is owned by Carbon County and is almost entirely parking lot, with a boat launch facility located in the center of the site. There are approximately 289 striped parking spaces, including parallel and perpendicular spaces. Access to the parking lot requires a fee at a gatehouse situated at the one entrance off of US 209. The site has six primary uses. Each are described to the right:

289 parking spaces

Parking Lot Cost Chart

Sunday	$6 / day
Monday	$5 / day
Tuesday	$5 / day
Wednesday	$5 / day
Thursday	$5 / day
Friday	$5 / day
Saturday	$6 / day

* Jim Thorpe Tourism Agency (2016)

Lehigh Gorge Trailhead

The Lehigh Gorge is a recreational and tourism destination that attracts bikers, hikers, nature watchers, and many others. It is most popular in the fall when leaves are changing within the gorge. Primary parking and access to the trail is from the project area. Access to the trail is at the northern end of the lot near the old Route 903 bridge, currently being demolished.

County Parking

Carbon County employees use the parking lot for their vehicular parking.

Boat Launch

The project area includes a boat launch facility with access to the popular Lehigh River Water Trail. More information regarding the boat launch facility is provided later in this chapter.

Jim Thorpe Visitors

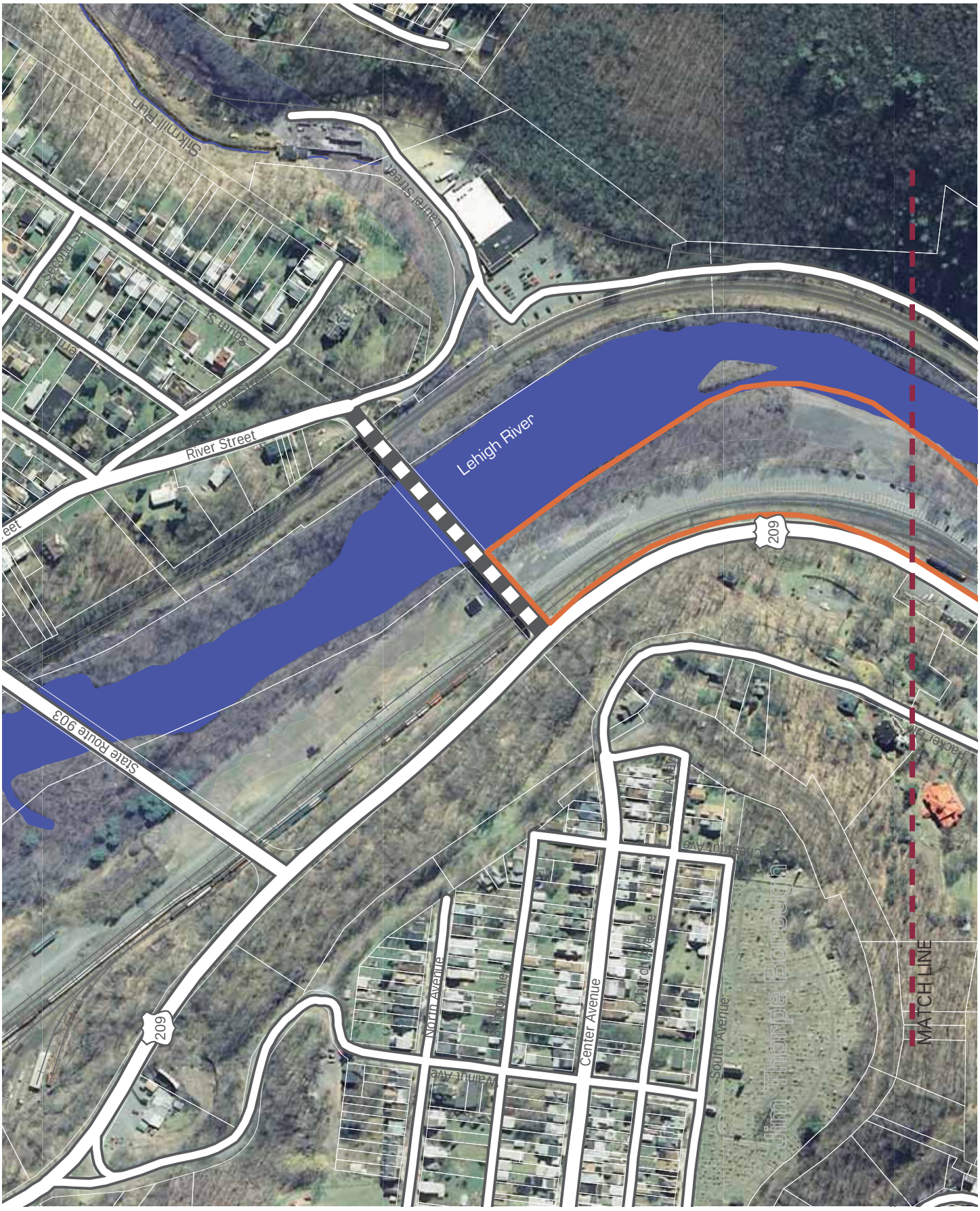
The Town of Jim Thorpe is a popular tourist destination with famous restaurants, bed and breakfasts, a theater, and more. It is even referred to as the "Switzerland of America." Many visitors use the parking lot given its location close to downtown and size when compared to other parking areas in the town.

Jury Parking

Jim Thorpe Borough is the County seat for Carbon County. During court, jurors are permitted to park for free.

Local residents

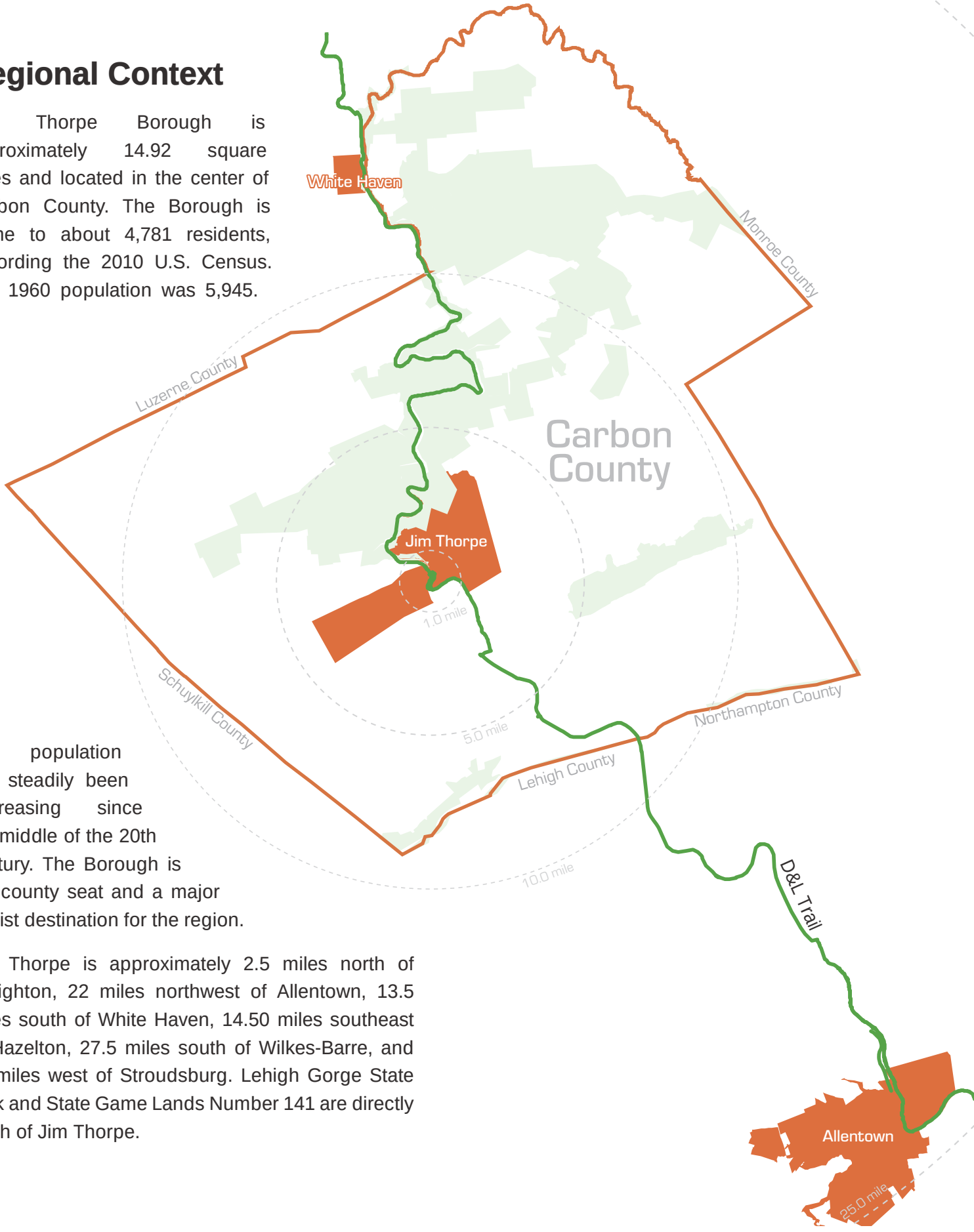
It was noted by the Project Steering Committee that locals commonly park in the southern half of the lot and generally have desired spaces.


Silkmill Run
Tabor Street
South St
River Street
Lehigh River
209
State Route 903
209
North Avenue
Second Ave
Center Avenue
Third Ave
Chestnut Ave
South Avenue
Walnut Ave
Jim Thorpe Borough
MATCH LINE


Jim Thorpe Borough
Lehigh River
Mauch Chunk Street
209
Mahoning Township
Lehigh Avenue
Susquehanna Street
Square
MATCH LINE
Broadway
Race
Site Aerial
Legend
Roads
Railroad Lines
Municipal Boundary
Parcel Lines
Project Area
N
feet
0
150
300
600

Regional Context

Jim Thorpe Borough is approximately 14.92 square miles and located in the center of Carbon County. The Borough is home to about 4,781 residents, according the 2010 U.S. Census. The 1960 population was 5,945.



The population has steadily been decreasing since the middle of the 20th century. The Borough is the county seat and a major tourist destination for the region.

Jim Thorpe is approximately 2.5 miles north of Lehighton, 22 miles northwest of Allentown, 13.5 miles south of White Haven, 14.50 miles southeast of Hazelton, 27.5 miles south of Wilkes-Barre, and 30 miles west of Stroudsburg. Lehigh Gorge State Park and State Game Lands Number 141 are directly north of Jim Thorpe.

The proposed D&L Trail runs from White Haven, PA in the north to Easton, PA in the south. There is currently a gap along the trail segment in Jim Thorpe with no safe or permitted connection between the two trail terminuses. Overall, the recreational trail has gained in popularity and use throughout recent years. This trend is expected to continue. According to the 2014 PA State Comprehensive Outdoor Recreation Plan, trails are the number one most desired recreation facility.

The Lehigh River Water Trail runs from White Haven, PA in Luzerne County to Easton, PA in Northampton County. Jim Thorpe provides 1 of 20 access points to the Lehigh River Water Trail, with three points located upstream.

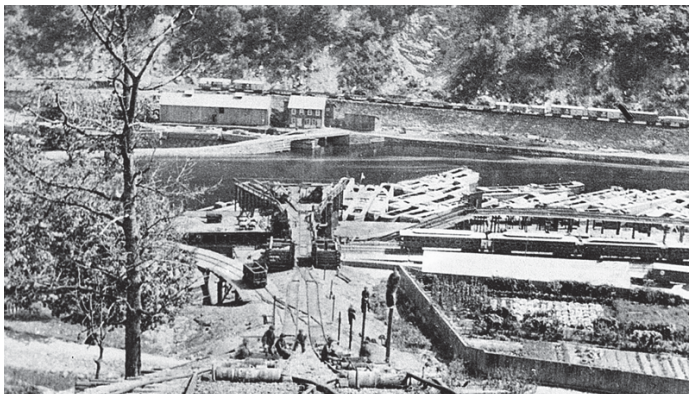
History

The project site has a rich history dating back to the discovery of anthracite coal in Carbon County in 1791. This initiated an economic upturn in the region driven by the coal industry. The town of Mauch Chunk, now Jim Thorpe, was founded in 1818. That same year, work on the Lehigh Canal started with an engineering survey from Easton to Mauch Chunk. Construction on the 46.5 mile Canal began in 1819 and was opened for operation in 1829. A second section was later built connecting Mauch Chunk up to White Haven.

When completed to White Haven, the canal was approximately 72 miles long. It contained 76 locks, eight guard locks, 28 dams, and six aqueducts. Canal dimensions were generally 60 feet wide at the top and 45 feet wide at the bottom of the canal prism. The prism was five to six feet deep and Tow Paths were eight to twelve feet wide.

Coal shipped down the Canal was mined in the small mining town of Summit Hill, eight miles west of Mauch Chunk. From Summit Hill, the coal was sent via the switchback railroad to Mauch Chunk. Here,

View of canal boat loading docks from Lehigh River



View of loading docks from switchback railroad

View of canal lock 1

View of Mauch Chunk

Existing trail access to the Lehigh River - topography is suitable for potential observation area

coal was sent down shoots to large wharves in the Lehigh River where canal boats would be loaded. A dam, just upstream from the Mauch Chunk Creek confluence with the Lehigh River, fed the canal.

The Lehigh Canal reached its peak year of usage in 1839 with 6,638 tons of coal shipped. In 1855, usage along the canal began to decline with the introduction of the Railroad by Asa Packer. Shipping stopped along the canal in 1931 in conjunction with the railroad industry and the Great Depression. Mauch Chunk officially changed its name in 1953 following the death of renowned athlete and Olympian, Jim Thorpe. This was done as an attempt to boost the local economy that was negatively impacted by the post-industrial age.

The Canal corridor has remained relatively undeveloped since the cease of operations in 1931. Today, the Tow Path is being developed as part of the regional Delaware and Lehigh National Heritage Corridor. The trail runs from Bristol, PA to Wilkes-Barre, PA connecting trail users with history and nature. Various gaps exist along the trail, including a gap in Jim Thorpe.

This Master Plan looks at connecting the last remaining gap of the D&L Trail in Carbon County.

On-Site Reconnaissance

The consultants conducted a reconnaissance of the site and the surrounding area. The initial site visit was done at the project kickoff meeting in mid-September 2016. The steering committee and consultants walked the length of the site, recorded notes and took photographs. This information was added to field maps as part of the inventory and analysis. Follow-up site visits were conducted to verify the feasibility of proposed improvements.

Planning Documents

Zoning Code Review

The project site falls within the General Commercial Zone and the Industrial Zone in Jim Thorpe Borough. Permitted uses do not list parking lots. However, the site is currently used as a parking lot and owned and used by the County of Carbon. Permitted uses in General Commercial include off-premise signs and accessory structures. Off-premise signs might include wayfinding signage for the D&L Trail or gateway signage for Jim Thorpe. An accessory structure might be the addition of a maintenance garage. Permitted uses in the Industrial Zone include accessory structures and appropriate municipal uses.

Parking stalls are required to be a minimum of nine feet by twenty feet. Driveways are a required minimum of twenty feet for 2-way circulation and twelve feet for 1-way circulation. Parking requirements were not specific to recreational use. Requirements for public or private assembly use requires one space per three seats provided. Loading requirements are a minimum of 50 feet in depth and twelve feet in width.

SALDO Review

A review of the Subdivision and Land Development Ordinance provided information to the consultant on Borough design standards. Curb radius is a required minimum of 15 feet for collectors and 40 feet for arterial. Cul-de-Sac turnarounds must have a minimum outside turning radius of 40 feet. Street trees are required to be spaced at most 50 feet along public rights-of-way. Street tree spacing would not be required along any internal trails.

Stormwater Management Ordinance

The site drains into the Lehigh River which is designated as Trout Stocking and Migratory Fishes (TSF, MF). It is unknown if a portion of the parking lot discharges in the piped stream, known as Mauch Chunk Creek, that traverses below the site and discharges into the Lehigh River. Mauch Chunk Creek is classified as an unnamed tributary to Lehigh River, Cold Water Fishes and Migratory Fishes (CWF, MF), per PA Code Chapter 93.

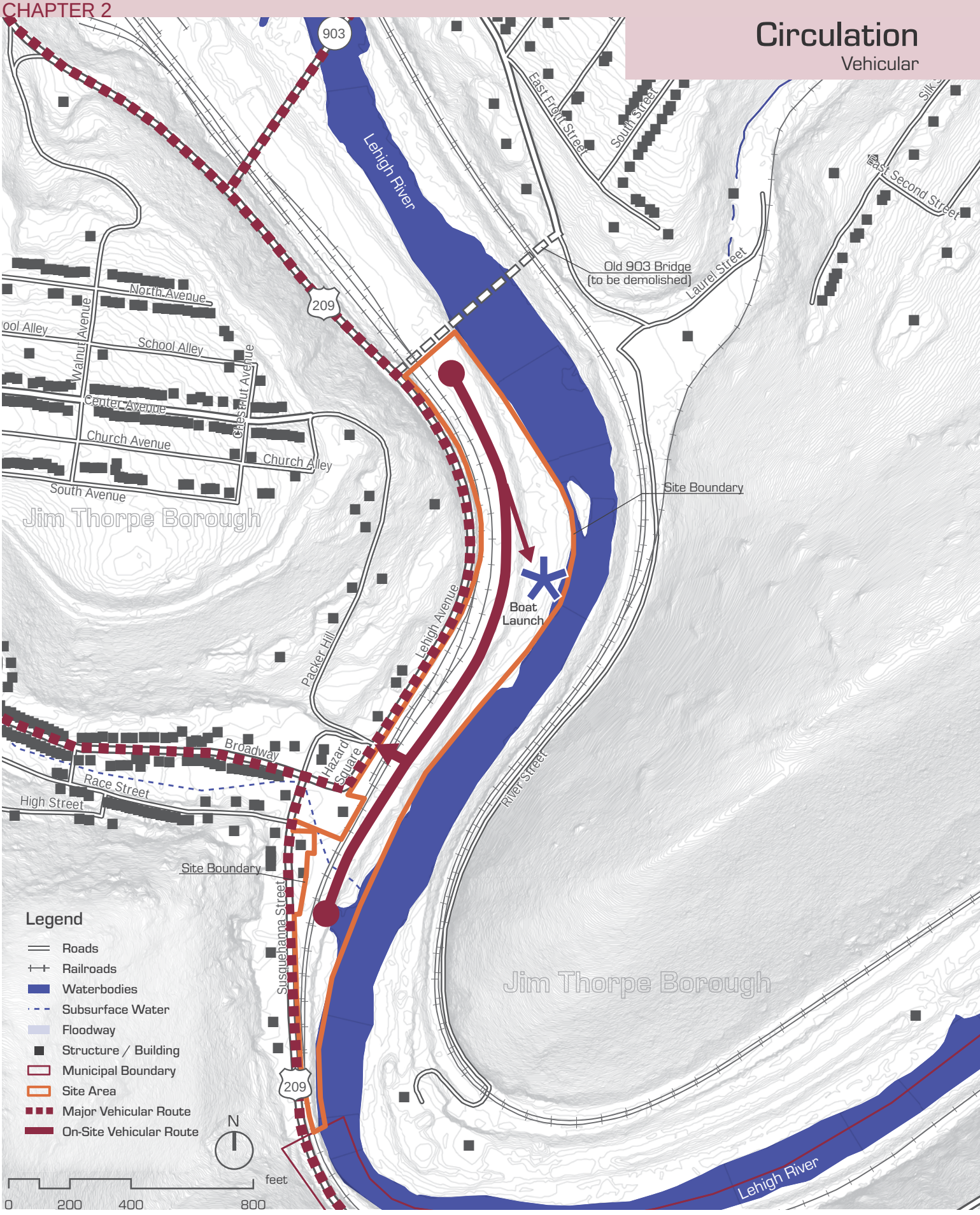
The Borough of Jim Thorpe Stormwater Management Ordinance indicates that the post-development runoff release rate criteria will need to be met in accordance with the subarea district the project is located in. Water quality and recharge volumes will be required to be met by groundwater recharge, also known as infiltration. Post Construction Stormwater Management Best Management Practices (BMPs) with infiltration capabilities will be proposed to reduce the post-development runoff rates and volumes to less than pre-development. Examples of such BMPs that may be utilized for the project are bio-retention swales, planting strips, infiltration berms, etc.

Proposed piping and/or artificial swale discharge shall be set back at least 75 feet from a receiving waterway. The area up to 50 feet from the top of streambank shall be planted in accordance with Zone I and II buffer planting requirements as depicted in “Pennsylvania Handbook of Best Management Practices for Developing Areas,” 1998, Riparian Forested Buffer. Zone I will comprise, at a minimum, the first 15 feet, with Zone II comprising the remaining 35 feet. This replanting may be waived by the Borough along streambank areas which receive overland or shallow flow from upstream, disrobed, meadow or other existing pervious surfaces.

Floodplain Management Ordinance

The Jim Thorpe Borough Floodplain Management Ordinance indicates that an application for a building proposed within a floodplain shall be made in writing to the Building Permit Office with the required information specified in the Ordinance. The application should also include a description of the

Circulation
Vehicular



type and extent of flood proofing measure which have been incorporated into the design of the structure. If any proposed construction or development is located within or adjacent to any identified flood-prone area, a plan shall be submitted depicting locations of existing and proposed flood-prone development or structures and delineate the area which is subject to flooding.

PA DEP Permits

An NPDES Permit will need to be obtained from Carbon County Conservation District if the proposed limit of disturbance will exceed one acre. Post Construction Stormwater Management BMPs will need to be proposed and designed to reduce the post-development runoff rates and volume to less than pre-development. Additionally, a 20% impervious cover reduction will need to be accounted for within the pre-development calculations. The proposed BMPs will be designed to meet the NPDES calculations in-conjunction with the Stormwater Management Ordinance. General Permits will also need to be obtained from PA DEP for the project.

Carbon County Comprehensive and Greenway Plan, 2013

The Carbon County Comprehensive and Greenway Plan completed in 2013 provides an overview of existing conditions and recommendations for development of Carbon County moving forward. The addition of a Greenway Plan in conjunction with the Comprehensive Plan stresses the County's emphasis on the development of trails and green corridors. The following review focuses on how the plan applies to the development of the Jim Thorpe Trail Connection Master Site Development Plan.

One of the goals of the plan specifically stresses "improvements to connect and complete greenway corridors and recreational trails." Specific goals to the greenway plan include:

- Developing a Greenway system that includes both recreation and conservation greenways
- Expand the County's existing trail and open space system
- Protect environmentally sensitive, cultural, scenic and historic areas of Carbon County
- Enhance tourism in the County

Jim Thorpe was mentioned as a gap along the trail corridor with a recommendation to complete the trail from the proposed pedestrian bridge to the Lehigh Gorge Trail.

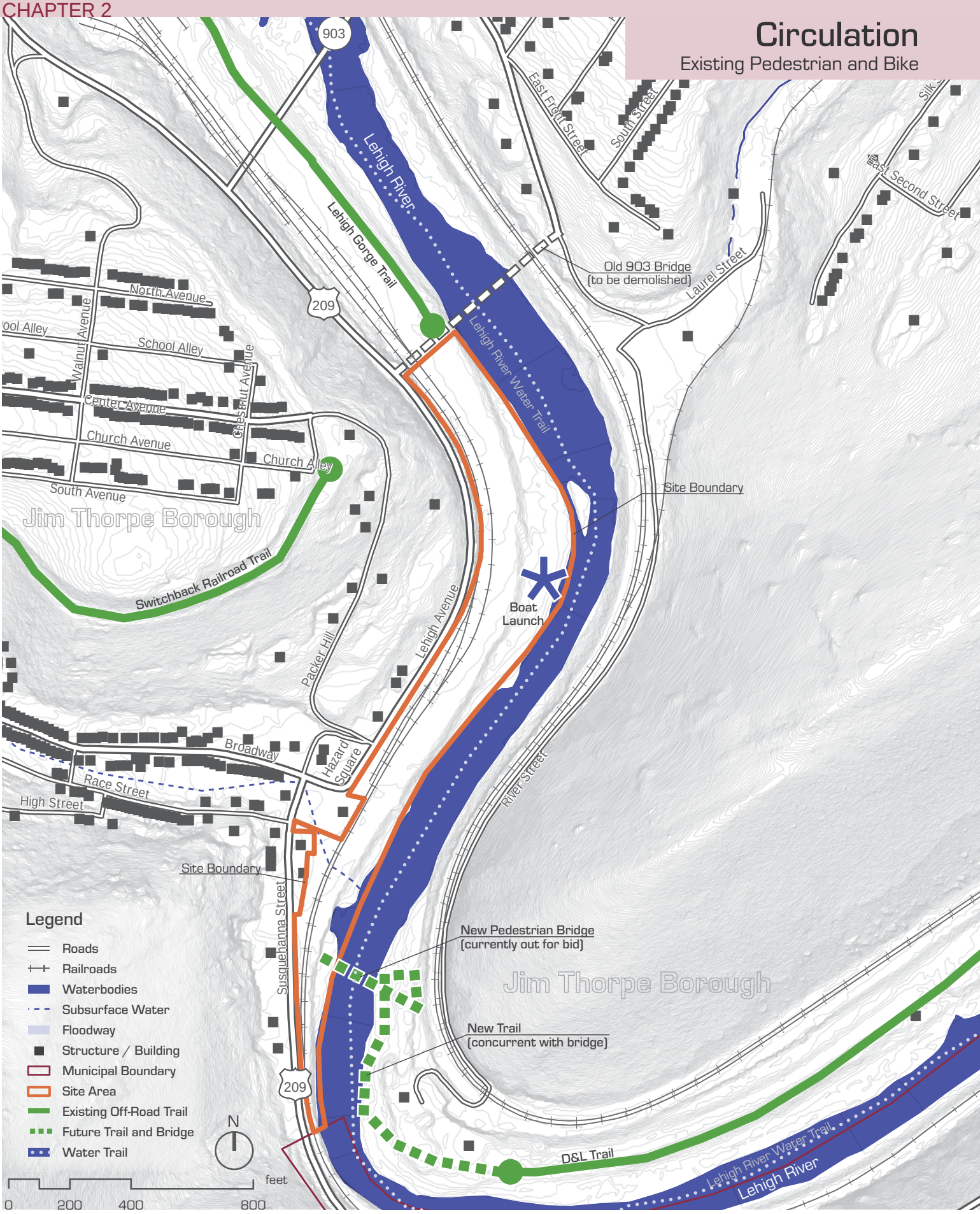
Circulation

Access to the parking lot from Jim Thorpe is restricted by the Reading Blue Mountain and Northern Railroad. The railroad is an active line that runs the entire length of the project area. Vehicular access is via a rail crossing along US 209 just north of the Mauch Chunk historic train station. This provides the only vehicular access in or out of the parking lot. The parking lot itself is a single linear lot with limited opportunities to turn around. Various drive aisle widths were observed using aerial and on-site information. The lot currently contains approximately 289 parking spaces.

Pedestrian access from Jim Thorpe across the railroad is at two locations. One through the historic rail station and the other at the vehicular entrance to the parking lot. Within the lot, there is no pedestrian circulation provided. Users currently have to walk down drive aisles.

Circulation

Existing Pedestrian and Bike



The D&L Trail is currently disconnected through Jim Thorpe. The southern trail segment ends south of the sewage treatment center on the eastern bank of the river. The northern trail segment ends at the terminus of the Lehigh Gorge Trail beneath the old Route 903 bridge (being demolished at the time of this study).

A pedestrian bridge over the Lehigh River is scheduled to be built to connect the D&L Trail with the parking lot. The anticipated completion of the bridge is spring 2018. When completed, D&L Trail users will have access to the Lehigh Gorge Trail through the parking lot. It is anticipated that this will significantly increase through-trail usage of the parking lot as well as establish a trailhead.

Geology and Soils

Jim Thorpe falls in the Anthracite Upland Section of the Ridge and Valley Province of Pennsylvania. The geology of the site is primarily made up of sandstone, siltstone, shale, and some conglomerate, according the Pennsylvania Department of Environmental Resources and PA DCNR.

The topography of the site is primarily flat with a steep drop off to the Lehigh River. The flat portion is almost entirely paved and used as a parking lot. The entire Lehigh River side of the parking lot drops off to the River. This slope is extremely steep and reaches one foot vertical to one foot horizontal (1:1 slope) in some areas. There is one flat area by the Lehigh River that is used as a boat launch.

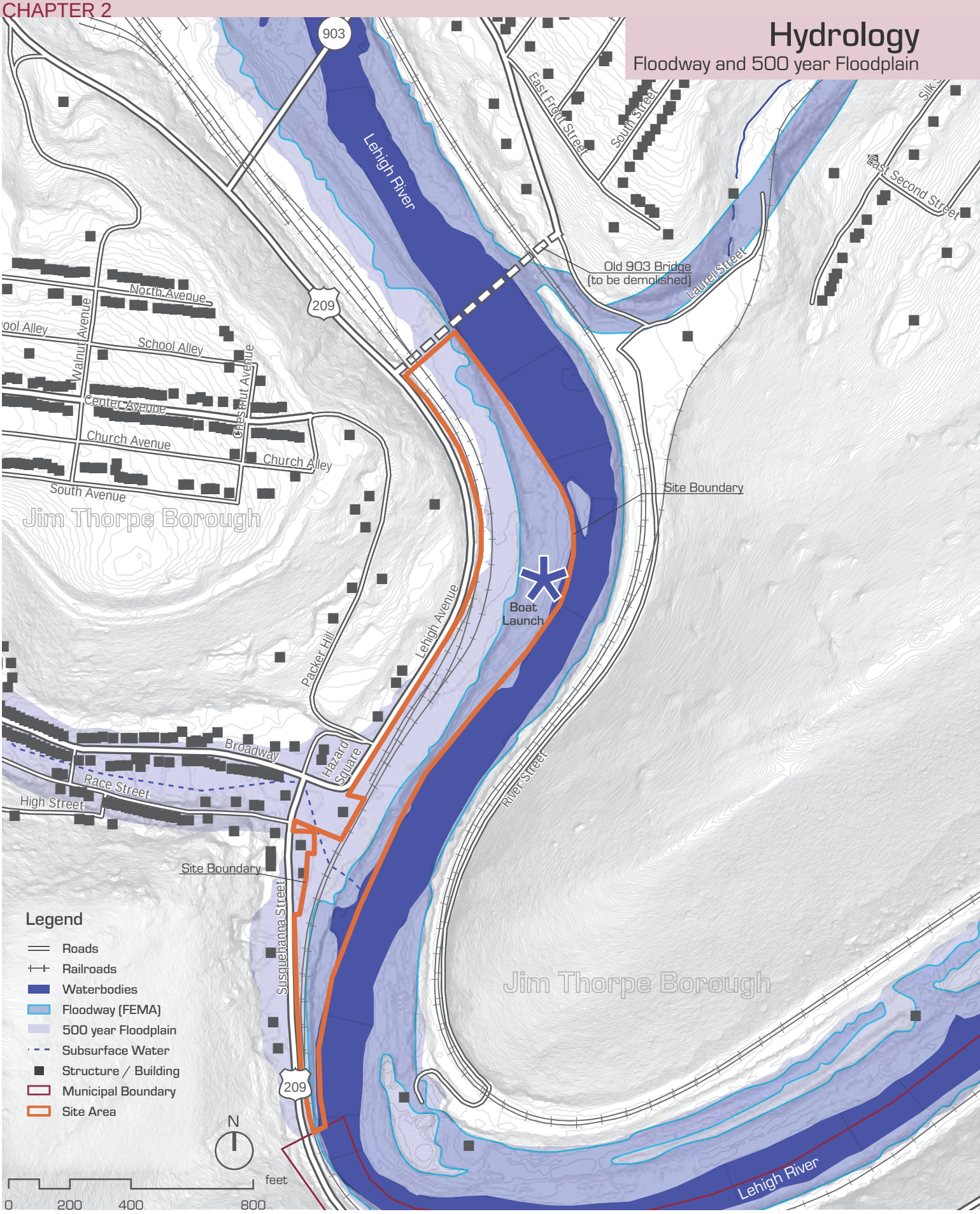
A websoil survey, according to the US Department of Agriculture's Web Soil Survey, indicates that the project area is primarily made up of "Made Land." Made Land is defined as unstable acid loamy soil transported from interbedded sedimentary rock. The depth to the water table is more than 80 inches and has a low water storage profile. A small portion of the site under the old Route 903 bridge is defined as Very Stony Land. Very Stony Land is defined as rubble land. The depth to bedrock is 10 to 40 inches with a very low water storage profile.

USDA Web Soil Survey

This fill dominated soil structure is directly related to historic coal processing operations. The unstable nature of the soil stresses the importance of vegetation as a stabilizer for the steep slopes down from the parking lot to the River. Any structure constructed along the steep slopes may require additional engineering to ensure its success.

Hydrology

Floodway and 500 year Floodplain



Hydrology

The entire east edge of the project area runs along the Lehigh River. The Lehigh is a 103 mile-long watercourse with a 1,345 square mile watershed. The river is part of the larger Delaware River watershed with a confluence located in Easton, PA. The Lehigh River is classified as a scenic river by DCNR, with some of its more pristine landscapes located in and around Jim Thorpe.

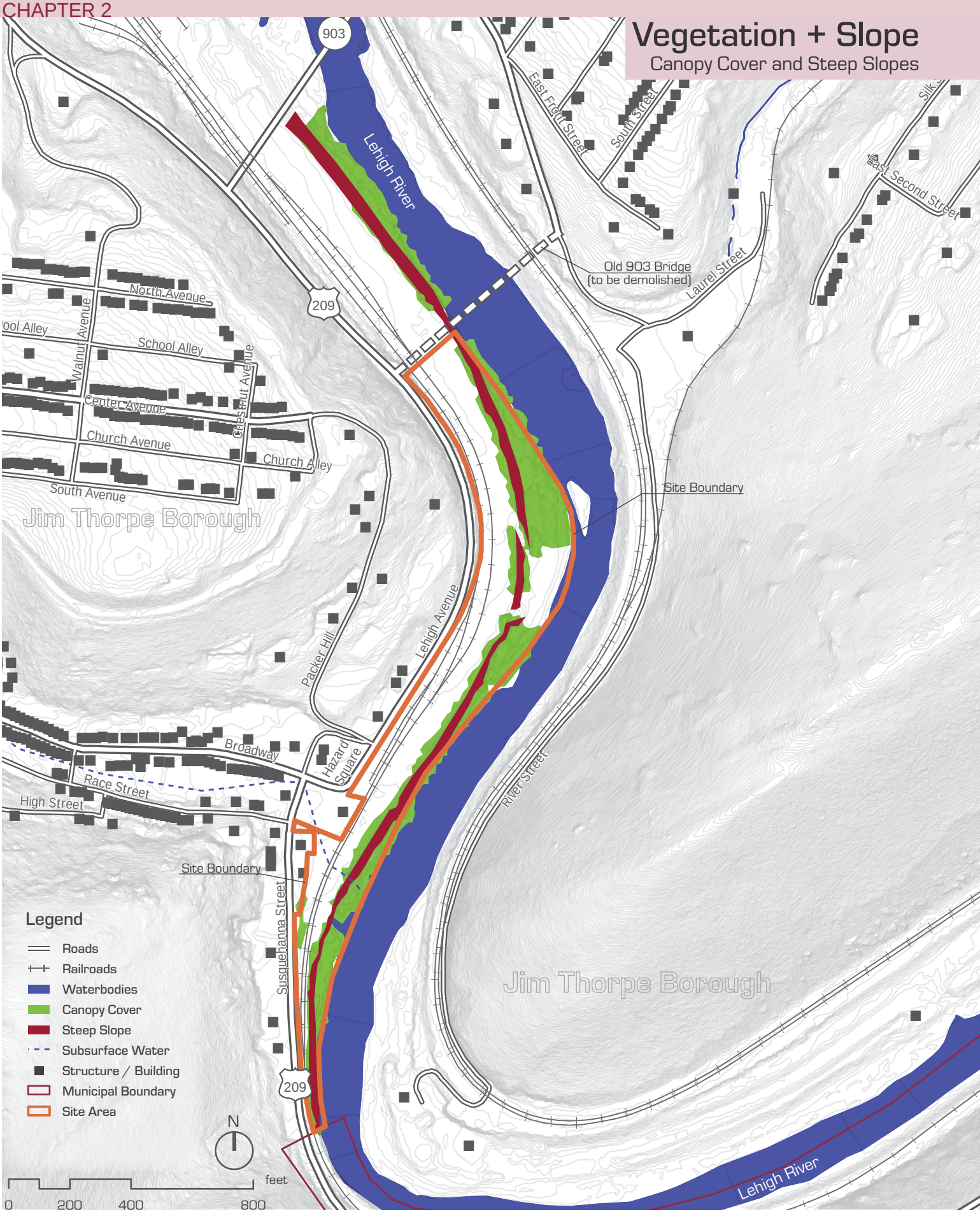
The Lehigh River is host to a wide range of recreational activities. Specifically, it is known for its whitewater rafting, kayaking, canoeing, hiking, and fishing. It is designated as a recreational Water Trail from White Haven, PA to Easton, PA (72 miles). In Easton, the Water Trail meets with the Delaware Water Trail and continues south to Philadelphia and the Delaware Bay. The project area contains a boat launch facility for access to the Water Trail. Additional information can be found at: http://www.wildlandspa.org/lrwt/.

Near the southern end of the site, the Mauch Chunk Creek flows via a subsurface structure to a confluence with the Lehigh River. The County Parking lot is built directly above the Mauch Chunk Creek culvert. The parking lot width is only about 40’ above the culvert, with no room for additional trail development except if a structure was built out over the Creek.

The 100 year floodplain of both the Lehigh River and Mauch Chunk Creek does not currently impact the County Parking Lot. The floodplain is confined by the steep slopes and a vegetated riparian zone that runs adjacent to the parking lot. Increased water velocity is typical during high flow conditions along the Lehigh River. This stresses the importance of the established riparian vegetation along the steep slopes of the site, which could otherwise experience excessive erosion. The Lehigh River Water Trail boat launch is the only site amenity that falls in the floodplain.

Vegetation + Slope

Canopy Cover and Steep Slopes



Vegetation

The vegetation currently found on the site is limited to plantings within the riparian zone east of the parking lot. The riparian zone is well-established with numerous desired species. This vegetation serves an important role as a visual buffer for the parking lot, and a stabilizer for the steep slopes. Any removal of vegetation is to be done with extreme caution given the geology and soil structure of the site.

A clearing within the riparian zone is found at the boat launch location. Here an area approximately 300' in length and 100' in depth along the river is almost entirely void of vegetation.

The actual parking lot has no vegetated islands, trees, shrubs, or lawn areas. West of the parking lot, there is no vegetation buffer between the lot and active railroad. This provides little to no maintenance obligations for the County, but also no amenity.

Assets and Constraints

The parking lot has multiple assets and constraints related to its current conditions, proposed improvements, access, topography, and hydrology.

D&L Trail

The D&L Trail pedestrian bridge engineering was completed and put out for bid in fall of 2016. When completed, D&L Trail users will have direct access to the southern terminus of the parking lot. At the northern terminus of the parking lot exists the Lehigh Gorge Trail. The parking lot thus creates the link between the two trail sections.

Vegetation

The existing vegetation within the riparian zone is a pre-established asset for water quality and floodway stabilization for the Lehigh River. The vegetation provides a soft backdrop to the parking lot, but also creates a constraint by limiting views of the Lehigh River and Lehigh gorge.

The opportunity exists to selectively prune vegetation to provide views of the adjacent landscape. Pruning should not disturb trees roots, which stabilize the steep slopes.

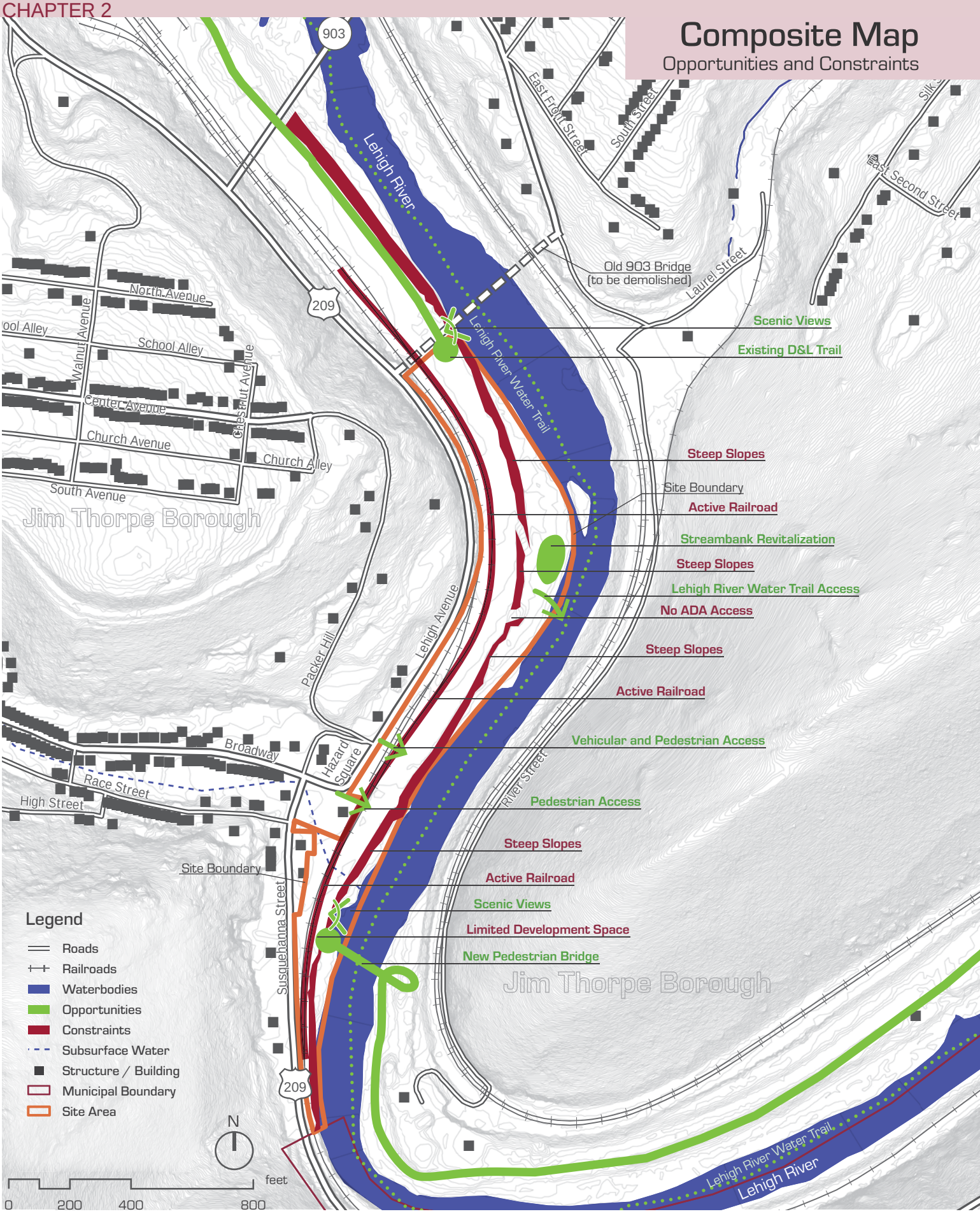
Boat Launch

The boat launch location is both an asset and a constraint. A switchback trail down to a cleared area adjacent to the river provides pedestrian access. A gravel driveway runs down for vehicular access, specifically for raft drop-off. The location has a raft slide that allows users to slide rafts down the hill from the parking lot. The large opening next to the river provides a gathering space for boat launches to the popular Lehigh River Water Trail. The size and barren nature of this area presents an opportunity to introduce additional riparian plantings. Additional plantings would need to be strategically placed in areas that would not impact the programmed function of the boat launch.

Constraints also exist at the boat launch, primarily in terms of access. The switchback trail is a steep route down to the River with slopes in excess of 16%. This far exceeds ADA regulations, which require a maximum of 1:12 or 8.33% slopes for ramps. Once down at the lower clearing, access to the river's Water Trail is particular difficult. The riverbank is very rock with stone ranging in size from inches to feet. Options exist within the floodplain to provide ADA access to the river. This work would have to be able to withstand significant flood events with high velocity water that are common along the Lehigh River.

Composite Map

Opportunities and Constraints



opportunities for streambank stabilization practices

Slopes

Slopes within the project area and the surrounding landscape are both assets and constraints. The existing county parking lot is graded flat and generally meets ADA requirements throughout. However, the eastern edge of the parking lot has a steep slope, exceeding 2:1 in some areas, which drops down to the Lehigh River and its floodway. This limits expansion along the parking lot without the addition of a wall.

The topography of the surrounding landscape creates a visual aesthetic for users. The popular Lehigh Gorge, just north of the site, and Bear Mountain, southeast of the site, are appealing topographic features. The potential exists to create views of these areas.

Access

A significant constraint for the site is access, both vehicular and pedestrian. Running along the entire western edge of the site and parking lot is an active railroad. Vehicular access over the railroad is restricted to one location. Within the parking lot, circulation is linear with limited opportunities to turn around. Drivers either have to park and back out to reverse travel, or perform a k-turn. Additional vehicular crossings are not realistic.

Pedestrian access is across the active rail and exists primarily in two locations along the Jim Thorpe historic district. One is at the Mauch Chunk Rail Station and one is at the vehicular access over the railroad, 200 feet north of the rail station. Both crossings are not ADA accessible and lack crossing warnings. These existing crossings do, however, provide opportunities to connect site users with Jim Thorpe.

CHAPTER 3

Suggested Improvement Options

Anticipated Level of Uses

The Jim Thorpe Trail Connection can serve as both an active and passive recreational amenity. It should be anticipated that overall use of the parking lot will increase given the new through trail's draw both locally and regionally. This will increase demand for parking and likely boost income generated from the parking lot. Trails are documented to add economic value to their host communities like Jim Thorpe and the Carbon County region.

Example of a Class 1 Bikeway - Bethlehem Greenway, PA

Example of a Class 2 Bikeway - Abington Township, PA

Trail Design Standards

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.

Class 1 Bikeways are completely separated from the roadway. They are also known as 'off-road trails', 'greenways', 'shared use paths', 'multi-use paths', and/or 'side paths'. These bikeways are generally shared by more than just bike users. More information is provided later in this chapter.

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

Class 3 Bikeways are also known as 'shared lanes' 'bike routes', 'sharrows', or 'marked shared lanes'. In these situations the cyclist shares the roadway with vehicular traffic and there are no special accommodations for the cyclist within the road right-of-way. Marked shared lanes, or sharrows, use pavement markings and signs such as "Bicycles May Use Full Lane" to define the route. Shared lanes or bike routes use only signage to define the route.

For the Jim Thorpe Trail Connection study, both Class 1 Bikeways and Class 3 Bikeways are considered. The addition of a bike lane, as is the case with Class 2 Bikeways, within the County parking lot is not suggested. The backing in and out of parked vehicles and the existing width of the drive aisle is not accommodating for this type of design.

Example of a Class 3 Bikeway - Charlotte, NC

Shared Use Path (Off-Road)

The trail type that provides for the largest population of users is a Shared Use Path, or Multi-use trail, also known as Class 1 Bikeways (described above). The American Association of State Highway and Transportation Officials (AASHTO) defines a 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.

This trail type provides for a variety of trail users, depending on the trail surface paving and available right-of-way width. Shared use path users are generally non-motorized and may include but are not limited to typical upright adult bicyclists, recumbent bicyclists, tandem bicyclists, child bicyclists, inline skaters, roller bladers, skateboarders, kick scooter users, and pedestrians (including walkers, runners, people using both non-motorized and motorized wheelchairs, people with baby strollers, people walking dogs, and others).

Another general trait of shared use paths is universal accessibility for those with disabilities due to gentle slopes, adequate widths, and smooth surfaces. Shared use path segments should provide facility access in accordance with the Federal Americans with Disabilities Act (ADA) guidelines to provide for trail users with disabilities.

AASHTO recommends shared use paths be a minimum of ten (10) feet wide for a two-way trail. Depending on the user 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. In some circumstances, where certain conditions exist, 8' width for a two-way path is acceptable.

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.

This type of trail is not recommended as the primary means of connection between the pedestrian bridge to the south and the Lehigh Gorge Section of the D&L Trail to the north. This type of trail could be added within the floodplain to provide connections both to and along the Lehigh River.

Trail Surface Types

Asphalt Surfaces

Asphalt 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. Asphalt trails are preferred in flood prone areas. Porous asphalt can also be used in situations where stormwater infiltration or a pervious surface is required. Porous asphalt should not be used in flood prone areas where silt will clog the voids in the pavement.

Asphalt Surface Trail

Concrete Surfaces

Concrete is the most durable material for trail surfaces but is the most costly. Concrete trails are commonly 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 sunlight.

Concrete Surface Trail

Compacted Aggregate Surfaces

Compacted aggregate surfaces, or stone dust trails, 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. Crushed limestone or sandstone or "Trail Surface Aggregate (TSA) Mix" are typical aggregates used in

Compacted Aggregate Surface Trail

this situation. A compacted aggregate surface can also serve as base material for an asphalt surface if trail use increases or funds become available for a surfacing upgrade. Compacted aggregate surfaces should be avoided in flood prone areas or slopes over 5%.

Compact Earth Surfaces

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 along the Lehigh River and provide for environmental education, bird watching, boating or fishing opportunities.

Wood Plank / Boardwalk Surfaces

Wood plank / boardwalk surfaces are often used in floodplains and wetland areas where wet and inundated ground surface is common. Boardwalks can provide an elevated, accessible surface for trail users but are often not as slip resistant. They are also more costly than other surfaces mentioned above.

Trails and many other recreational facilities commonly developed within floodplains 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, compacted aggregate surfaces are not recommended. Trails should not be located within a floodway, which is where the most significant flood damage occurs.

Boardwalk decking may be a solution to overlook locations within the Jim Thorpe project area.

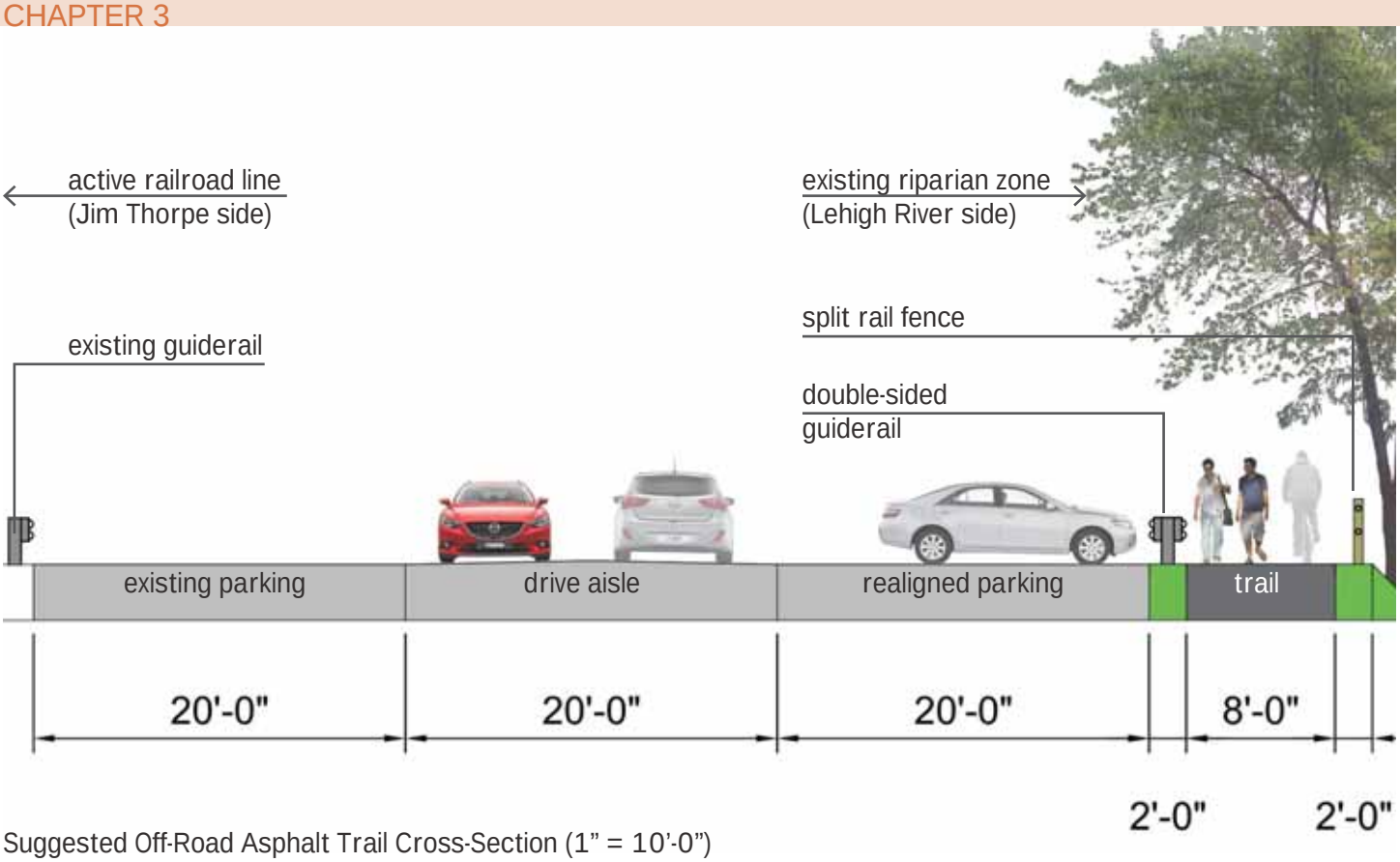
Compacted Earth Surface Trail

Wood Plank / Boardwalk Surface Trail

Sources:

Guide For Development of Bicycle Facilities, American Association of State Highway and Transportation Officials (AASHTO), 2012;

Pennsylvania Trail Design & Development Principles, Guidelines for Sustainable, Non-motorized Trails, Pennsylvania Department of Conservation and Natural Resources (DCNR), 2013



Suggested Off-Road Asphalt Trail Cross-Section (1" = 10'-0")

Suggested Trail Design

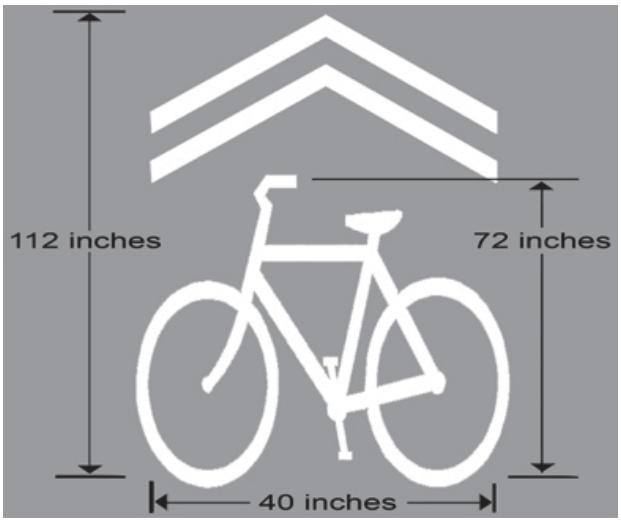
The following are proposed trail designs for various trail facility types and surface types found throughout the proposed Jim Thorpe Trail Connection.

Off-Road Asphalt Trail

The proposed off-road asphalt trail design for this project is applicable to the Hybrid Trail Alignment alternative and the Dedicated Trail Alignment alternative (discussed later in this chapter). Considering the existing site constraints and the County's emphasis on minimizing the impact to the number of existing parking spaces, the proposed design explores an 8' wide multi-use asphalt trail. By implementing an 8' trail, the existing river embankment and riparian zone remain undisturbed and parking lot loss is limited.

The AASHTO standard of 2' shoulders on either side of the trail was used to accommodate guiderail along the parking lot and split rail fencing along the Lehigh River embankment. Any guiderail that separates the parking lot and the off-road trail will need to include 5' wide gaps approximately every 100' (as marked on the plans on page 34-37) to provide access from the parking lot to the trail. This design of the trail shifts the parking bays along the riverside of the parking lot closer to the parking bays along the railroad side of the parking lot, narrows the drive aisle to 20', and restripes the parking bays at 20' by 9' (per Borough SALDO and Zoning). This 20' minimum drive aisle widens at the parking lot entrance to accommodate vehicles entering and exiting the lot. The proposed off-road trail is separated two feet from the newly striped parking bays to provide room for the protective guiderail.

The trail itself is constructed on the Lehigh River side of the parking lot between the top of the river embankment and the guiderail. The 2' shoulder between the Trail and the top of the embankment provides room for a split rail fence to protect users



Sharrow Pavement Markings

Bikes May Use Full Lane Signage

from the embankment's steep slopes. Parts of the trail may be constructed on existing pavement that was vacated by the shift in parking. Other portions of trail are constructed along the existing flat areas on top of the embankment. Where the trail is constructed on top of existing paving, the pavement may be milled and overlaid to provide a smooth and uniform trail surface. The construction of the trail on existing paving dictates the asphalt surface type. A diagrammatic cross-section of the trail is provided on the facing page.

Off-Road Compacted Aggregate Trail

The proposed Compacted Aggregate Trail, or stone dust trail, is applicable to the Northern Trail Segment (discussed later in this chapter). The Lehigh Gorge section of the D&L Trail is currently a compacted aggregate trail.

The proposed off-road Compacted Aggregate Trail is 10' wide. The AASHTO standard of 2' shoulders on either side of the trail was used to accommodate grading, guiderail and split rail fencing. Guiderail is suggested along the parking lot side of the trail if parking is located within 5' of the trail. If a larger buffer between the trail and parking lot is provided, stormwater best management practices (BMPs) are suggested to capture parking lot and trail run-off.

On-Road Trail

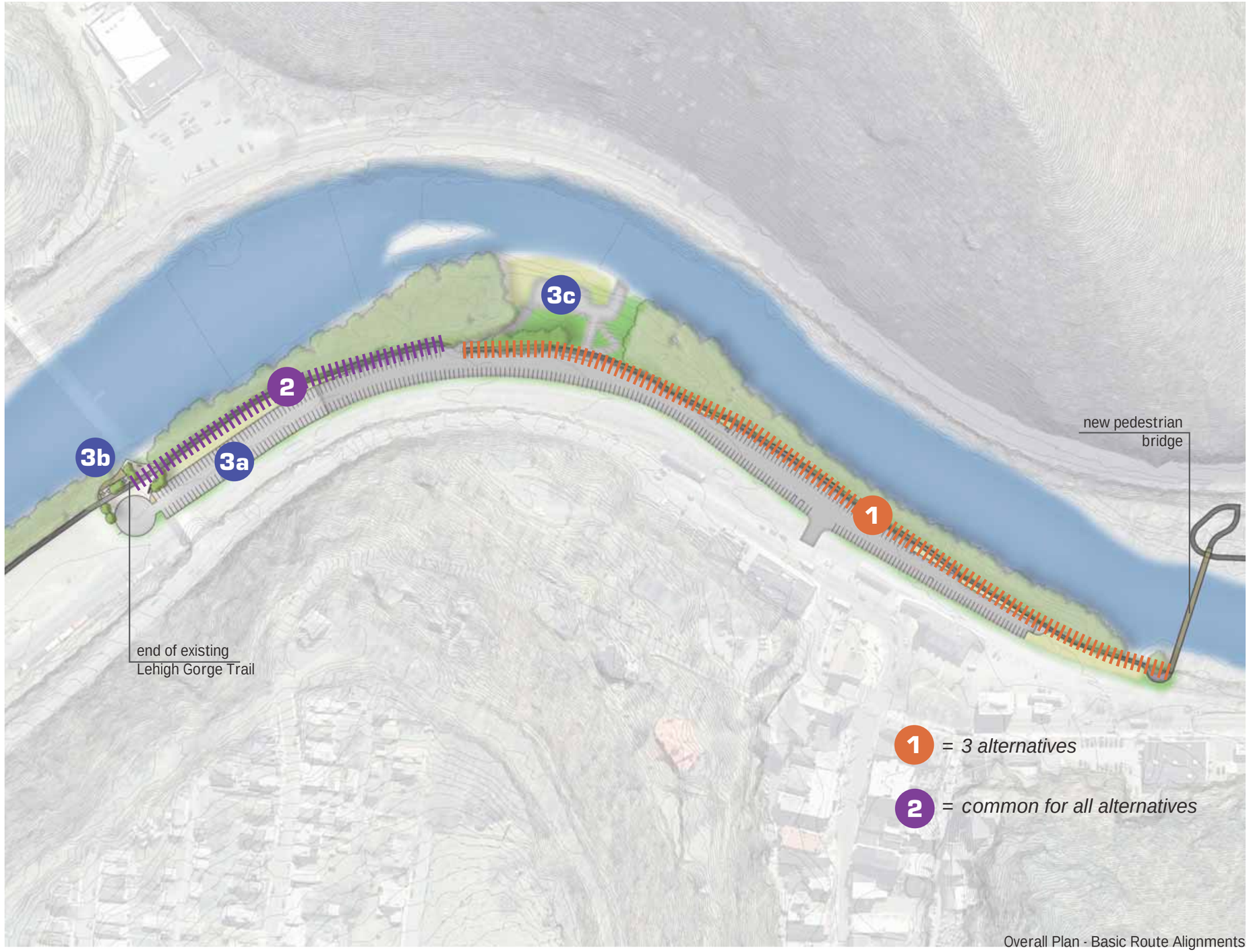
The on-road trail design proposes "sharrow" pavement markings be provided at 100' increments centered in each direction of the drive aisle. "Bikes May Use Full Lane" signage is suggested at various points throughout the design to inform both bikers and motorists. Signage should be placed at the entrance to the parking lot, the terminus of off-road trail segments, and at 250' intervals. Examples of pavement markings and signage are found above.

Suggested Improvement Plan

The suggested improvement plan is broken down into three sections: Alignment Alternatives, Northern Trail Segment, and Amenity Options. It is suggested that one of Alignment Alternatives be selected, in conjunction with the Northern Trail Segment, to complete the trail from the pedestrian bridge to the Lehigh Gorge section of the D&L Trail. The Amenity Options are provided as suggestions that enhance the aesthetics and functionality of the site.

Alignment Alternatives

Three alignment alternatives were explored that create a trail connection from the pedestrian bridge to the boat launch access road in the center of the project area, including: On-Road Alternative; Hybrid Alternative; and a Dedicated Trail Alternative. All three have assets and constraints, and include a Suggested Trail Design, as described earlier in this chapter. The alternatives are designed to function individually or as a phase for a possible future alternative. A first phase might be an on-road route, the second phase a hybrid route, and the final phase might be a dedicated trail route.



Overall Plan - Basic Route Alignments

Legend

required to complete trail

1 *Alignment Alternatives [from pedestrian bridge to boat launch gravel access road]*

- On-Road Option*
- Hybrid Option*
- Off-Road Option*

2 *Northern Trail Segment**

3 *Amenity Options*

[a] Parking Lot Formalization*
[b] Trailhead and Bridge Overlook*
[c] Riparian Enhancements*
[d] Add Overlooks
[e] Add Bike Racks
[f] Add benches
[g] Add Shade
[h] Stormwater Management
[i] ADA boat access

* pricing provided in chapter 4

- Existing Groundcover
- Existing Canopy Cover
- Existing Parking Lot
- Gravel Access
- Proposed Off-Road Trail
- Proposed Seeding Areas

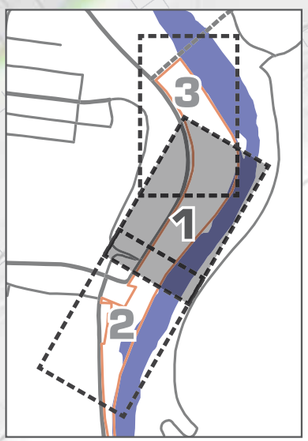
0 100 200 400 feet

option 1

On-Road Alternative

The On-Road Trail Alternative explores an on-road route through the County parking lot.

Key Map



- Existing Groundcover
- Existing Canopy Cover
- Existing Parking Lot
- Gravel Access
- Proposed Off-Road Trail
- Proposed Seeding Areas

0 *parking spaces lost*

Legend

1. Trail Connection to Northern Trail Segment
2. Enhanced Riparian Zone Plantings
3. Formalize Gravel Boat Access Parking
4. Boat Launch Raft Drop-off Zone
5. Existing Entrance and Gatehouse

The Jim Thorpe segment of the D&L Trail begins at the south end with a small off-road trail connection from the pedestrian bridge to the southern terminus of the existing parking lot. It is suggested that this segment be constructed as an asphalt surface given the sharp turn from the pedestrian bridge to the parking lot. A compacted aggregate surface would experience erosion from intensity of use and require additional maintenance costs and upkeep.

From the southern terminus of the parking lot to the boat launch access road, the trail shifts to an on-road route. The on-road route has pavement markings and “Bikes May Use Full Lane” signage. The suggested placement of these components is found on the above plan.

The asset of this alternative is its cost and quick implementation. Upon the completion of the pedestrian bridge in 2018, Carbon County can easily provide new striping and signage within the confines of the existing parking lot to route users

between the pedestrian bridge and the Northern Trail Segment. There is no loss of existing parking with this alternative.

The constraint of this alternative is its significant safety concerns. The potential of liability is greatly increased by routing biker, trail users, and visitors through an existing parking lot cartway. Vehicles will be backing in and out of parking spaces with low visibility.

Another constraint of this alternative is its lack of amenity and recreational appeal. Bringing residents and visitors of Jim Thorpe to the waterfront is one goal of this Master Plan. An on-road route fails to address this objective and does not contribute to the appeal and economic benefits an off-road trail has on year-round parking lot use, and tourism for the Borough.

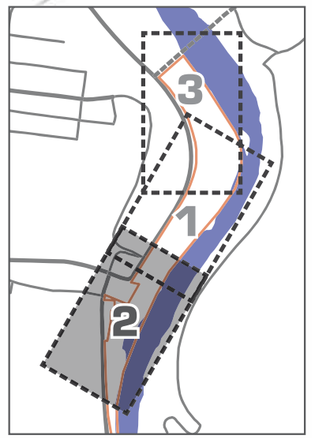
If this alternative is implemented as an initial phase, it is recommended that the County actively seek additional funding to implement improved alternatives in subsequent phases that provide safer and more desirable off-road routes.

Legend

1. Trail Connection to Northern Trail Segment
2. Enhanced Riparian Zone Plantings
3. Formalize Gravel Boat Access Parking
4. Boat Launch Raft Drop-off Zone
5. Existing Entrance and Gatehouse
6. Existing Railroad Crossing and New Crosswalk
7. Portal Plaza to Pedestrian Bridge
8. Future Pedestrian Bridge
9. Bike Parking

- Existing Groundcover
- Existing Canopy Cover
- Existing Parking Lot
- Gravel Access
- Proposed Off-Road Trail
- Proposed Seeding Areas

Key Map

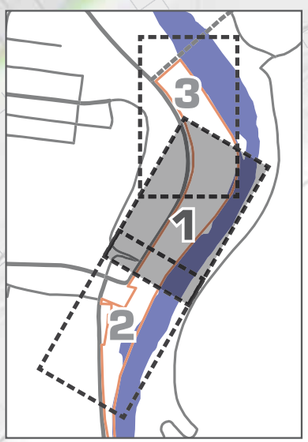


option 2

Hybrid Alternative

The Hybrid Trail Alignment explores a combination of off-road and on-road trails from the pedestrian bridge to the Northern Trail Segment.

Key Map



- Existing Groundcover
- Existing Canopy Cover
- Existing Parking Lot
- Gravel Access
- Proposed Off-Road Trail
- Proposed Seeding Areas
- Proposed Fence along Trail
  - split rail fence on river side
  - guiderail on parking lot side
- 5' wide break in guiderail

0 *parking spaces lost*

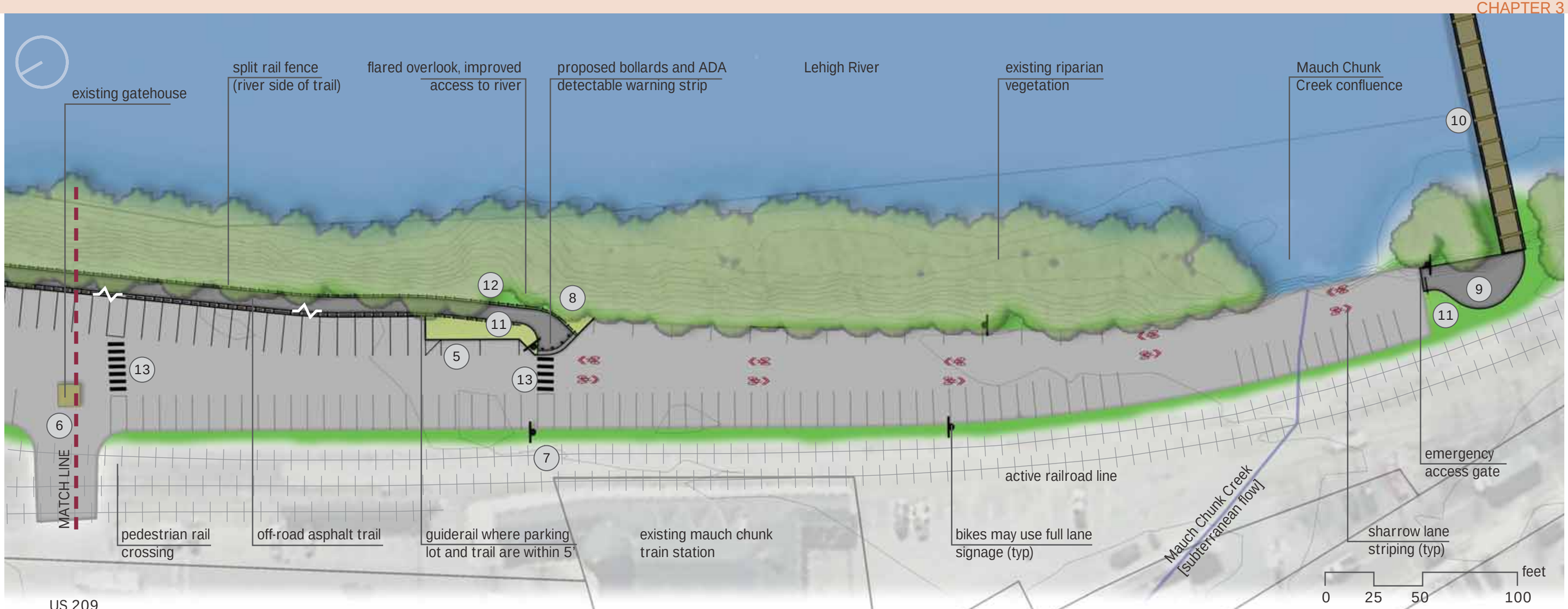
Legend

1. Trail Connection to Northern Trail Segment
2. Enhanced Riparian Zone Plantings
3. Formalize Gravel Boat Access Parking
4. Boat Launch Raft Drop-off (no guiderail)
5. Stormwater BMP Rain Gardens
6. Existing Entrance and Gatehouse

This alternative begins with a small off-road trail connection from the pedestrian bridge and extends to the southern terminus of the parking lot. It is suggested that this segment be constructed as an asphalt surface.

From the southern terminus of the parking lot, the trail type changes to an on-road (sharrow) route. Signage and pavement markings must be installed in this section. Across from the existing pedestrian rail crossing at the Train Station, the route shifts to an off-road asphalt trail and extends north to the Northern Trail Segment. The Hybrid Alternative and Dedicated Trail Alternative (discussed later in this chapter) suggest the same 8' off-road asphalt trail alignment and width from this point north.

The major asset of this alternative is the net loss of zero parking spaces. This can be accomplished by shifting the existing parking and formalizing the parallel parking spaces. The proposed design also creates a preferred connection to Jim Thorpe at the Mauch Chunk Train Station. An existing pedestrian crossing can be improved at this location that lines



up with the proposed off-road trail location and then provides trail users and Jim Thorpe visitors with easy access to a recreational trail amenity. A river overlook is suggested at this location where riverbank topography allows.

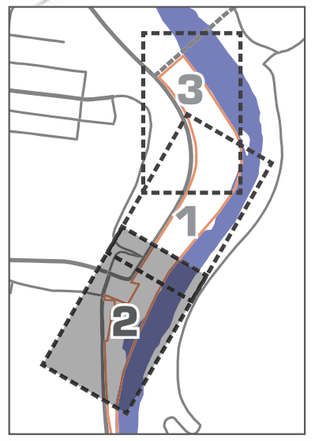
The 450' on-road trail segment still presents a safety liability, except that the southern terminus of the parking lot is commonly occupied by local residents and results in less visitor vehicular traffic. Parking lot users upon entering the lot should be directed north to park to limit the vehicular traffic at the southern end. Another constraint, but not fatal flaw of the alternative, is the 8' trail width. This is further explained in the Dedicated Trail Alignment Alternative.

Legend

1. Trail Connection to Northern Trail Segment
2. Enhanced Riparian Zone Plantings
3. Formalize Gravel Boat Access Parking
4. Boat Launch Raft Drop-off (no guiderail)
5. Stormwater BMP Rain Gardens
6. Existing Entrance and Gatehouse
7. Existing Railroad Crossing and New Crosswalk
8. Off-Road Trail Terminus
9. Portal Plaza to Pedestrian Bridge
10. Future Pedestrian Bridge
11. Bike Parking
12. Overlooks
13. Enhanced Pedestrian Crossing

- Existing Groundcover
- Existing Canopy Cover
- Existing Parking Lot
- Gravel Access
- Proposed Off-Road Trail
- Proposed Seeding Areas
- Proposed Fence along Trail
  - split rail fence on river side
  - guiderail on parking lot side
- 5' wide break in guiderail

Key Map

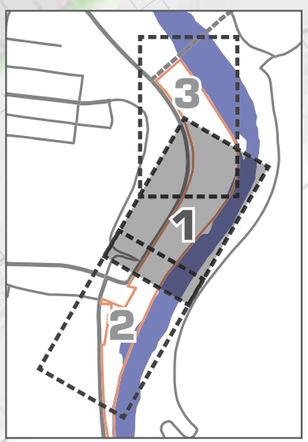


option 3

Dedicated Trail Alternative

The Dedicated Trail Alignment alternative explores a trail connection route that is completely off-road linking the pedestrian bridge to the boat launch access road. From here it would connect with the Northern Trail segment to create an entirely off-road route through the project area.

Key Map



- Existing Groundcover
- Existing Canopy Cover
- Existing Parking Lot
- Gravel Access
- Proposed Off-Road Trail
- Proposed Seeding Areas
- Proposed Fence along Trail
  - split rail fence on river side
  - guiderail on parking lot side
- 5' wide break in guiderail

Legend

1. Trail Connection to Northern Trail Segment
2. Enhanced Riparian Zone Plantings
3. Formalize Gravel Boat Access Parking
4. Boat Launch Raft Drop-off Zone
5. Stormwater BMP Rain Gardens
6. Existing Entrance and Gatehouse

31 *parking spaces lost*

This alternative, similar to the Hybrid Trail Alternative, explores an 8' wide multi-use trail. By implementing an 8' trail, approximately 31 parking spaces are lost. A 10'-wide trail would result in the loss of approximately 75 parking spaces.

Assets of this alternative include the creation of a safe route for trail users that is separated from vehicular traffic, a recreational amenity that is more appealing, and can in itself serve as a Jim Thorpe asset.

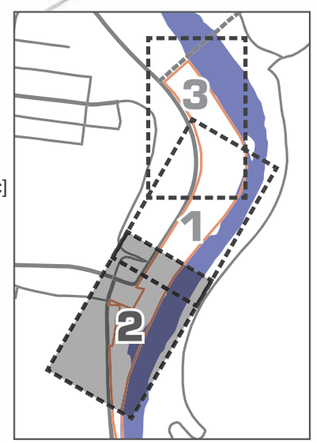
Constraints of this alternative include the limited width of the trail and the loss of parking. The 8' dimension provides sub-standard trail width that could be a constriction during heavy use periods, especially with increased bikers and pedestrians.

Legend

1. Trail Connection to Northern Trail Segment
2. Enhanced Riparian Zone Plantings
3. Formalize Gravel Boat Access Parking
4. Boat Launch Raft Drop-off Zone
5. Stormwater BMP Rain Gardens
6. Existing Entrance and Gatehouse
7. Existing Railroad Crossing and New Crosswalk
8. Gravel Access Road for Maintenance
9. Meadow Plantings at Demolished Asphalt
10. Portal Plaza to Pedestrian Bridge
11. Future Pedestrian Bridge
12. Bike Parking
13. Overlooks
14. Enhanced Pedestrian Crossing
15. Trail User Amenity Area [bike racks, benches, shade, etc]

- Existing Groundcover
- Existing Canopy Cover
- Existing Parking Lot
- Gravel Access
- Proposed Off-Road Trail
- Proposed Seeding Areas
- Proposed Fence along Trail
  - split rail fence on river side
  - guiderail on parking lot side
- 5' wide break in guiderail

Key Map



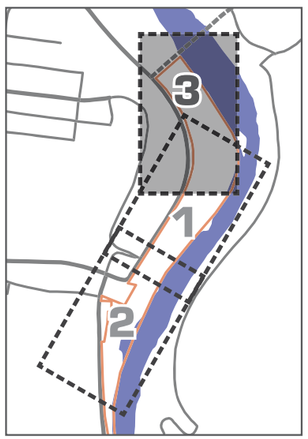
Northern Trail Segment

The Northern Trail Segment is a proposed off-road trail extending from the boat launch access road, north to the terminus of the Lehigh Gorge Trail. It is suggested that the Northern Trail Segment be constructed concurrent with any of the aforementioned design alternatives. This will complete the D&L Trail connection and close the last remaining trail gap in Carbon County.

This trail segment would be constructed as an off-road compacted aggregate trail at 10' wide, to match the existing Lehigh Gorge segment of the D&L Trail. The alignment of the trail should be located close to the Lehigh River embankment to allow for more parking opportunities adjacent to the trail.

At the time of this MSDP, the old Route 903 bridge was being demolished. Areas of the parking lot just south of the old bridge were being used for demolition staging. As demolition is completed, it is suggested that the County be mindful of a future trail alignment when delineating the parking lot.

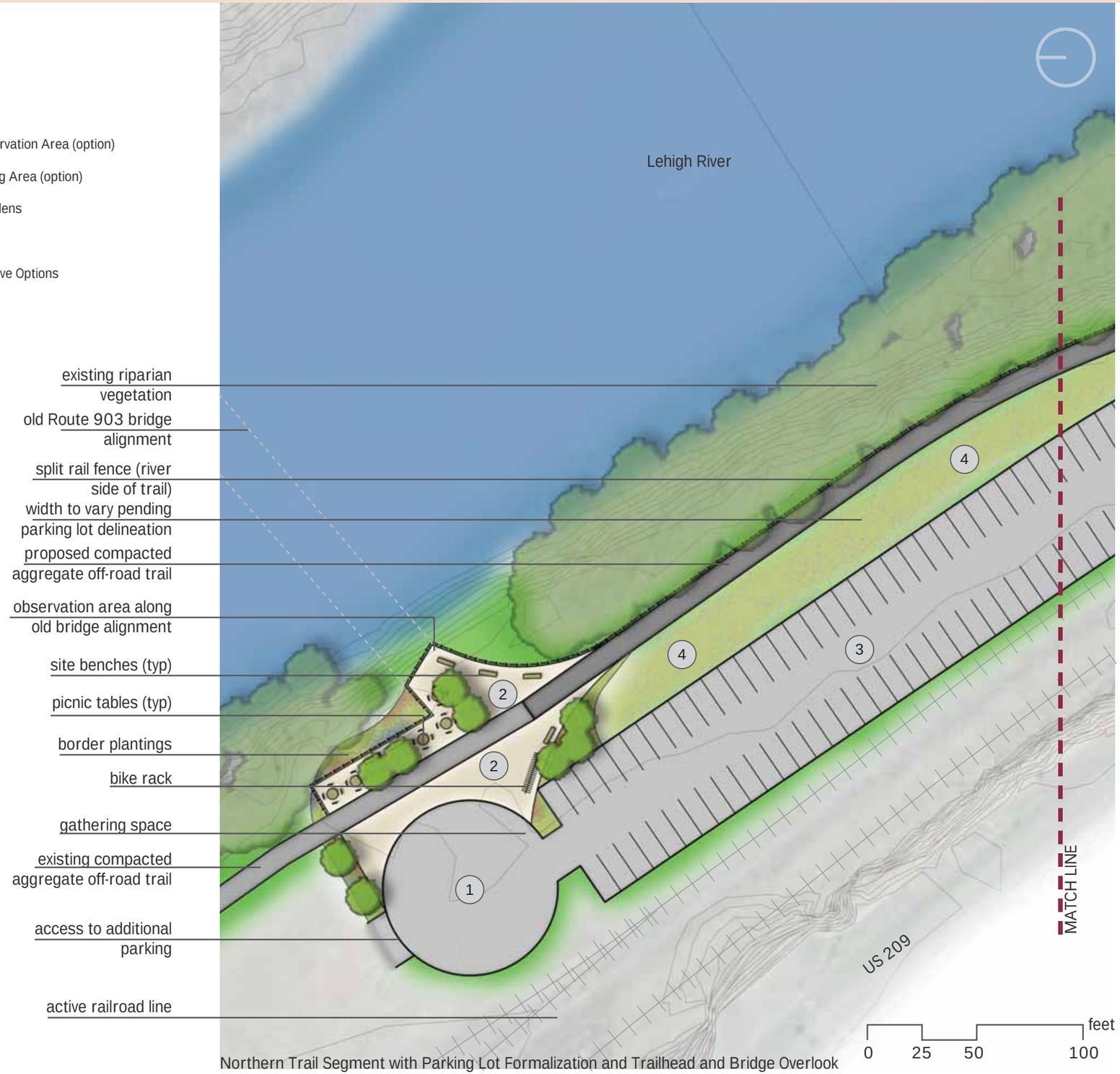
Key Map



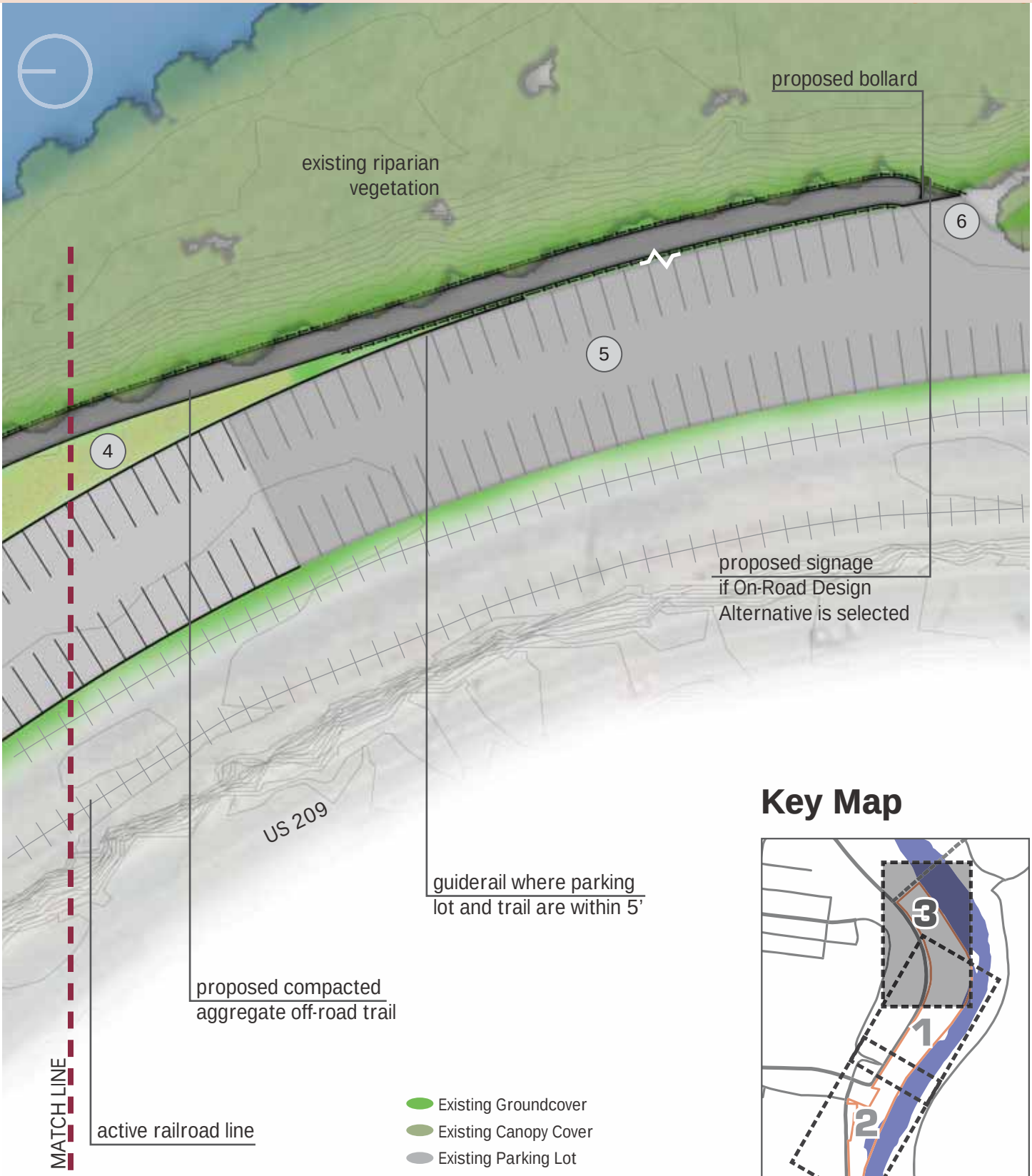
This trail segment is common to all three aforementioned alternatives

Legend

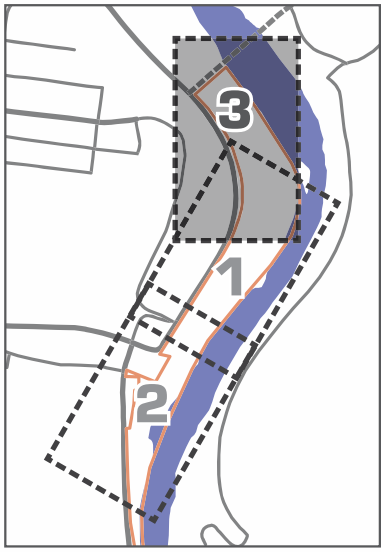
1. Turnaround (optional)
2. Trailhead Drop-off and Observation Area (option)
3. Formalized Northern Parking Area (option)
4. Stormwater BMP Rain Gardens
5. Existing Asphalt Parking Lot
6. Trail Connection to Alternative Options



Northern Trail Segment with Parking Lot Formalization and Trailhead and Bridge Overlook



Key Map



feet
0 25 50 100

Northern Trail Segment with Parking Lot Formalization and Trailhead and Bridge Overlook

Amenity Options

The following Amenity Options are in addition to the trail connection improvements that can provide additional site amenities to further enhance the functionality, aesthetics, and use of the County Parking lot.

Trailhead and Bridge Observation Plaza

The Trailhead and Bridge Observation Plaza provides a formalized access point to the D&L Trail. The location on the northern end of the proposed trail connection at the existing terminus of the Lehigh Gorge Trail. By situating a formalized trailhead farther north, trail users are more likely to park farther north. This may open up more parking opportunities for Jim Thorpe visitors closer to town.

The observation plaza is conceived as part of the trailhead. The demolition of the old Route 903 bridge opens a void in the riparian forest zone, providing views of the river and surrounding landscape. The observation plaza would be constructed within this void on the historic alignment of the old bridge. The plan to the right illustrates the design intent.

The Trailhead and Bridge Observation Plaza also include a drop-off zone and various site furnishings and amenities. Bike racks, benches, and picnic tables are all provided. Trees situated around and within the plaza provide shade for plaza users. The gardens around the perimeter of the plaza offer an aesthetic component and provide stormwater BMPs. They also serve to visually and physically separate the plaza user from the adjacent environs.

Parking Lot Formalization

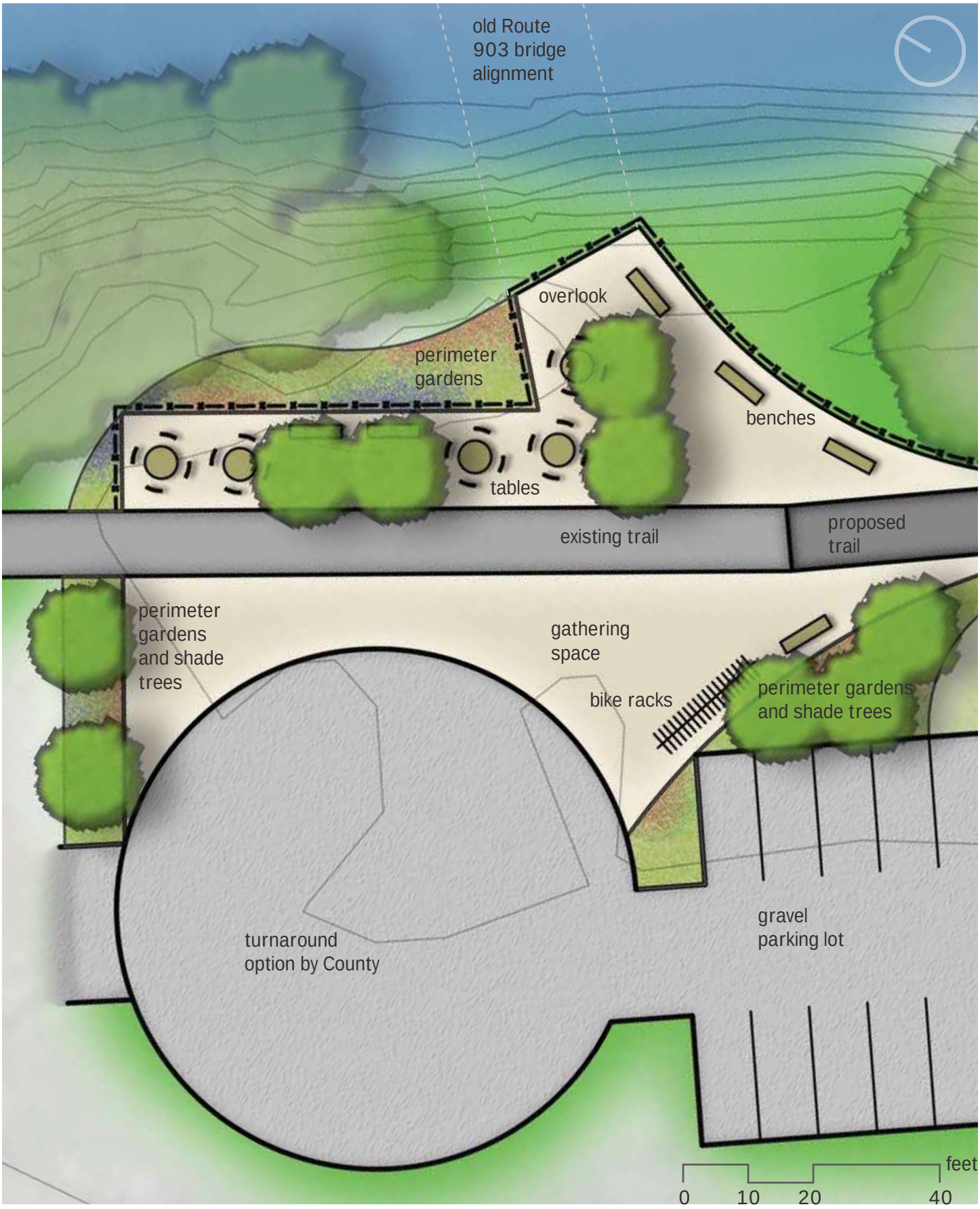
The formalization of the northern parking lot will create a designed parking area with standard parking stalls and drive aisles, and provide a more controlled parking environment that is easier to navigate. By also formalizing the parking lot, the County knows the exact number of parking spaces available and can avoid overpopulating the lot. It is understood that parts of the parking lot have already been delineated following the demolition of the old Route 903 bridge.

The parking lot formalization may also involve the addition of a turnaround at the end of the lot, adjacent to the trailhead and bridge observation area. The turnaround was shown at this location given that this is provided as the limit of this project scope. The County of Carbon owns additional land north of the shown turnaround. As the County so chooses, the parking lot formalization will be expanded farther north.

By situating the Northern Trail Segment adjacent the Lehigh River embankment, and formalizing the parking lot along the active railroad, excess open space is created between the trail and the parking lot. This space is not wide enough to accommodate an additional row of parking, but could be used to implement additional stormwater BMPs. The width of this space will vary pending the future delineation of the parking lot. Stormwater BMP concepts are discussed in the next section of this report.

Amenity Options

[a] Parking Lot Formalization
[b] Trailhead and Bridge Overlook
[c] Riparian Enhancements (next page)
[d] Add Overlooks
[e] Add Bike Racks
[f] Add benches
[g] Add Shade
[h] Stormwater Management (next page)
[i] ADA boat access (next page)

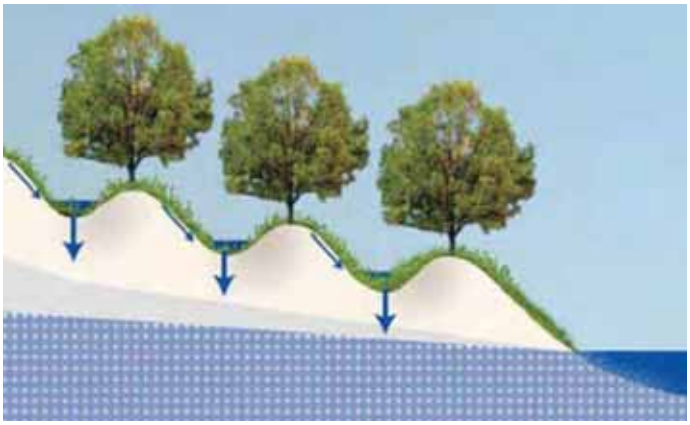

old Route
903 bridge
alignment
overlook
perimeter
gardens
benches
tables
existing trail
proposed
trail
perimeter
gardens
and shade
trees
gathering
space
bike racks
perimeter gardens
and shade trees
turnaround
option by County
gravel
parking lot
feet
0
10
20
40

Stormwater Management

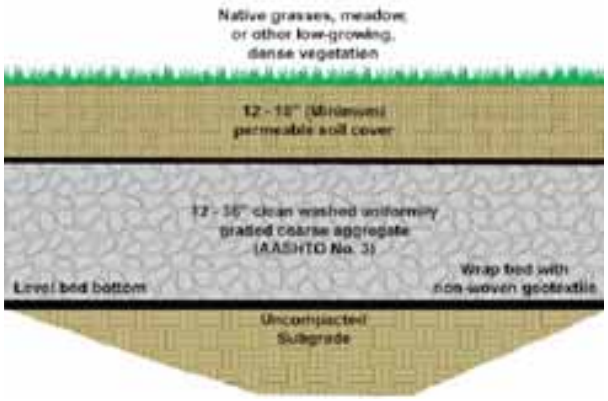
A stormwater management exemption may apply to the selected Suggested Improvement Plan and/or Amenity Options. However, this is dependent upon the existing impervious parking and additional areas that may not have been accounted for when initial stormwater management controls were implemented. This is also dependent upon the earth disturbance required to construct the suggested improvements. If earth disturbance is greater than 1 acre, then stormwater management controls will be required.

The following are examples of possible stormwater management BMPs and riparian buffer improvements that may be utilized:

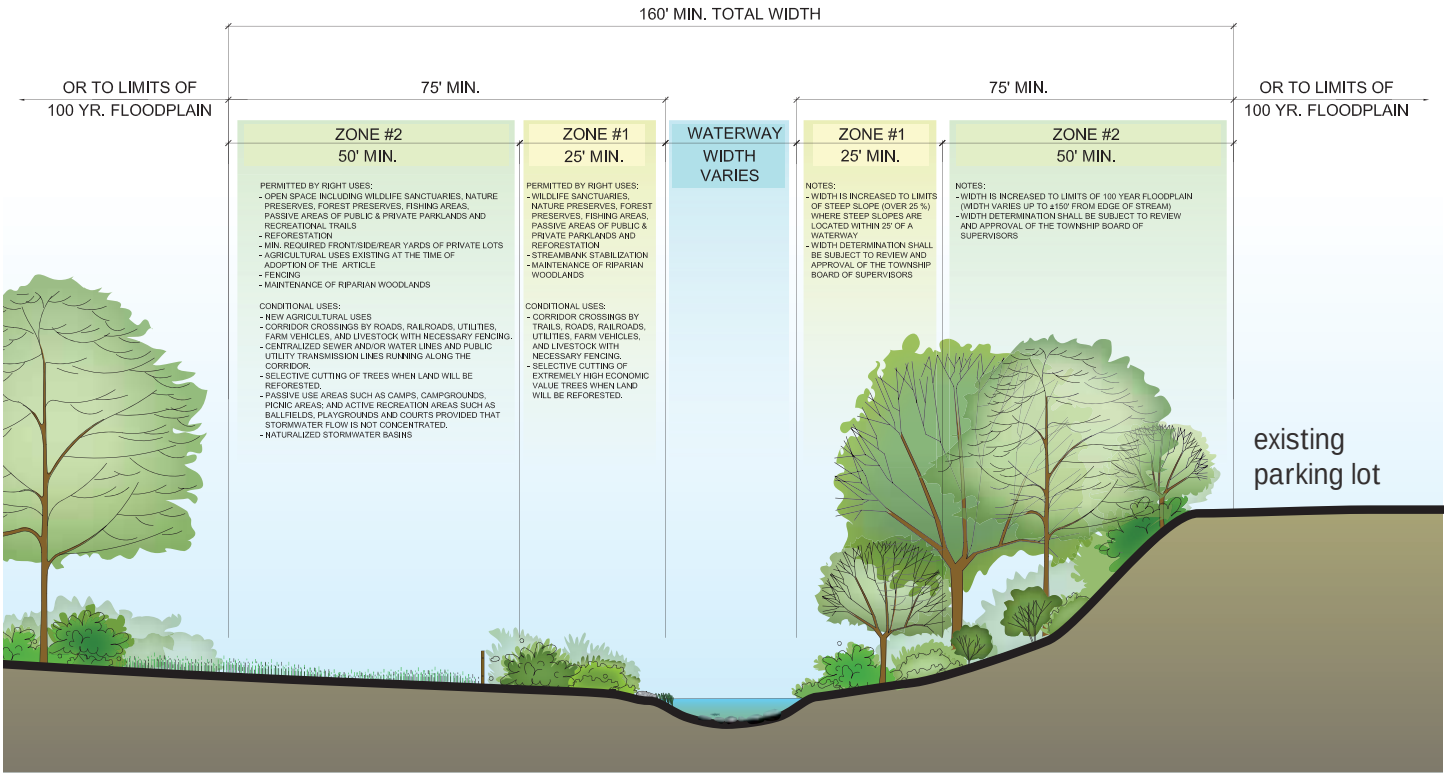
bio-retention swale example



Infiltration Berm



bio-retention swale profile



Recommended Riparian Buffer Plan (full size located in appendix)

ADA Accessibility

Improvements along the Jim Thorpe Trail Connection must be in compliance with current ADA accessibility standards. The gentle slopes within the parking lot provide ample opportunity to create an ADA compliant trail.

The most recent version of the standards are found at: http://www.ada.gov.

Additional guidelines have also been developed for outdoor recreation facilities. These can be found at: http://www.access-board.gov/guidelines-and-standards/recreation-facilities.

The addition of ADA compliant boat launch facilities is becoming more and more popular. These usually involve special access ramps that allow disabled persons to more easily enter and exit kayaks.

ADA boat launch facility example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CHAPTER 4

Implementation

Project Phasing

Implementation for the Jim Thorpe Trail Connection Master Site Development Plan can be broken down into phases and implemented as funding becomes available. County priorities resulted in the phasing plan as shown on the next page. The first two phases of development are necessary for the completion of the trail from the pedestrian bridge to the Lehigh Gorge section of the D&L Trail. Phase 1 has three alternatives (1.1, 1.2, and 1.3). Only one option needs to be implemented with phase 2 to complete the trail. Upgrades can be implemented in later phases as funding becomes available.

Phasing Cost Estimate	Phase 1.1 - On-Road Alternative	Phase 1.2 - Hybrid Trail Alternative	Phase 1.3 - Dedicated Trail Alternative	Phase 2 - Northern Trail Connection	Phase 3 - Northern Parking Lot	Phase 4 - Trailhead and Overlook	Phase 5 - Riparian Enhancements
Proposed Site Improvements	$ 18,880	$ 97,896	$ 123,349	$ 32,534	$ 45,243	$ 100,762	$ 34,766
Mobilization (3%)	$ 566	$ 2,937	$ 3,700	$ 976	$ 1,357	$ 3,023	$ 1,043
Construction Surveying (2%)	$ 378	$ 1,958	$ 2,467	$ 651	$ 905	$ 2,015	$ 695
Erosion and Sedimentation Control (5%)	$ 944	$ 4,895	$ 6,167	$ 1,627	$ 2,262	$ 5,038	$ 1,738
Construction Contingency (10%)	$ 1,888	$ 9,790	$ 12,335	$ 3,253	$ 4,524	$ 10,076	$ 3,477
Design and Enginneering (15%)	$ 2,832	$ 14,684	$ 18,502	$ 4,880	$ 6,786	$ 15,114	$ 5,215
Total Estimated Construction Costs	$ 25,488	$ 132,160	$ 166,521	$ 43,921	$ 61,078	$ 136,029	$ 46,934

Phase 1 Alternatives

Phase 1 + Phase 2 Completes the Trail

Amenities at Carbon County discretion

Total Estimated Implementation Costs (no Amenities)	
Phase 1.1 and 2 - On-Road Alternative	$ 69,409
Phase 1.2 and 2 - Hybrid Alternative	$ 176,081
Phase 1.3 and 2 - Dedicated Trail Alternative	$ 210,442

Cost Estimates of Capital Improvements

A detailed cost estimate of proposed capital improvements is provided in the appendix of this report. The figures above show a breakdown of costs per phase. Unit costs were established based on construction costs for similar projects and reflect prevailing wage rates that are required for public construction projects.

It is important to note that the three alternatives for phase 1 were priced independent of each other. If the County were to choose to implement a second alternative as a later phase, the additional cost of implementing that alternative will likely be less than shown above. For example, the on-road alternative (1.1) includes an bridge entry plaza, pavement markings, and signage. If the hybrid alternative (1.2) were implemented later as funding became available, the bridge entry plaza would already be constructed.

The three Amenity Options include: Formalizing the Northern Parking Lot (phase 3), Trailhead and Bridge Overlook (phase 4), and Riparian Improvements (phase 5). Phase 3 and 4 were discussed in Chapter 3. Riparian Improvements would include work done at the Boat Launch clearing adjacent to the Lehigh River to add wetland plantings and remove areas of gravel.

Potential Partners / Funding Sources

Pennsylvania Department of Conservation and Natural Resources (PA DCNR)

Community Conservation Partnership Program (C2P2)

The Community Recreation and Conservation Program through the PA DCNR Community Conservation Partnership Program (C2P2) provides funding for recreation, park, trail and conservation projects. These include planning for feasibility studies, trail studies, conservation plans, master site development plans, and comprehensive recreation park and open space and greenway plans. In addition to planning efforts, the program provides funding for land acquisition for active or passive parks, trails and conservation purposes, and design, construction and rehabilitation of parks, trails, and recreation facilities. Most of these projects require a 50% match, which can include a combination of non-DCNR cash and/or non-cash values.

Recreational Trails Program (RTP)

The Pennsylvania Recreational Trails Program is also through the C2P2 Program, and awards grants to federal and state agencies, local governments, non-profit and for-profit organizations to assist with the construction, renovation and maintenance of trails and related facilities for both motorized and non-motorized recreational trail use, the purchase or lease of equipment for trail maintenance and construction and the development of educational materials and programs. These grants require a minimum 20% match, which can include a combination of cash and/or non-cash values.

Grant applications for the C2P2 program are accepted annually—usually in April. More information can be found at: http://www.dcnr.state.pa.us/brc/grants/indexgrantsinstruct.aspx.

Department of Community and Economic Development (DCED)

Commonwealth Financing Agency (CFA) - Greenways, Trails and Recreation Program (GTRP)

The Greenways, Trails, and Recreation Program (GTRP) provides funding for: public park and recreation area projects, greenway and trail projects, and river or creek conservation projects. The program requires a 15% local cash match of the total project cost and DCED share must not exceed $250,000.

More information can be found at: http://www.newpa.com/programs/greenways-trails-and-recreation-program-gtrp/.

Local Share Account (LSA) - Monroe County

The Local Share Account for Monroe County is administed by PA DCED as per the Gaming Act (Act 71). LSA funds can be used for economic development, community development and public interest projects in Monroe County and some adjacent counties including Carbon County.

Applications are due between the beginning of July and the end of September of each year.

More information can be found at: http://dced.pa.gov/programs/local-share-account-lsa-monroe-county/#.WGU-mFMrJpg.

Department of Community and Economic Development (DCED)

Commonwealth Financing Agency (CFA) – Multimodal Transportation Fund

The Multimodal Transportation Fund, administered by PA DCED, provides grants to encourage economic development and ensure that a safe and reliable system of transportation is available to the residents of the Commonwealth. 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. Grants are available for projects with a total cost of $100,000 or more and grants shall not exceed $3,000,000 for any project. For more information please visit http://www.newpa.com/find-and-apply-for-funding/funding-and-program-finder/multimodal-transportation-fund

PennDOT Multimodal Fund

PennDOT's multimodal program seeks to improve freight and passenger mobility options, maximize benefits of capital investment in all modes of transportation, promote safety on all modes of transportation, use transportation improvements to spur economic development, and improve the effectiveness and efficiency of the transportation network. Projects eligible for funding include:

- projects related to streetscape, sidewalk enhancement, pedestrian safety
- transit oriented development projects
- projects related to connectivity improvements
- projects that coordinate local land use with transportation assets to enhance existing communities

The PennDOT Multimodal fund is separate from the Multimodal Transportation Fund administered by the Pennsylvania DCED. A local match of at least 30% of the non-federal project costs is required. Upcoming deadlines and more information on the program can be found at: http://www.penndot.gov/ProjectAndPrograms/MultimodalProgram/Pages/default.aspx

The PennDOT Multimodal fund is separate from the Multimodal Transportation Fund administered by the Pennsylvania DCED.

Transportation Alternatives Program (TAP)

The Transportation Alternatives Program (TAP) is a Federal Highway Administration (FHWA) fund set-aside under the Surface Transportation Program (STP) for community-based "non-traditional" transportation and transit projects designed to strengthen the cultural, aesthetic, and environmental aspects of the nation's intermodal transportation system. The Transportation Enhancements (TE) funding category, which has historically funded many pedestrian and bicycle supportive projects such as streetscape improvements, was originally established by Congress in 1991 under the ISTEA transportation authorization legislation, and was most recently affirmed as TAP under the Moving Ahead for Progress in the 21st Century Act (MAP-21).

The program seeks to provide funding for projects such as construction, planning, and design of on-road and off-road trail facilities for pedestrians, bicyclists, and other non-motorized forms of transportation. Non-motorized forms of transportation include sidewalks, bicycle infrastructure, pedestrian and bicycle signals, traffic calming techniques, lighting and other safety-related infrastructure, and transportation projects to achieve compliance with the Americans with

Disabilities Act of 1990. For more information on the PA Transportation Alternative Program, visit the DVRPC website at http://www.dvrpc.org/TA/

PennVEST (Pennsylvania Infrastructure Investment Authority)

PennVEST offers both grants and low interest loans for projects that help to manage stormwater and improve water quality. Several of the proposed recommendations will be of interest to PennVEST since they include stormwater BMPs.

More information can be found at: http://www.pennvest.pa.gov/Pages/default.aspx#.Vcux3WfbJ9A

Environmental Education

The Pennsylvania Environmental Education Grants Program awards funding to schools, nonprofit groups and county conservation districts to develop new or expanded current environmental education programming. The funds are administered through the Pennsylvania Department of Environmental Protection for projects ranging from creative, hands-on lessons for students and teacher training programs to ecological education for community residents. Educational Resources, including exhibits, educational signage, and demonstration projects, also qualify for funding. Grant applications cannot exceed $3,000 and require no match, however it is recommended. Applications are due in December and awarded in April.

Private Foundations

There may be regional corporations and foundations that support public works such as trail development. Competition for these funds is usually brisk, but opportunities should be researched.

Foundations and institutions represent another potential source of funding for education-related site improvements and programming. Grants are available to support student field trips, provide teacher training in science, and provide other educational opportunities. Education tied to research can increase the pool of potential funds. The science community and research institutions are the logical starting points for solicitation foundation funds.


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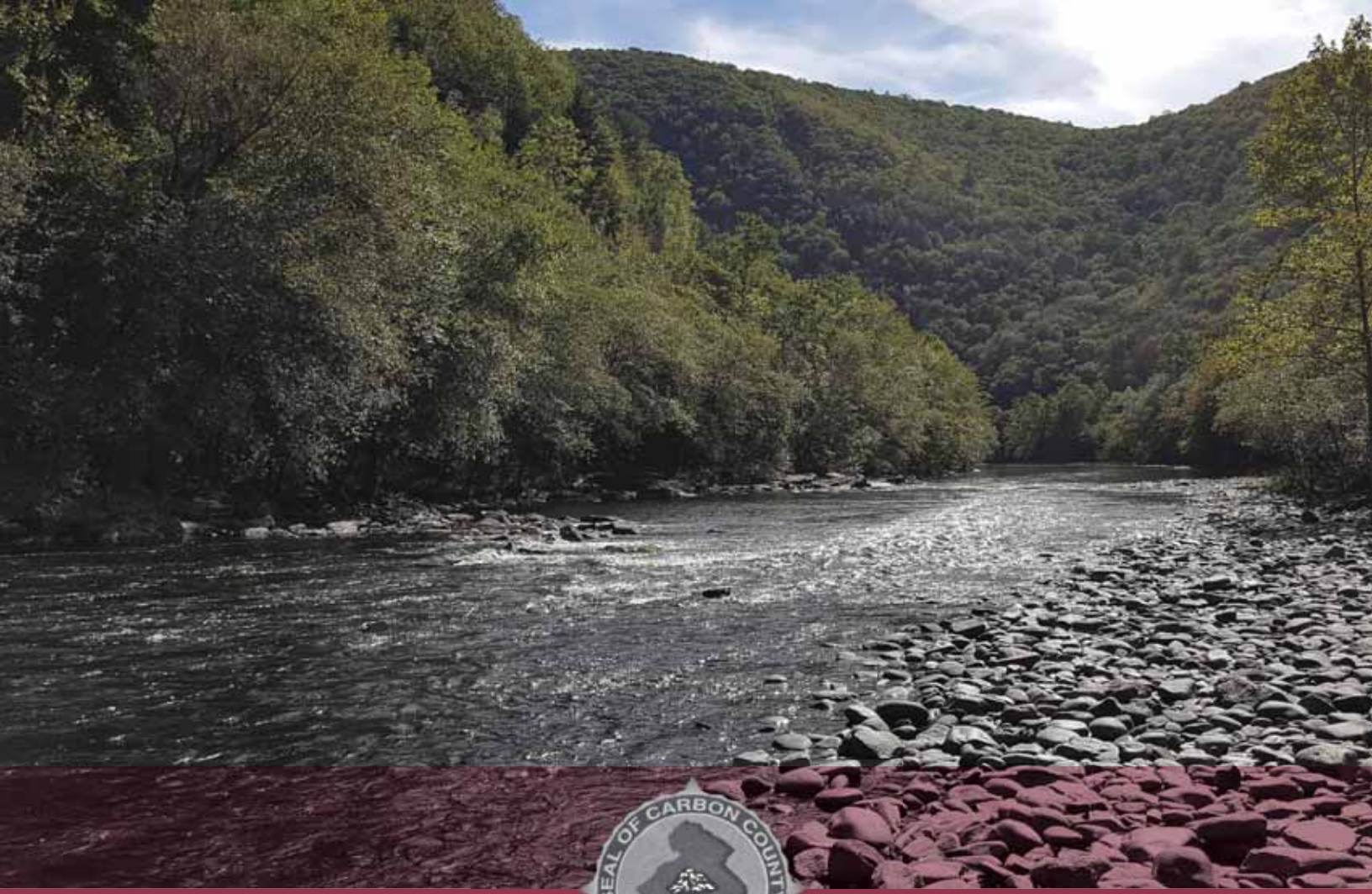
Appendix

Appendix provided as a separate file

(CD to be provided with final report)



SIMONE COLLINS LANDSCAPE ARCHITECTURE

HanoverEngineering

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