



# Randolph Woods Nature Preserve

## MASTER SITE PLAN

**Public Meeting 4 – September 9, 2020**

# Meeting Agenda

- **Introductions**
- **Project Schedule**
- **Draft Plan Comments**
- **Final Plan**
- **Proposed Improvements**
- **Implementation**
- **Next Steps**
- **Discussion**



## MASTER PLAN VISION STATEMENT

**“The Randolph Woods Nature Preserve aspires to be a vital part of Malvern’s park system, provide nature based passive recreation and community activity, while promoting natural resource conservation, land stewardship, and related education.”**

# Project Team

## Simone Collins Landscape Architecture

- **Peter Simone, RLA, FASLA**
- **Sarah Leeper, RLA, ASLA**
- **Joe Wallace, ASLA**

## Comprehensive Land Services

- **Patrick Fasano, Forester**

## Applied Ecological Services

- **Michael McGraw, Wildlife Biologist**



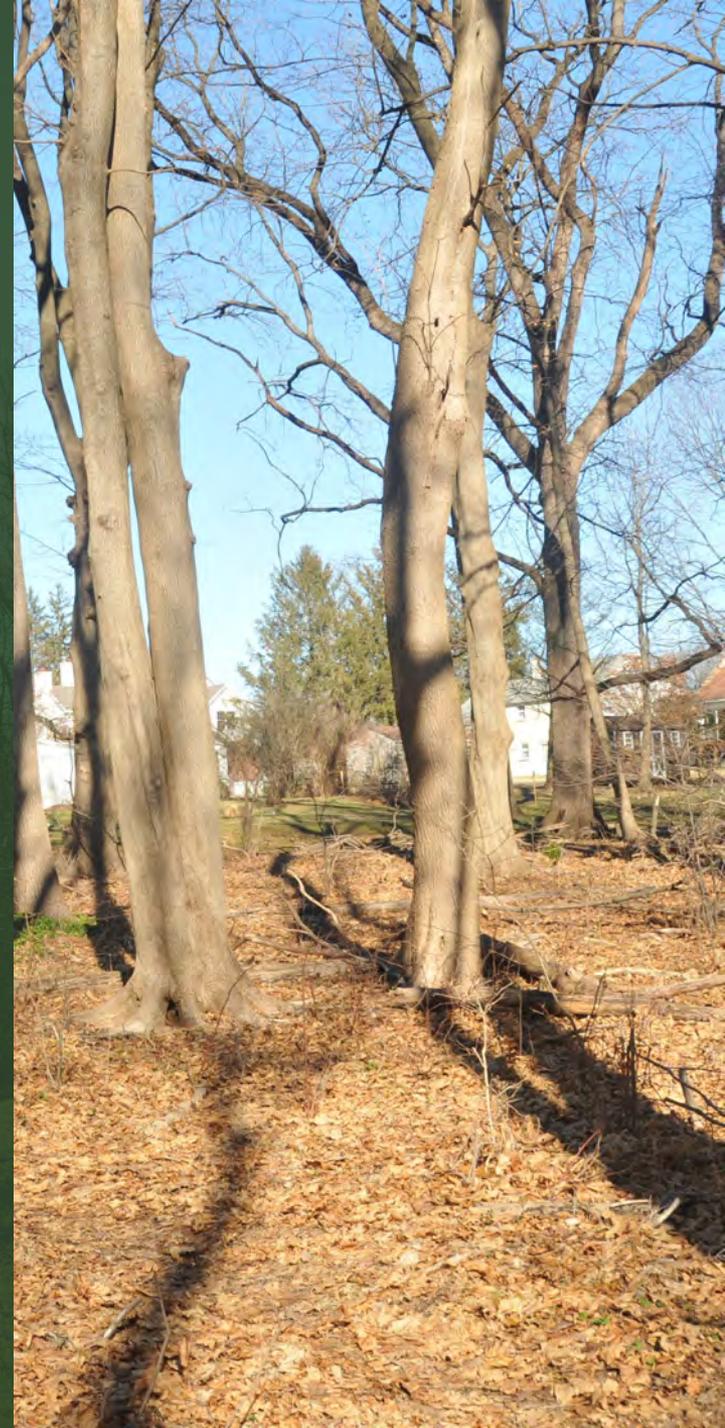
# Master Plan Committee

## Committee:

- Mark Niemiec, Chair
- Brian Walker, Vice-Chair
- Christopher Bashore, Secretary
- Helise Bichesfsky-Reilly, D.O.
- Joe Bones
- John Butow
- Brian Hamilton
- John Meisel
- Brendan Phillips
- Barbara Rutz
- Zoe Warner, Ph.D.

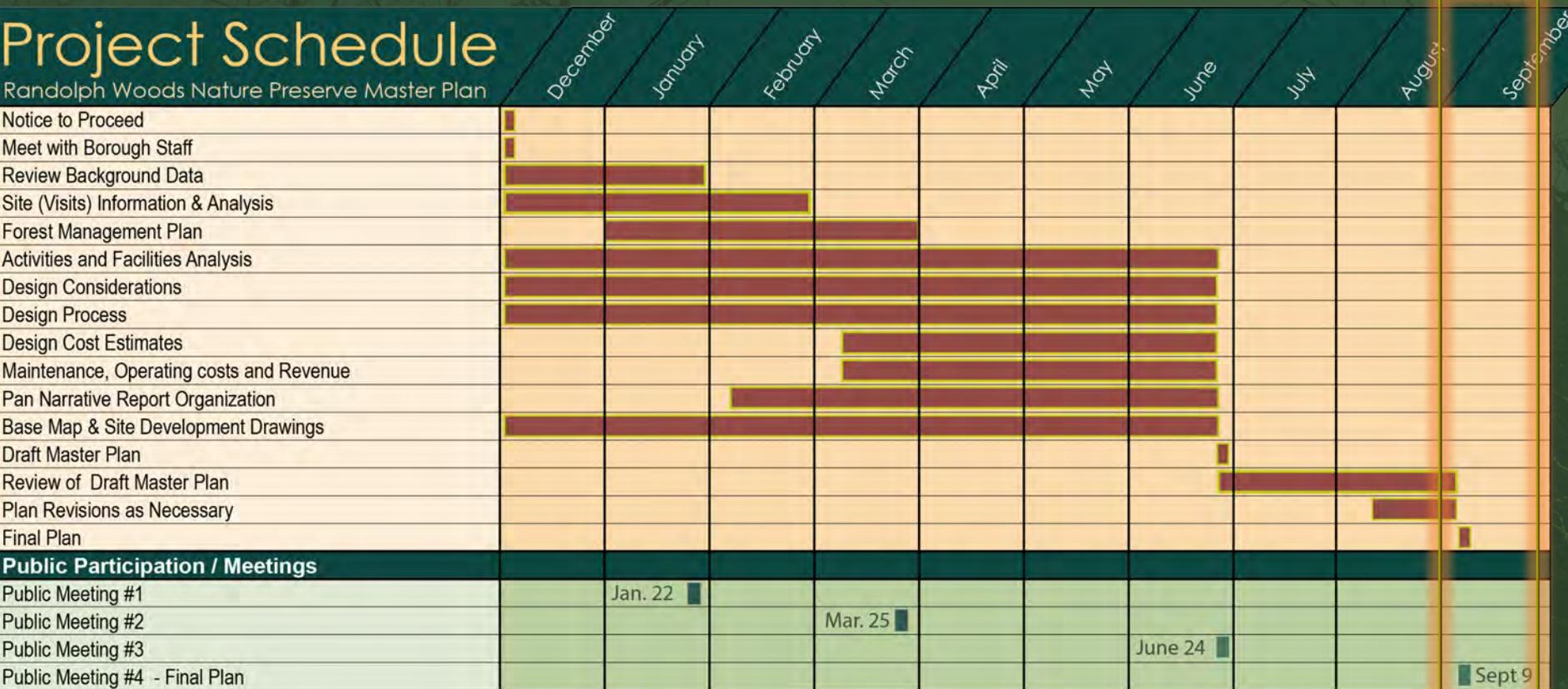
## Professional Guidance:

- Andrew Kirkpatrick, Willistown Conservation Trust, Director of Stewardship



# Project Schedule

Randolph Woods Nature Preserve Master Plan



We are at the fourth & final public meeting



The background is a dark green, semi-transparent overlay on a photograph of a wooded area. The trees are mostly bare, suggesting a late autumn or winter setting. In the lower right, a wooden picnic table is visible. The overall tone is muted and naturalistic.

# Draft Plan Comments

# Draft Report Comments

16 Total comments.

## Comments Breakdown:

- 1 comment to not include sidewalks on 1<sup>st</sup> Avenue
- 3 in support of the large pump track on 1<sup>st</sup> Avenue
- 1 in support of a combination of playground and pump track on 1<sup>st</sup> Avenue
- 1 in support of a playground with no pump track on 1<sup>st</sup> Avenue
- 1 to keep trails within Preserve for biking
- 1 comment concerned about potential pump track noise
- 2 comments noted there are few safe places for bicycles in Malvern
- 1 comment for additional funding sources
- 1 comment for improvements to mapping graphics
- 2 comments on grammatical errors in the draft report
- 1 comment on edits to the appendix
- 1 comment in support of a dog park in Randolph Woods



# Draft Report Comments

## Comments received over 2+ month public review period

- “As expressed by a large representation of our community, I would like to see the pump track built, and I prefer the 15,000 sq ft proposal.”
- “I am worried about the noise and traffic on something like a pump track on this lot. I would much prefer a playground on this plot.”
- “My vote is option C which would provide for a larger pump track.”
- “Malvern has many playgrounds and places to play and explore but no options for bikers.”
- “The large pump track would provide an exciting venue that is unique to the area that we would all use regularly and support however possible.”
- “Include ‘Chester County’s Preservation Partnership Grant Program’ & ‘PECO Green Region Open Space Program’ in available funding sources”



# Draft Report Comments

## Support for First Avenue Pump Track

- A petition in support of the “First Avenue Parcel Pump Track” was addressed to the Malvern Borough and Simone Collins
- The petition in support of the pump track contained **280 signatures**



The background of the slide is a dark green color with a faint, semi-transparent image of a wooded area. The trees are mostly bare, suggesting a late autumn or winter setting. In the lower right corner, a wooden picnic table is visible. The overall tone is muted and naturalistic.

# Final Plan

# RANDOLPH WOODS NATURE PRESERVE

## Master Site Plan



September 2020



## Study Purpose

*In 2015, a concerned resident brought to Borough Council attention the apparent decline in the health of the Randolph Woods Preserve's forest. The Borough Planning Commission did an initial evaluation of the property and recommended to the Borough Council that an ad hoc committee be formed to review the site issues and make recommendations to ensure the continued health of the Preserve. A copy of this report, titled Randolph Woods Ad Hoc Committee Final Report to Borough Council, can be found in the appendix of this report. This master plan study was a direct recommendation of the 2017 report.*



## Project Team

A project team composed of the Randolph Woods Ad Hoc Committee, Township Staff, Willistown Conservancy, and consultants was formed to guide the public through the master plan process. The Committee is diverse and offers varied expertise and experience. Committee insights informed and guided the team throughout the process. Andrew Kirkpatrick, Director of Stewardship at the Willistown Conservation Trust, provided professional guidance to the committee throughout the process. Willistown Borough staff, led by Borough Manager Christopher Bashore, helped to coordinate the process and provided input and comment on the plan.

The consultant team included many disciplines. Simone Collins Landscape Architecture (SC), a planning and design firm with expertise in parks, trails, greenways, and recreational facilities, served as the prime consultant. SC was responsible for overall facility design, public participation, and overall coordination with the Committee and project team.

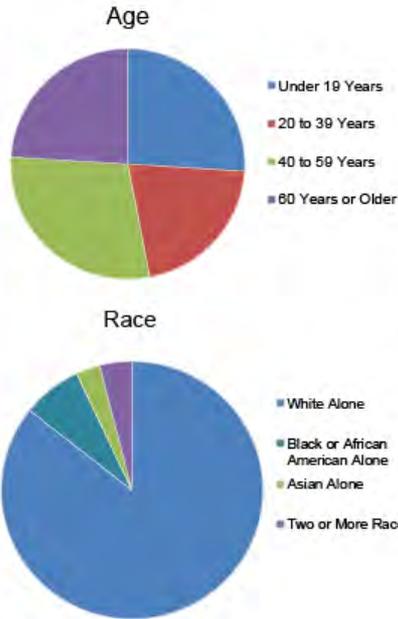
Applied Ecological Services, Inc (AES) is a leading ecological consulting firm dedicated to bringing the science of ecology to land-use decisions. AES's knowledge of ecological systems provides a solid foundation for creating balanced ecological designs and solutions that are sustainable, cost-effective, and enduring. AES plan components include baseline habitat and wildlife analysis, and stewardship / restoration recommendations.

Comprehensive Land Services (CLS) is a forestry and wildlife consulting firm with many years of experience in the Commonwealth. Sole proprietor / forester Patrick Pasano was responsible for the analysis of the existing park woodlands and the formulation of the Forest Management Plan.

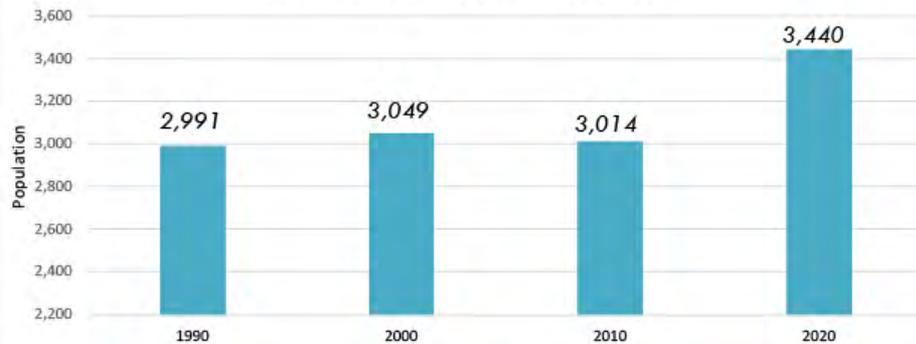
## Demographics

The 2010 US census estimated the Borough population at 2,998 inhabitants. Recent 2018 population estimates of 3,440 indicate a 14.9% growth in Borough residents. This growth in population has coincided with new development within the Borough, both in the housing and commercial sectors.

The Borough population has a median age of 42.5 and the population is spread fairly evenly across age groups with 23% under the age of 18, 9% from 18 to 24, 23% from 25 to 44, 27% from 45 to 64, and 19% who were 65 years of age or older. The Borough has a median household income of \$93,906, 1.4 times above the metropolitan area. The Borough residents are well educated with 95.7% having graduated high school - 63% hold a bachelor's degree or higher. The Borough race is predominantly white at 86.2% with 7.4% black or African American, 2.4% Asian, and 3.8% being two or more races.



Malvern Borough Population 1990-2020



## History

Like much of Chester County the Borough and the surrounding land was predominantly used for agriculture throughout the 1800's and into the early 1900's. Historical aerials of the site from 1932 depicts the area as pasture with few mature trees.

The sole site structure is a pump house built around 1890. This was purchased by the Borough from David Evans in

1945. The site's springs served as a water source for the Borough. Historical aerials from 1958 and 1971 depict the pump house and water tower. In 1996, the Borough water system was sold to Aqua. Today, the remnants of the water tower are gone however the pump house is still on site. A full explanation of the Borough water system can be found in the Ad Hoc Committee Dec 2017 report in the master plan report appendix.



## Existing Facilities & Structures

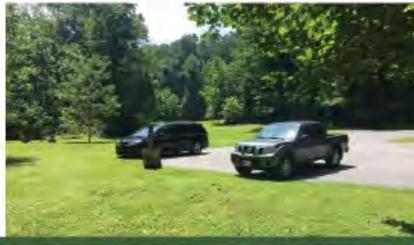
The only building in the Preserve is the historic Pump House. The structure presents opportunities for historic interpretation.



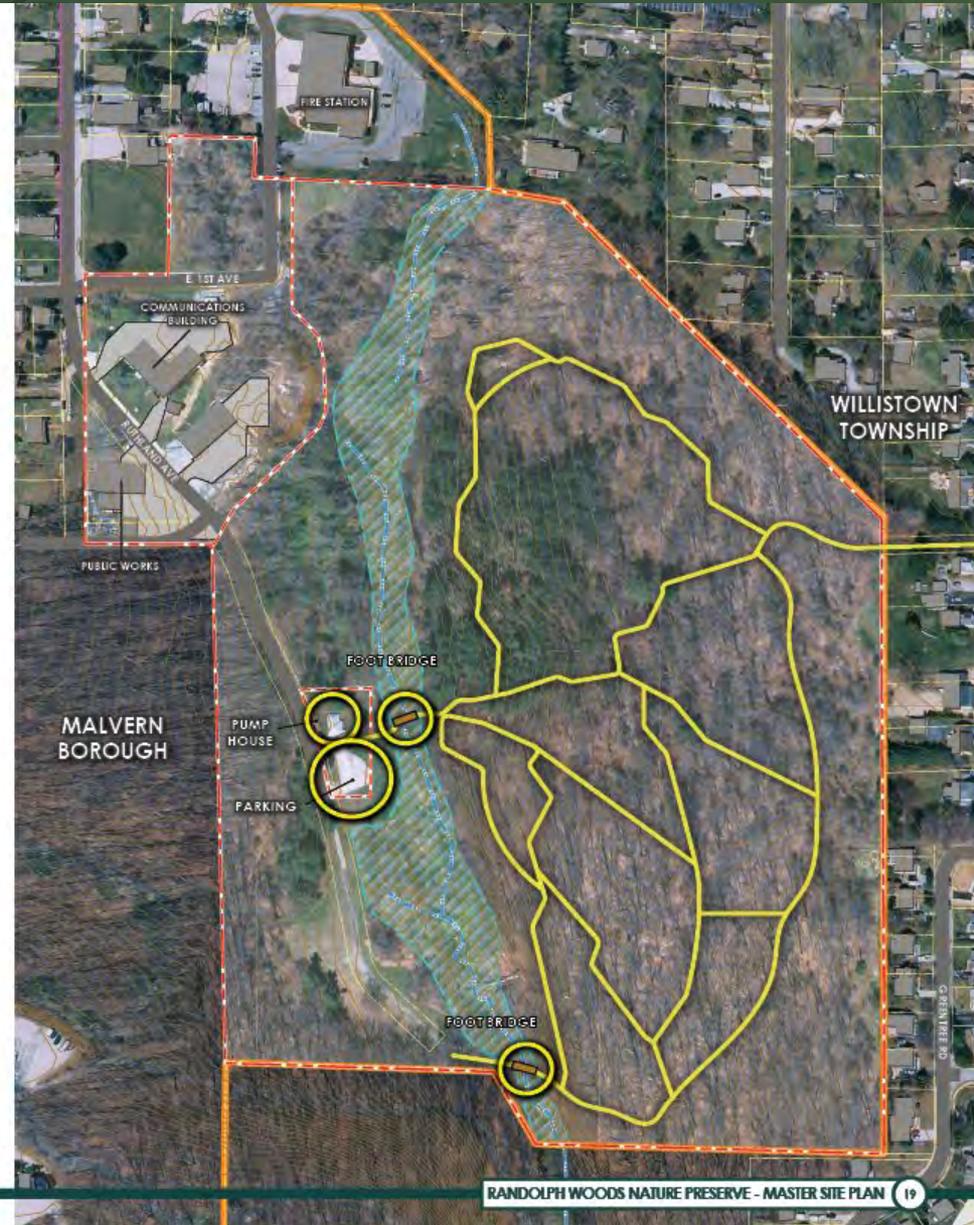
Two wooden foot bridges have been constructed across Ruth Run, the first central to the site at the Pump House and the second near the southern boundary. The bridges are sited low in the floodplain and their approaches are not all ADA accessible. Located near the southern bridge are remnants of a former crossing in the form of concrete abutments on both sides of the stream.



A small asphalt parking area approximately 76 feet by 55 feet in size can accommodate 8-12 cars. The parking area is located along the south facade of the Pump House and the paving extends to the concrete landing of the Pump House door. The paving is within 75 feet of the stream's edge and the vegetation between is mown lawn.



A network of earthen hiking trails traverses the woods in the eastern side of Ruth Run. There is a total of approximately 1.4-miles of trails in this area. Due to improper location in the landscape, some trails are showing signs of severe erosion. There are additional foot trails that enter the Preserve from adjoining private residential homes located along Duffryn Ave. Unofficial mountain bike trail elements have been constructed within the Preserve, without the permission of the Borough.

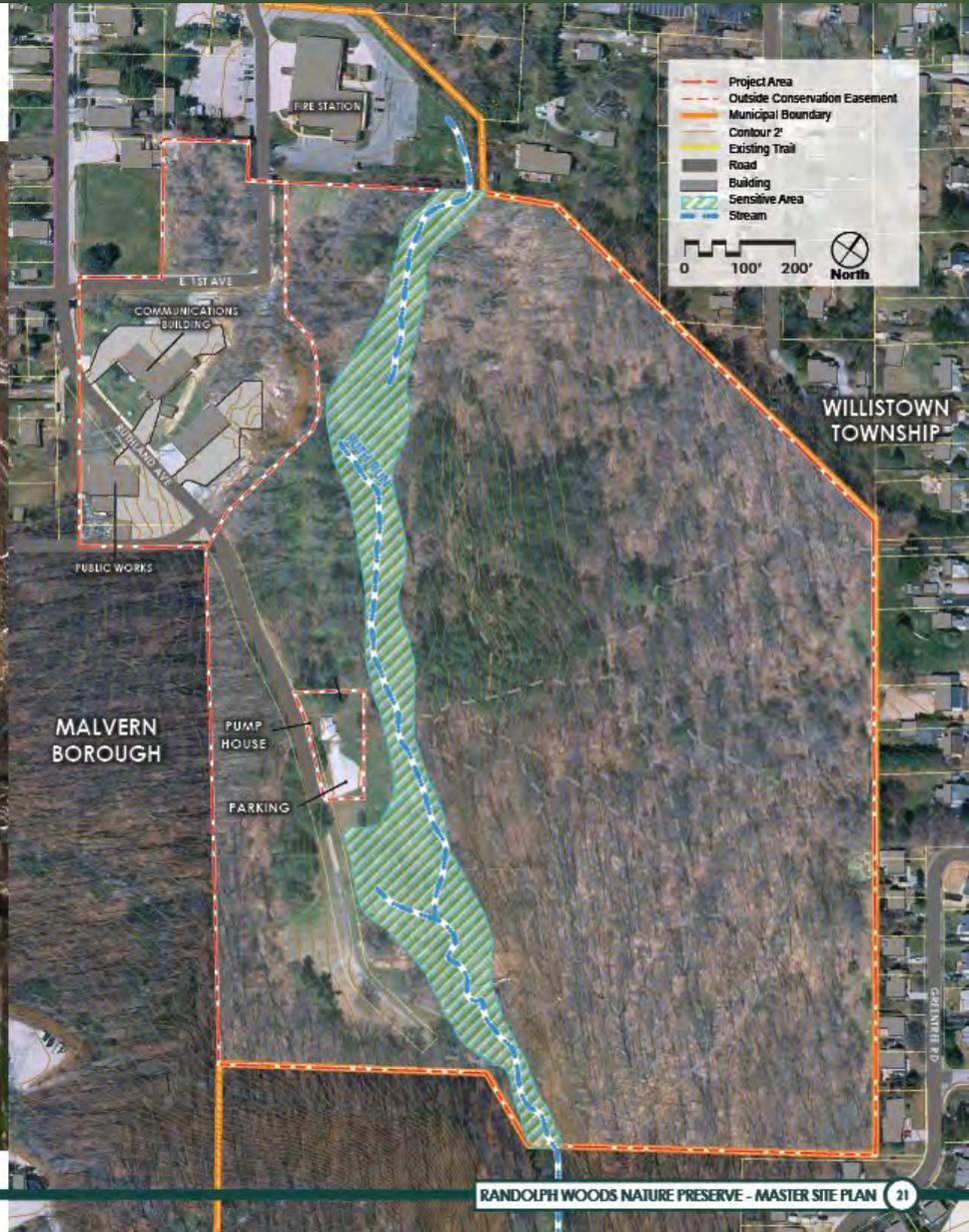
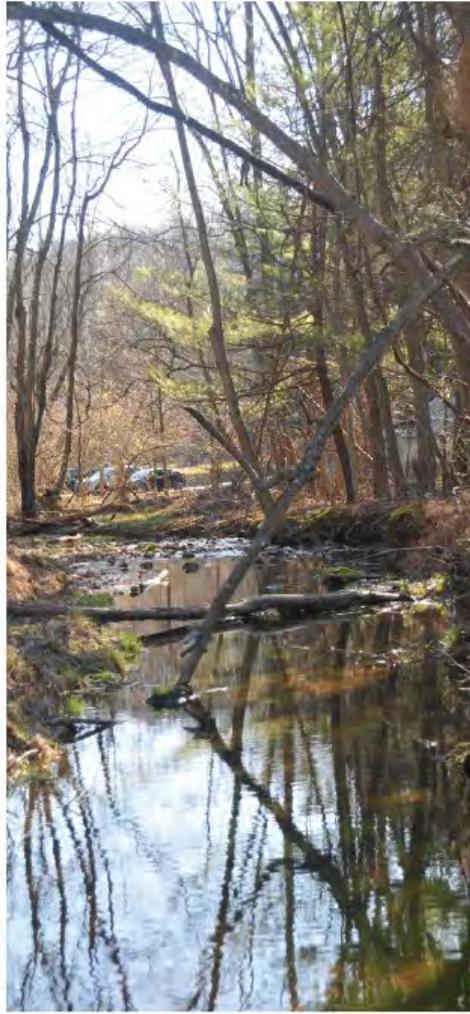


## Hydrology

Site Hydrology is dominated by area seeps and springs that form Ruth Run. Ruth Run runs north to south through the central part of the Preserve. Ruth Run is a tributary to the East Branch of Crum Creek, located about three-quarters of a mile south of the site. Crum Creek is classified by the Pennsylvania Department of Environmental Protection (PaDEP) as a High Quality (HQ) water way stream. Crum Creek is the largest drinking water source for area residents. Two reservoirs, the Lower Crum Reservoir and the 391-acre Springton Lake Reservoir, supply drinking water for 200,000 area residents.

The Crum Creek and its tributaries are classified as Impaired Streams by PaDEP, and as such their host municipalities are subject to the requirements of MS-4 (Municipal Separate Storm Sewer System) planning and permitting.

There are mapped wetlands within the site. However, additional existing wetland vegetation and habitat found around the stream headwaters and along the stream corridor indicate the presence of added site wetland.





**3**

**Recommendations**

## Preliminary Concept Plans

Two preliminary plans were presented for public feedback. Each plan included a picnic area and nature-based play area as well as an ADA compliant loop trail. Concept A limited intrusions into the proposed restored interior forest habitat. The concept A trail network was limited to a single loop trail and the Duffryn Trail. Concept A proposed 2 miles of trails and pedestrian facilities, while Concept B expanded upon the existing trail network and proposed 3.3 miles of trails and pedestrian facilities.

Alternatives for the "First Avenue Parcel" were presented and explored through four bubble diagrams (see below), each diagram depicting a different use for the current unused space. Option A depicted a 15,000 square foot playground. Option B depicted a 10,000 square foot pump track and 5,000 square foot playground. Option C depicted a 15,000 square foot pump track. Option D depicted a 15,000 square foot public storage yard. All options included a 50' privacy buffer.



## Public Consensus

The intent and goals for the Randolph Woods Preserve were established during the original master plan and solidified in 2001 when the Borough entered a Conservation Easement with Willistown Conservation Trust. During the master plan process, there was a strong public desire to incorporate mountain biking as a permitted activity within the Preserve. After much consideration of the easement's stipulations, the Master Plan Committee determined that it was their responsibility to work within the framework of the existing Randolph Woods Preserve Conservation Easement as developed by the Willistown Conservation Trust. However, in understanding the public desire for recreational amenities for community tweens and teens (an age that can be difficult to engage) - the committee determined that, although mountain biking would not be allowed within the Preserve, there is an opportunity for a pump track geared towards mountain biking; this would be recommended for the First Ave parcel (an unused area of the Preserve outside of the conservation easement).

Trail development priorities should focus on eliminating and rerouting trails with erosion issues. The future trail system should strike a balance between habitat and public access. A larger perimeter trail with smaller interior hiking loops (which accommodate varied user experiences and unique interpretive opportunities) is more desirable than a single perimeter loop trail.

## Site Stewardship

### Forestry Management Recommendations

Site forestry recommendations for the next 10 years are laid out in the Forestry Management Plan (see appendix). The plan focuses on controlling deer and invasive plants for the first 1-5 years. Years 5-10 focus on selective tree removal to create canopy openings paired with understory restoration and seedling plantings. The goal of the forest plan is to create a healthy and sustainable forest capable of self-regeneration.

The master plan recommends deer fencing around most of the forest in the Preserve. This deer fencing would encompass the forest on the eastern side of Ruth Run, but not cross the stream. Fence stream crossings often collect trash and debris during floods, which can lead to openings in the fence and permit deer into the enclosure area. The fence is a substantial capital improvement; steady growth of deer populations in Southeastern Pennsylvania over the past 30 years justify the investment as a long-term insurance policy for restoration efforts within the Preserve. Smaller, temporary deer enclosures will be required for restoration plantings if a perimeter deer fence is not installed.

### Ecological Restoration Improvements

Ecological restoration recommendations are laid out in the Randolph Woods Ecological Condition Assessment (see appendix). The assessment makes recommendations for each management unit.

#### Management Area 1: White Pine Plantation

Very limited removal of select pines is recommended to eliminate overcrowding and allow for the inclusion of some hardwoods into the forest canopy. Restoration understory plantings should focus on creating a blended ecotone understory between the white pine forest and adjacent forested wetland habitat. This focus on the transition between the two different habitats will lead to a diversity of habitat and animal species.

#### Management Area 2: Smaller Hardwoods / Open Woodland Forest

Select canopy thinning and removal of invasive tree stands is paired with pocket planting of native shrubs and warm season grasses. These savanna habitat pockets within the forest will improve nesting bird habitat.

#### Management Area 3: Mature Hardwood Forest

The selective removal of trees that crowd mature canopy trees is recommended. The rerouting of the southernmost trail should be a trail improvement priority. The implementation of interim measures such as the placement of water bars should be considered.

#### Management Area 4: Water Resource Protection

This area has been identified as the most sensitive habitat on site. Recommendations for invasive removal in this area are a priority. Additional BMPs should be implemented in areas that directly contribute to the headwater areas. This includes the conversion of lawn to meadow along First Ave; this area could be expanded via partnering with the adjacent fire house, adding their lawn to the meadow area. Installation of a vegetated swale/diversion berm in the eastern public works yard is recommended, as well as installation of a vegetative swale at the First Ave parcel.

There is an area of dense spruce planting that has eliminated forest floor planting, leading to rilling and erosion. The spruce should be removed, and a restoration planting of a successional meadow and hardwood tree saplings should be implemented.

Pipe inputs to this area should be properly dissipated and further exploration up watershed should be performed to determine if additional water quality BMPs can be implemented at the inlet source.





# Design Elements

## ADA Stone Dust Trail

A 5-foot wide compacted stone dust trail is proposed to provide an ADA-compliant trail option within the Preserve. The material provides a level and stable walkway while maintaining a rustic character. In key locations, the placement of boulders or logs along the edge can help prevent the migration of stone dust material. Benches should be located along the trail to allow users to stop and rest.

## Hiking Trail

Hiking trails are the least expensive type of trail to install; however, they limit the types and number of trail users. Compacted earthen surfaces are primarily used for hiking and are often used to navigate the site in environmentally sensitive areas. Hiking trails do not meet strict ADA requirements; however, ADA trail guidelines should be referenced when determining final trail alignments.

Hiking trails will be 3-5 feet wide and composed of compacted earthen surfaces. A series of hiking trails currently exists throughout the site; the plan recommends the removal and realignment of some of these trails to eliminate stormwater erosion issues. Additional new trails are proposed. Hiking trails in the Preserve will be limited to pedestrian use.

Final trail alignments should minimize impacts to slopes and limit erosion. Trail design should follow best management practices:

- Improved/proposed trails to follow a curvilinear route that matches the terrain. Trails should be designed so that water will flow across and not along the trail (which would lead to erosion).
- Outsloping or cross slope: An outsloped tread is one that is lower on the outside or downhill side of the trail than it is on the inside or bankside. Outsloping lets water sheet across the trail naturally. The tread should be outsloped at least 5 percent. For ADA compliant trails, maximum cross slope should be 2%.

- Grade reversals or water dips: These are short sections of trail that change from climbing to descending, and then return to climbing. This reversal shortens the water flow along a path and enhances trail drainage.
- Waterbars: A waterbar is a built rock, log, and/or earthen structure placed perpendicular to the trail. Waterbars will intercept water flows along a trail and divert them. Waterbars do require the most maintenance and upkeep compared to other trail design devices and should be implemented as a last resort to alleviate trail erosion.

## Sidewalks

Sidewalk design should conform to the Borough standard of a 4-foot wide brick and concrete surface. ADA curb cuts and crosswalks should be included. Though it is not required to include crosswalks at driveways, it is recommended that they be included at the two driveway crossings to define a clear pedestrian route through the Public Works area.

## Footbridges & Boardwalk

The two existing bridges are constrictive to stream hydrology, which leads to bank erosion. These bridge approaches are not within ADA accessible slopes. New bridges should have a clear deck width of 5 to 6 feet with railings and should be located high enough to allow for high storm flows to pass beneath without significant obstruction. Wood structures would be in keeping with the rustic design vocabulary of the Preserve. The new bridges will require a "general" permit from PADEP.

There are areas along the stream corridor that have adjoining wetlands or sensitive habitat. A boardwalk is proposed in these areas. The boardwalk should have a clear deck width of 5-feet with toe railing. Wood or recycled plastic would be appropriate.

The background of the slide is a dark green color with a faint, semi-transparent image of a wooded area. In the foreground, there is a dark green rounded rectangular banner containing the text. The background image shows several bare trees and a picnic table in the lower right corner.

# Proposed Improvements

# Forest Management Report

- Deer Management Priority
- Years 1-3 – Invasive Removal
- Years 3-10 Select Canopy Openings paired with Tree Plantings



## Existing Conditions

- |  |                                     |  |  |
|--|-------------------------------------|--|--|
|  | Contour 2'                          |  | Management Unit 1: White Pines   |
|  | Stream                              |  | Management Unit 2: Smaller Diameter Hardwoods / Open Woodland Areas                                      |
|  | Sensitive Area                      |  | Management Unit 3: Mature Hardwood (Poplar)  |
|  | Parcel Line                         |  | Management Unit 4: Water Resource Protection Area - Hydric Soils / Wetlands / Headwater / Stream Buffers |
|  | Bridge                              |  |  |
|  | Sidewalk                            |  |  |
|  | Road                                |  |  |
|  | Building                            |  |  |
|  | Areas Outside Conservation Easement |  |  |
|  | Municipal Boundary                  |  |  |
|  | Existing Trail                      |  |  |



# Overview

- Deer Fence & Gate Entries (3)
- Short Meadow / Mown Edge along Deer Fence & Residential Properties
- Stormwater BMP's



# Deer Fence

**Destruction of Preserve understory by deer (which prevents the regeneration of native species) is the single most negative influence on the health of the Randolph Woods Preserve Forest.**

**Fencing deer out of the Preserve is the first and most important step toward stopping this destruction and is a step toward the elimination of invasive species and the re-establishment of a healthy, balanced Preserve ecosystem.**

**An informational / educational program for adjacent residences and nearby neighbors should precede and accompany the installation of the exclusion fence**



**Tyler Arboretum deer fence**

# Forest Management Recommendations:

## Management Area 1: White Pine Plantation

Limited removal of select pines is recommended to eliminate overcrowding and allow for the inclusion of some hardwoods into the forest canopy.

## Management Area 2: Smaller Hardwoods / Open Woodland Forest

Select canopy thinning and removal of invasive tree stands is paired with pocket planting of native shrubs and warm season grasses. These savanna habitat pockets within the forest will improve nesting bird habitat.



# Forest Management Recommendations:

## Management Area 3: Mature Hardwood Forest

The selective removal of trees that crowd mature canopy trees is recommended. The rerouting of the southernmost trail should be a trail improvement priority. The implementation of interim measures such as the placement of water bars should be considered.

## Management Area 4: Water Resource Protection

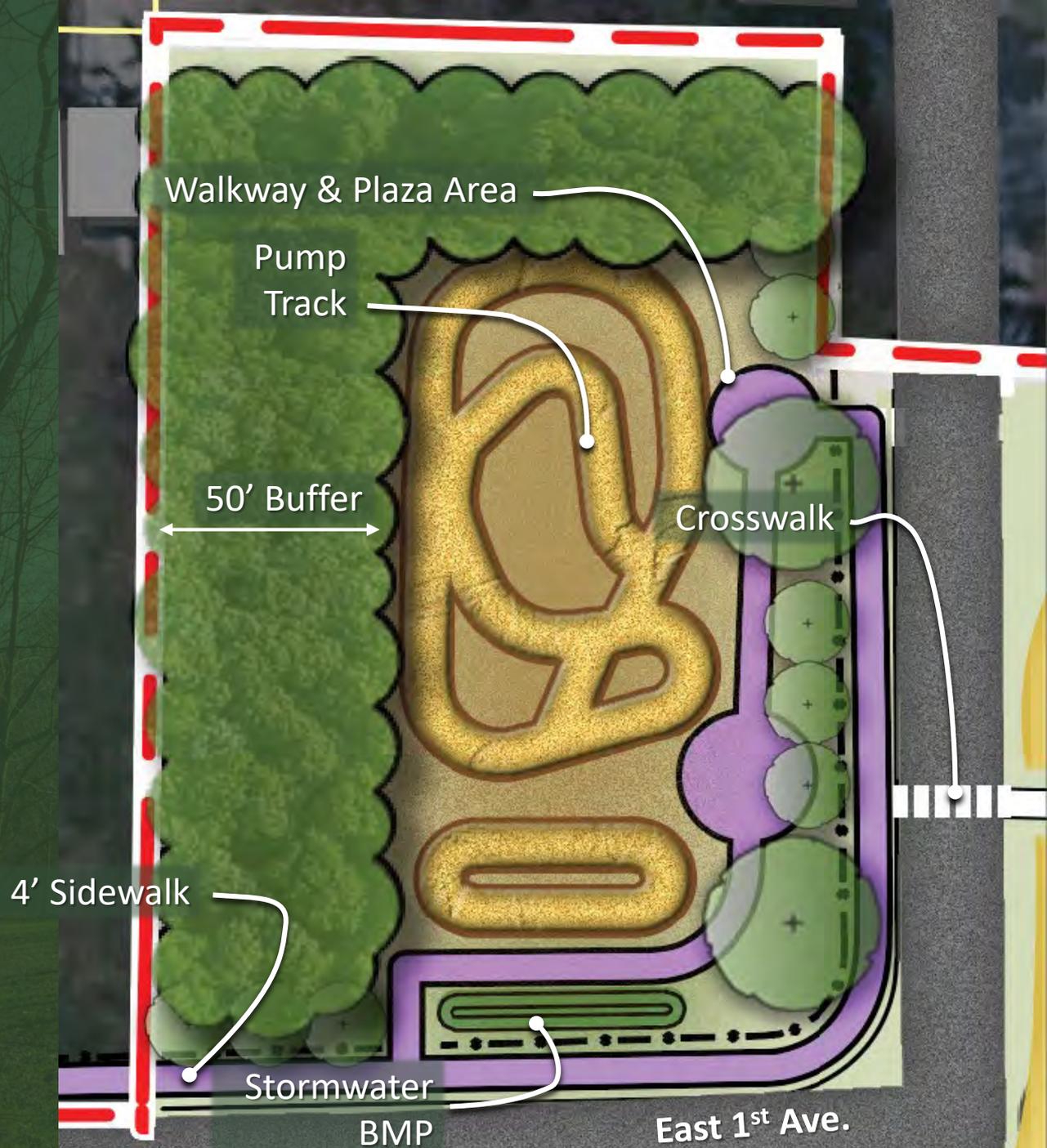
Invasive removal in this area are a priority. BMPs should be implemented in areas that directly contribute to the headwater areas.

Installation of a vegetated swale/diversion berm in the eastern public works yard is recommended, as well as installation of a vegetative swale at the First Ave parcel.



# First Avenue Pump Track

- Pump tracks are used by mountain bikers for training focused on developing upper body strength.
- First Avenue pump track provides safe & dedicated space for mountain bikers to recreate



# Pump Track

- Used by mountain bikers for training focused on developing upper body strength.
- Vary in size from neighborhood scale of 5,000 to 10,000 SF to regional scale of 10,000 - 20,000 SF



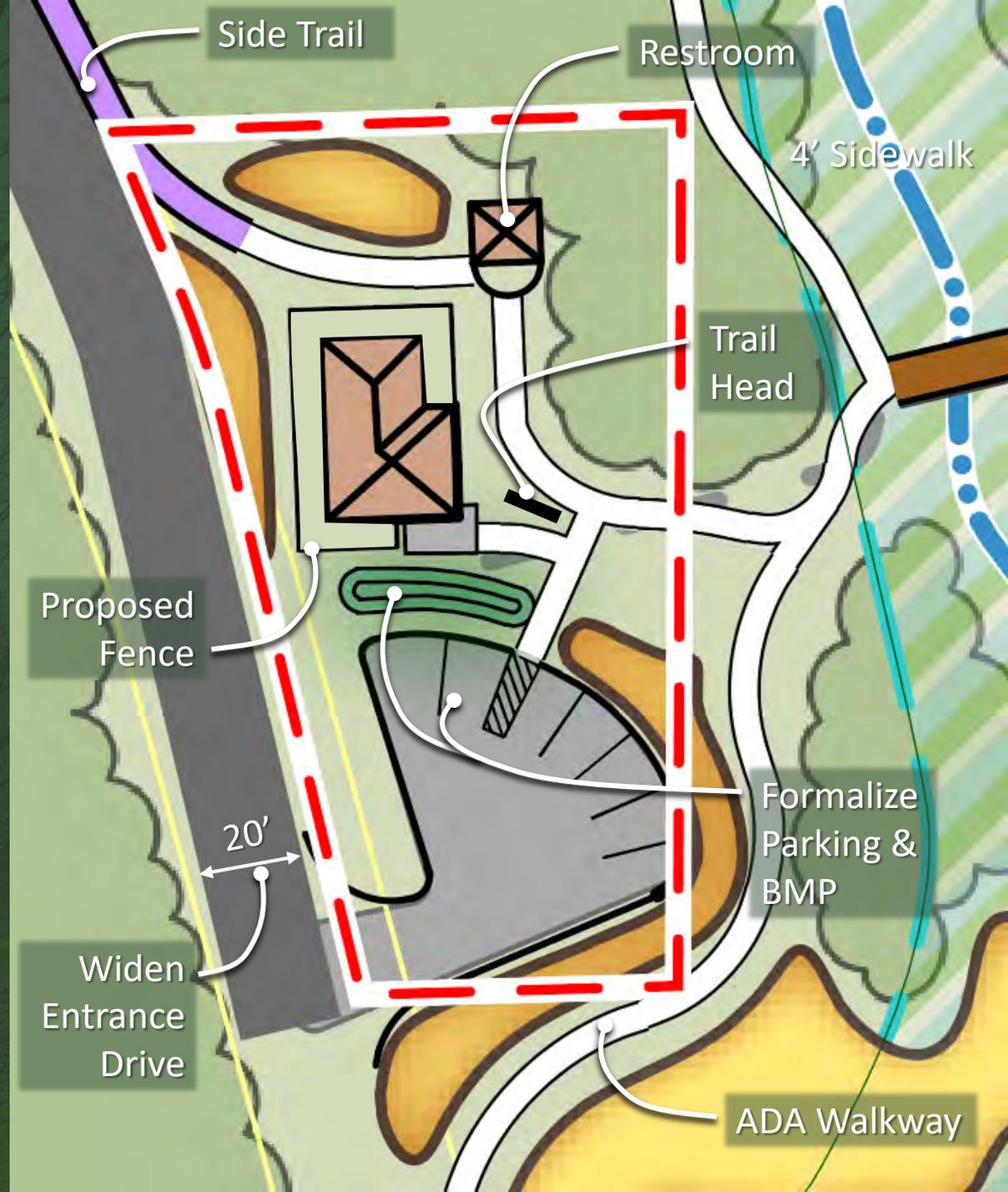
# Improved Entrance

- Preserve sign moved to corner of Ruthland & First Avenues for increased visibility
- Sidewalks provide connection to preserve
- Trees beautify & formalize preserve entrance
- Treat Stormwater from yard before entering woods



# Improved Parking Area

- Stand alone restroom
- ADA accessible stone dust pathways
- Formalize parking – 2 ADA with Van Unloading Access and 5 Regular Spaces
- Native meadow plantings
- Widen entry drive to 20'



# Options for the Pumphouse

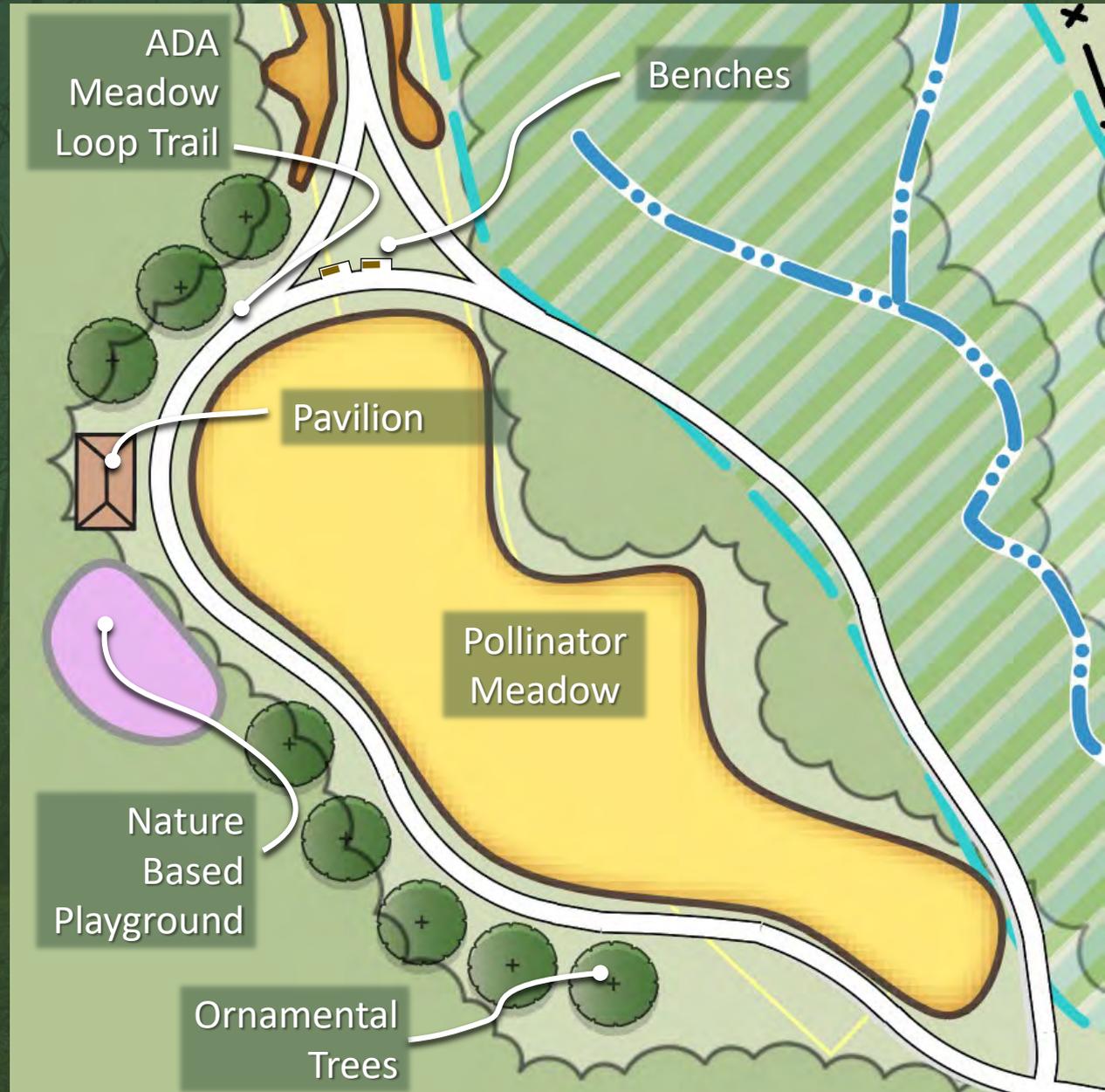
Not suitable for adaptive reuse for a bathroom. Recommend a separate bathroom be built. More economical and easier to maintain.

- 1. Renovate.** Renovate so that this is usable building. The structure is 1150 square feet. Redevelopment costs can be reasonable estimated at a minimum of \$350/SF. This results in a renovation cost of at least \$400,000 Can this be justified in context of the needs and costs to protect the forest and headwaters resources? Also, what are the uses of this building that would justify this cost?
- 2. Modify.** Partially demolish the walls, roof to remain to create an open air pavilion structure.
- 3. Interpretive Partial Demolition.** Demolish most of the structure and leave the foundation walls up to a height of about 3 feet. Interpret the historic use and spring that remains in the building. May or may not wish to add a new roof that over the foundation (but not attached to it). (Precedent of a similar use is Franklin Court which uses a analogous technique to display the home of Benjamin Franklin).
- 4. Wait.** "Mothball" the structure for the time being. Revisit in the future. Use now for equipment storage?

***\*Note: The utility pole next to the pump house formerly had a large electrical transformer on the pole. Recommend conducting soil tests in the vicinity of the pole to test for the presence of any PCBs.***

# Meadow Recreation Area

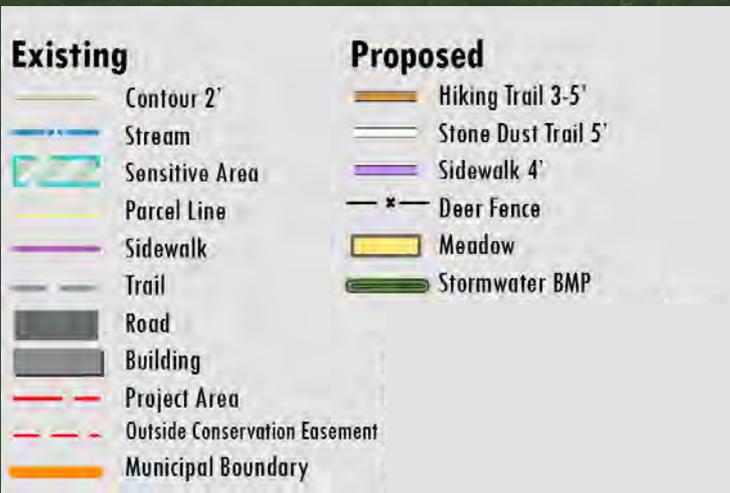
- New pavilion & picnic area
- Nature-based play area
- ADA stone dust trail
- 0.15 Mile Loop Trail
- Native pollinator meadow plantings



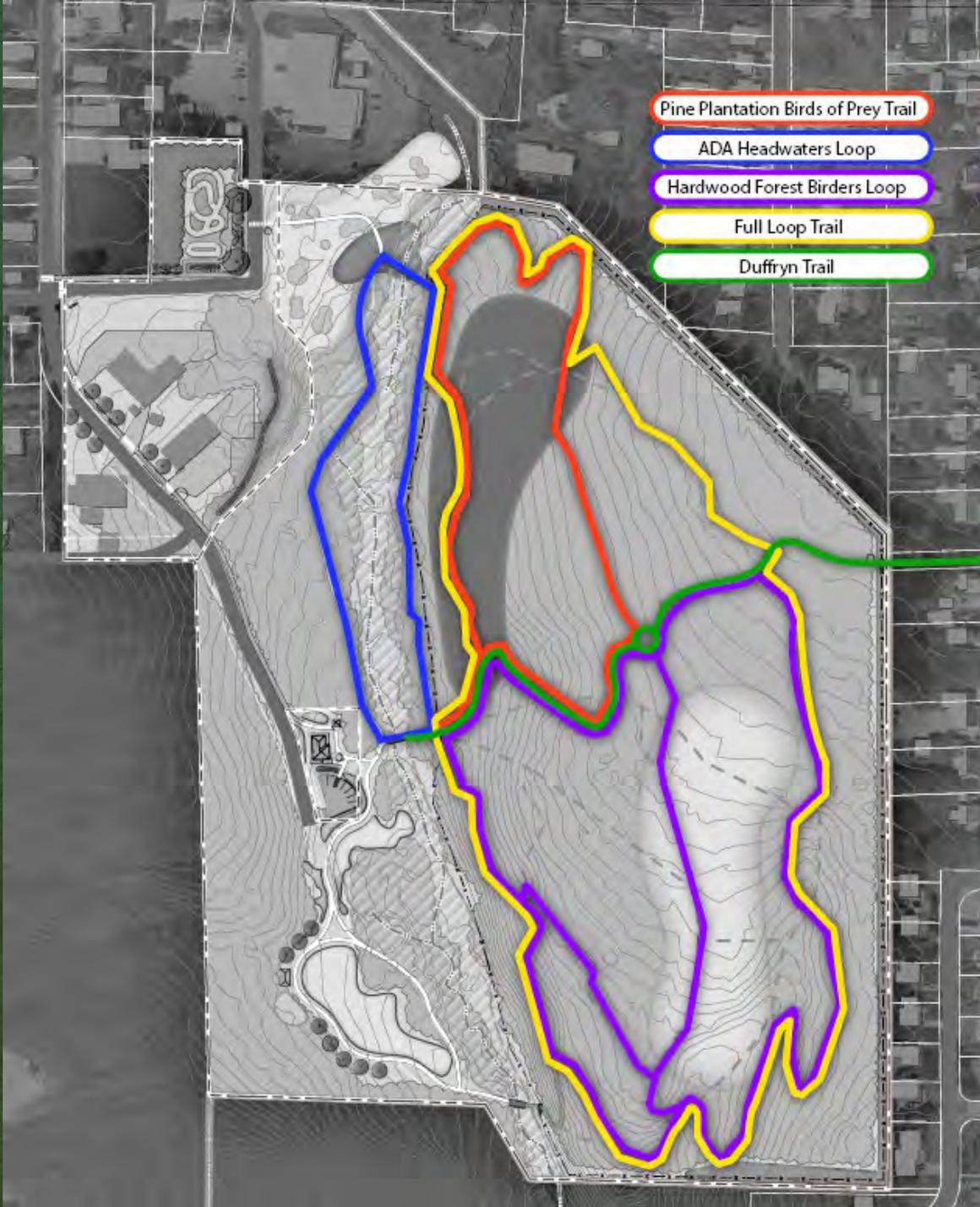
# Trails Hierarchy

- Sidewalks: **.15 mi**
- ADA Stone Dust Trails **.65 mi**
- Hiking Trails: **1.45 mi**
- Boardwalks: **.05 mi**
- 3 new ADA compliant stream crossings

**TOTAL: 2.3 MILES of Pedestrian Pathways**



# Trail Improvement Areas



# Pine Plantation Birds of Prey Trail

- 5' Wide stone dust trail
- 0.42 Miles Loop
- Board walks through stream protection areas
- Interpretive signage theme: History of White Pine in Pennsylvania / Importance to Bird of Prey Habitat



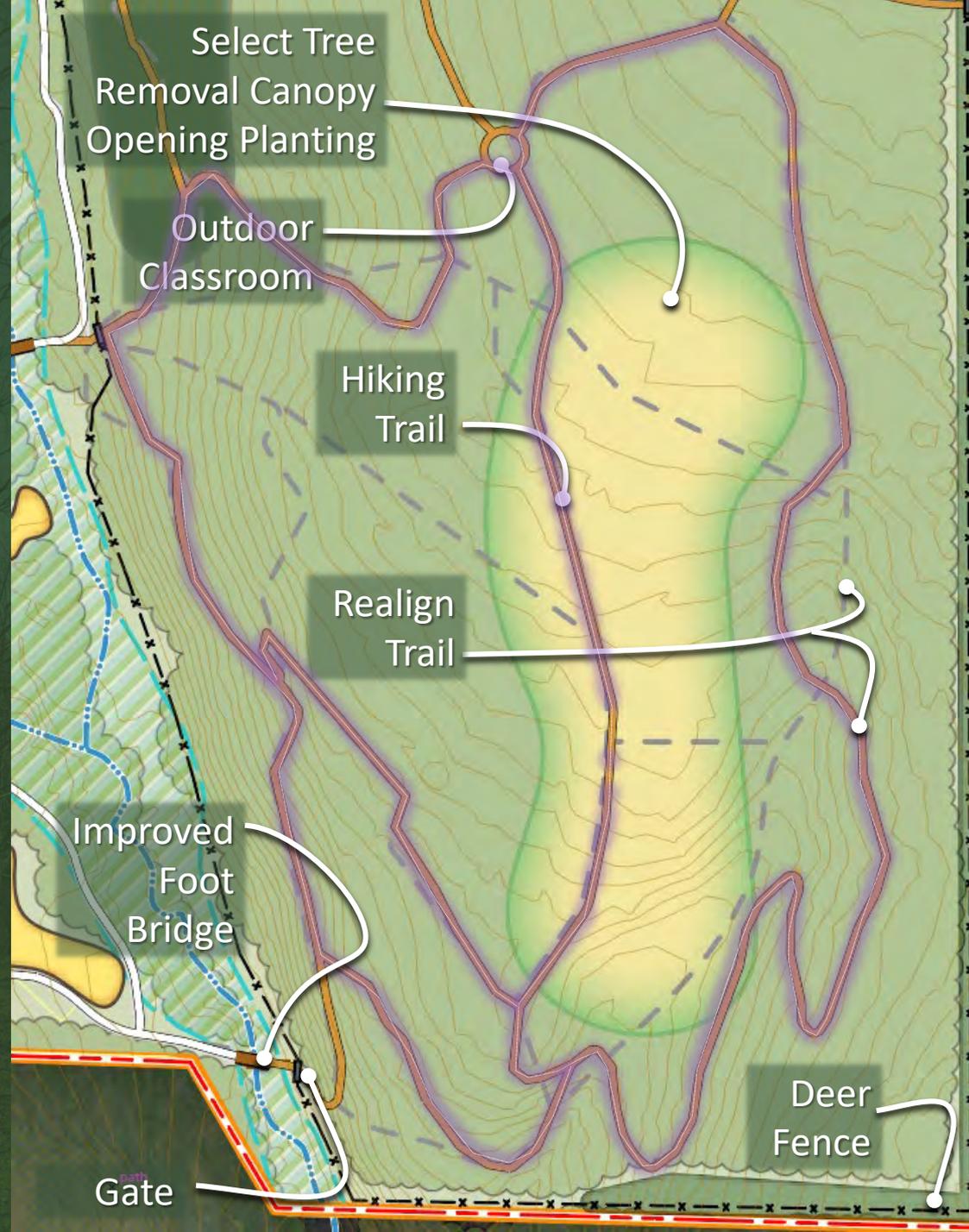
# ADA Headwaters Loop Trail

- 5' Wide stone dust trail
- 0.36 Mile Loop
- Boardwalks through stream protection areas
- Interpretive signage theme: Headwater Protection



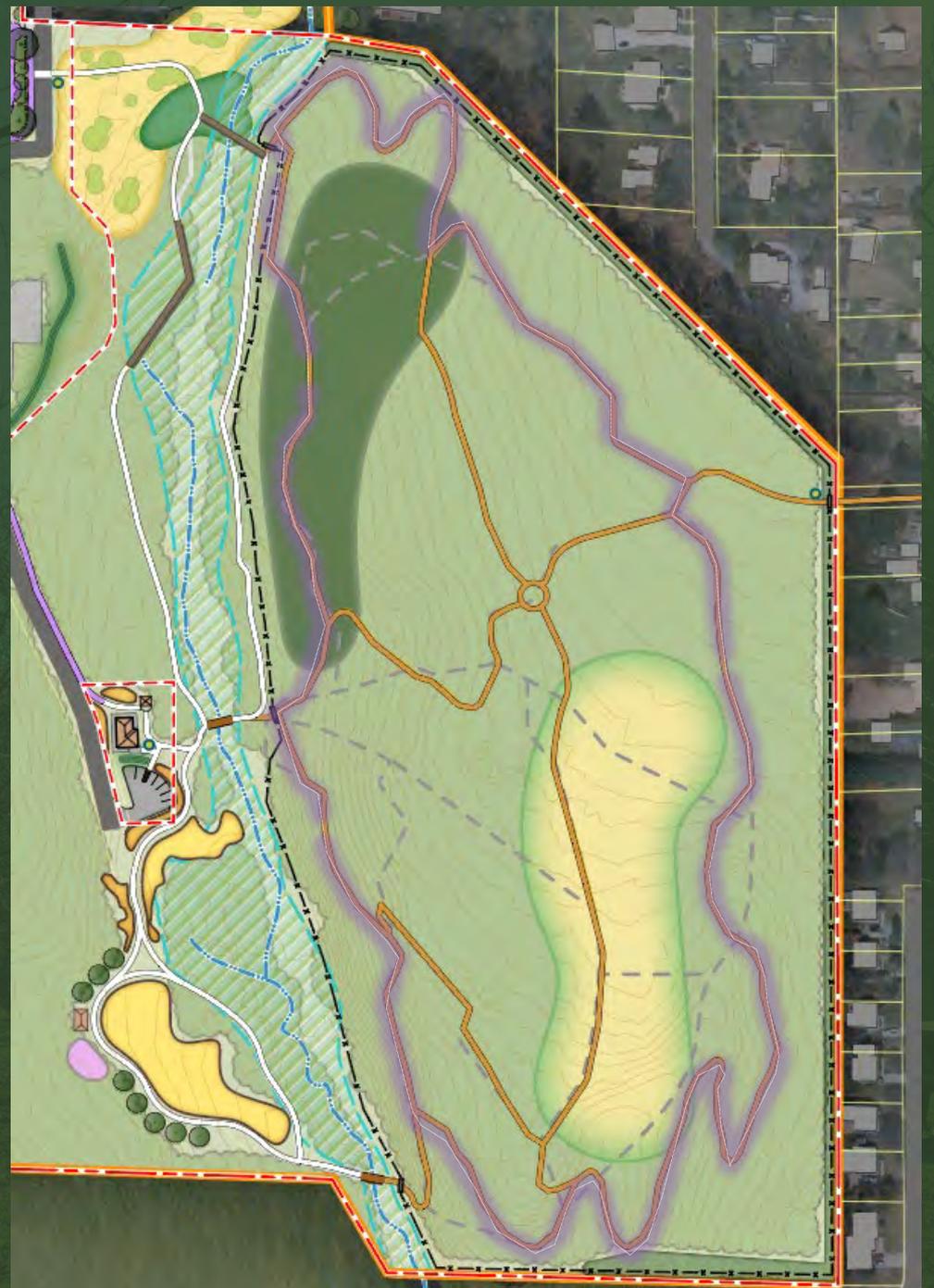
# Hardwood Forest Birders Loop Trail

- 3-5' Wide dirt hiking trail
- 0.50 Miles Upper Loop  
0.42 Miles Lower Loop  
0.63 Outer Loop
- Interpretive signage theme:  
Song Bird Habitat



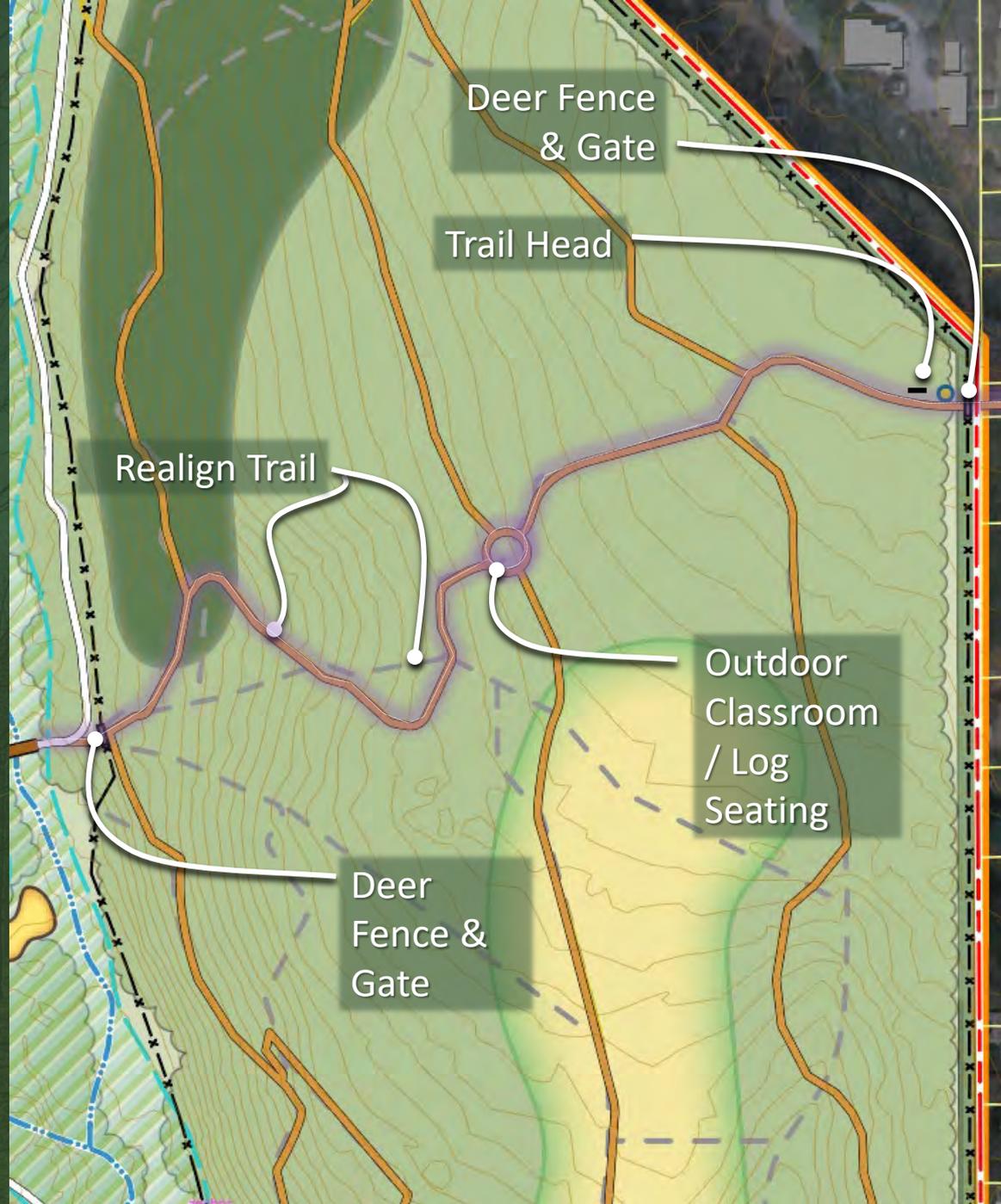
# Full Loop Trail

- 3-5' Wide dirt hiking trail
- 0.88 Miles



# Duffryn Trail

- 3-5' Hiking Trail
- 0.25 Miles
- Trail Head
- Outdoor Classroom



# ADA Accessibility

All improvements must be designed in accordance with ADA Accessibility Guidelines

Preserve hiking trails should meet the following guidelines when feasible:

- Surface: firm and stable
- Clear tread width: 36" minimum
- Tread Obstacles: 2" high maximum (permitted on earthen trails)
- Cross Slope: 5% max.
- Passing Space: provided at least every 1000' where trail width is less than 60"
- Signs: shall be provided indicating the Length of the trail or trail segment



The background image shows a park scene with several bare trees in the foreground and middle ground. A picnic table is visible on the right side. The entire image is covered with a dark green, semi-transparent overlay. In the bottom-left corner, there is a dark green rounded rectangle containing the word "Implementation" in white text.

# Implementation

# Estimated Costs of Development

Estimated Costs of Development Summary	
<b>1. Ruthland Ave Entrance</b>	<b>\$ 198,000</b>
<b>Total Proposed Site Improvements</b>	<b>\$ 158,200</b>
Design and Engineering (10%)	\$ 15,900
<b>Construction Cost Total</b>	<b>\$ 23,900</b>
<b>2. First Ave Entrance</b>	<b>\$ 173,000</b>
<b>Total Proposed Site Improvements</b>	<b>\$ 138,200</b>
Design and Engineering (10%)	\$ 13,900
<b>Construction Cost Total</b>	<b>\$ 20,900</b>
<b>3. Pump House Area</b>	<b>\$ 262,100</b>
<b>Total Proposed Site Improvements</b>	<b>\$ 209,600</b>
Design and Engineering (10%)	\$ 21,000
<b>Construction Cost Total</b>	<b>\$ 31,500</b>
<b>4. Picnic &amp; Play Meadow</b>	<b>\$ 217,600</b>
<b>Total Proposed Site Improvements</b>	<b>\$ 174,000</b>
Design and Engineering (10%)	\$ 17,400
<b>Construction Cost Total</b>	<b>\$ 26,200</b>
<b>5. Trail Improvements</b>	<b>\$ 259,900</b>
<b>Total Proposed Site Improvements</b>	<b>\$ 207,800</b>
Design and Engineering (10%)	\$ 20,800
<b>Construction Cost Total</b>	<b>\$ 31,300</b>
<b>Forest Management and Restoration</b>	<b>\$ 553,300</b>
<b>Total Proposed Site Improvements</b>	<b>\$ 481,000</b>
Design and Engineering (10%)	\$ 48,100
<b>Construction Cost Total</b>	<b>\$ 24,200</b>
<b>Preserve Wide Improvements Total:</b>	<b>\$ 1,663,900</b>
<b>Total Proposed Park Wide Site Improvements</b>	<b>\$ 1,368,800</b>
Design and Engineering (10%)	\$ 137,100
<b>Construction Cost Total</b>	<b>\$ 158,000</b>

Detailed cost estimates are in the Master Plan Report.

Construction Cost Include are estimated as a percentage of the total improvement cost. They include:

- Mobilization 3%,
- Erosion & Sedimentation Control 2%, and
- Construction Contingency 10%

\* Construction Cost Include are estimated as a percentage of the total improvement cost. They include: Mobilization 3%, Erosion & Sedimentation Control 2%, and Construction Contingency 10%

# Recommended Phasing Priorities

## Restoration:

- 1-3 Invasives Removal
- 4-10 Years Restoration Planting

### Phase A

- Deer Fencing & Educational Signage - **\$244,000**
- Pump Track - **\$173,000**

### Phase B

- Sidewalk Improvements
- Entry Signage
- BMP
- First Ave Connection
- ADA Headwaters Loop Trail

### Phase C

- Picnic Pavilion
- Nature Play
- Meadow Loop Trail
- Restrooms
- Parking Improvements

### Phase D

- Interior Hiking Trail Improvements



# Next Steps

- **Committee vote on recommendations to Borough Council**
- **Pursue Grant applications for design, engineering and construction of all or part of phase 1.**



# Thank You

## Simone Collins Landscape Architecture

- **Peter Simone, RLA, FASLA – [psimone@simonecollins.com](mailto:psimone@simonecollins.com)**
- **Sarah Leeper, RLA, ASLA – [sleeper@simonecollins.com](mailto:sleeper@simonecollins.com)**
- **Joe Wallace, ASLA – [jwallace@simonecollins.com](mailto:jwallace@simonecollins.com)**

## Comprehensive Land Services

- **Patrick Fasano, Forester**

## Applied Ecological Services

- **Michael McGraw, Wildlife Biologist**



## Estimated Costs of Development Summary

<b>1. Ruthland Ave Entrance</b>		<b>\$ 198,000</b>
Total Proposed Site Improvements		\$ 158,200
Design and Engineering (10%)		\$ 15,900
Construction Cost Total		\$ 23,900
<b>2. First Ave Entrance</b>		<b>\$ 173,000</b>
Total Proposed Site Improvements		\$ 138,200
Design and Engineering (10%)		\$ 13,900
Construction Cost Total		\$ 20,900
<b>3. Pump House Area</b>		<b>\$ 262,100</b>
Total Proposed Site Improvements		\$ 209,600
Design and Engineering (10%)		\$ 21,000
Construction Cost Total		\$ 31,500
<b>4. Picnic &amp; Play Meadow</b>		<b>\$ 217,600</b>
Total Proposed Site Improvements		\$ 174,000
Design and Engineering (10%)		\$ 17,400
Construction Cost Total		\$ 26,200
<b>5. Trail Improvements</b>		<b>\$ 259,900</b>
Total Proposed Site Improvements		\$ 207,800
Design and Engineering (10%)		\$ 20,800
Construction Cost Total		\$ 31,300
<b>Forest Management and Restoration</b>		<b>\$ 553,300</b>
Total Proposed Site Improvements		\$ 481,000
Design and Engineering (10%)		\$ 48,100
Construction Cost Total		\$ 24,200
<b>Preserve Wide Improvements Total:</b>		<b>\$ 1,663,900</b>
Total Proposed Park Wide Site Improvements		\$ 1,368,800
Design and Engineering (10%)		\$ 137,100
Construction Cost Total		\$ 158,000

\* Construction Cost Include are estimated as a percentage of the total improvement cost. They include: Mobilization 3%, Erosion & Sedimentation Control 2%, and Construction Contingency 10%

## 1. Ruthland Ave Entrance

Total Proposed Site Improvements	\$	158,200
Design & Engineering (10%)	\$	15,900
Mobilization (3%)	\$	4,800
Erosion and Sedimentation Control (2%)	\$	3,200
Construction Contingency (10%)	\$	15,900
<b>Total Estimated Project Costs</b>	<b>\$</b>	<b>198,000</b>

Item No.	Item Description	Estimated Quantity	Unit Price	Total Item Amount
<b>Pedestrian Improvements</b>				<b>\$ 33,600</b>
1.	Ruthland Ave Sidewalk - 4' wide borough standard with curb	344 LF	\$ 80.00	\$ 27,520
2.	Crosswalks - curb cut, DWS, & Stripping	3 LS	\$ 2,000.00	\$ 6,000
<b>Vehicular Improvements</b>				<b>\$ 28,300</b>
1.	Widen Driveway 3' - includes full width mill and overlay & stabilization	565 LF	\$ 50.00	\$ 28,250
<b>Utility Improvements</b>				<b>\$ 73,000</b>
1.	Sanitary Sewer line	525 LF	\$ 54.00	\$ 28,350
2.	Grinder/Pump Station	1 LS	\$ 10,000.00	\$ 10,000
3.	Waterline - 2" copper line	525 LF	\$ 66.00	\$ 34,650
<b>Amenities</b>				<b>\$ 3,500</b>
1.	New Preserve Sign - First and Ruthland Ave	1 EA	\$ 3,500.00	\$ 3,500
<b>Planting</b>				<b>\$ 5,400</b>
1.	Entrance Sign Plantings	200 SF	\$ 7.50	\$ 1,500
2.	Tree Plantings	6 EA	\$ 650.00	\$ 3,900
<b>Stormwater Infrastructure / Best Management Practices</b>				<b>\$ 14,400</b>
1.	Eastern Public Work Yard - Vegetative Swale / Diversion Berm	320 LF	\$ 45.00	\$ 14,400

## 2. First Ave Entrance

Total Proposed Site Improvements	\$ 138,200
Design & Engineering (10%)	\$ 13,900
Mobilization (3%)	\$ 4,200
Erosion and Sedimentation Control (2%)	\$ 2,800
Construction Contingency (10%)	\$ 13,900
<b>Total Estimated Project Costs</b>	<b>\$ 173,000</b>

Item No.	Item Description	Estimated Quantity	Unit Price	Total Item Amount
<b>Pedestrian Improvements</b>				<b>\$ 47,100</b>
1.	First Ave Sidewalk - 4' wide borough standard with curb	450 LF	\$ 80.00	\$ 36,000
2.	Crosswalks - curb cut, DWS, & Stripping	3 EA	\$ 2,000.00	\$ 6,000
3.	Connector Trail - 5' wide Stone Dust	280 SF	\$ 18.00	\$ 5,040
<b>Pump Track</b>		<b>610 LF</b>		<b>\$ 46,100</b>
1.	Fill Material	610 CY	\$ 45.00	\$ 27,450
2.	Site Grading	610 CY	\$ 25.00	\$ 15,250
3.	Stabilization Planting	1,112 SY	\$ 3.00	\$ 3,335
<b>Admenities</b>				<b>\$ 20,000</b>
1.	Pump Track Sign	1 EA	\$ 2,000.00	\$ 2,000
2.	Walkway and plaza paving - concrete	1,164 SF	\$ 6.00	\$ 6,984
3.	Trail Head Signage	1 LS	\$ 2,000.00	\$ 2,000
4.	Bike Rack	2 EA	\$ 1,600.00	\$ 3,200
5.	Benches	4 EA	\$ 1,450.00	\$ 5,800
<b>Planting</b>				<b>\$ 22,500</b>
1.	Entrance Plantings	200 SF	\$ 7.50	\$ 1,500
2.	Meadow Planting - Firehouse Side	0.02 AC	\$ 6,000.00	\$ 138
3.	Buffer Planting	12,500 SF	\$ 1.25	\$ 15,625
4.	Tree Plantings	8 EA	\$ 650.00	\$ 5,200
<b>Stormwater Infrastructure / Best Management Practices</b>				<b>\$ 2,500</b>
1.	Pump Track - Vegetative Swale	55 LF	\$ 45.00	\$ 2,475

### 3. Pump House Area

Total Proposed Site Improvements	\$	209,600
Design & Engineering (10%)	\$	21,000
Mobilization (3%)	\$	6,300
Erosion and Sedimentation Control (2%)	\$	4,200
Construction Contingency (10%)	\$	21,000
<b>Total Estimated Project Costs</b>	<b>\$</b>	<b>262,100</b>

Item No.	Item Description	Estimated Quantity	Unit Price	Total Item Amount
<b>Pedestrian Improvements</b>				<b>\$ 17,900</b>
1.	Driveway entrance Side trail- 5' wide asphalt	203 SY	\$ 50.00	\$ 10,139
2.	Connector Trail - 5' wide Stone Dust	429 LF	\$ 18.00	\$ 7,722
<b>Admenities</b>				<b>\$ 166,500</b>
1.	Restroom Facility - on Concrete Pad, w Electrical & Water Service	1 LS	\$ 160,000.00	\$ 160,000
2.	Trail Head Signage	1 LS	\$ 2,000.00	\$ 2,000
3.	Bike Rack	1 EA	\$ 1,600.00	\$ 1,600
4.	Benches	2 EA	\$ 1,450.00	\$ 2,900
<b>Pump House</b>				<b>\$ 12,700</b>
1.	Demo Asphalt Paving	30 SY	\$ 5.00	\$ 150
2.	Demo Fencing	195 LF	\$ 3.00	\$ 585
3.	New Fencing	140 EA	\$ 85.00	\$ 11,900
<b>Planting</b>				<b>\$ 6,600</b>
1.	Trail Head Plantings	200 SF	\$ 7.50	\$ 1,500
2.	Meadow Planting	0.19 AC	\$ 6,000.00	\$ 1,144
3.	Tree Plantings	6.00 EA	\$ 650.00	\$ 3,900
<b>Stormwater Infrastructure / Best Management Practices</b>				<b>\$ 5,900</b>
1.	Parking - Vegetative Swale	130 LF	\$ 45.00	\$ 5,850

## 4. Picnic & Play Meadow

Total Proposed Site Improvements	\$	174,000
Design & Engineering (10%)	\$	17,400
Mobilization (3%)	\$	5,300
Erosion and Sedimentation Control (2%)	\$	3,500
Construction Contingency (10%)	\$	17,400
<b>Total Estimated Project Costs</b>	<b>\$</b>	<b>217,600</b>

Item No.	Item Description	Estimated Quantity	Unit Price	Total Item Amount
<b>Pedestrian Improvements</b>				<b>\$ 22,300</b>
		<i>0.15 Miles</i>		
1.	Meadow Loop Trail - 5' wide Stone Dust	1,234 LF	\$ 18.00	\$ 22,212
<b>Amenities</b>				<b>\$ 125,500</b>
1.	Educational Signage	1 LS	\$ 1,000.00	\$ 1,000
2.	Pavilion - On concrete pad with electrical service	1 CY	\$ 75,000.00	\$ 75,000
3.	Picnic Tables	6 EA	\$ 1,000.00	\$ 6,000
4.	Nature Base Play Area - 1500 SF	1 LS	\$ 25,000.00	\$ 25,000
5.	6" Engineered Wood Fiber - includes prepared subbase for drainage	1,500 SF	\$ 6.50	\$ 9,750
6.	Benches	6 EA	\$ 1,450.00	\$ 8,700
<b>Planting</b>				<b>\$ 26,200</b>
1.	Demo Access Drive	1,286 SY	\$ 4.00	\$ 5,144
2.	Top soil and grade old driveway	214 CY	\$ 45.00	\$ 9,645
3.	Nature Base Play Plantings	400 SF	\$ 7.50	\$ 3,000
4.	Meadow Planting	0.52 AC	\$ 6,000.00	\$ 3,116
5.	Tree Plantings	8 EA	\$ 650.00	\$ 5,200

## 5. Forest Wide

Total Proposed Site Improvements	\$ 207,800
Design & Engineering (10%)	\$ 20,800
Mobilization (3%)	\$ 6,300
Erosion and Sedimentation Control (2%)	\$ 4,200
Construction Contingency (10%)	\$ 20,800
<b>Total Estimated Project Costs</b>	<b>\$ 259,900</b>

Item No.	Item Description	Estimated Quantity	Unit Price	Total Item Amount
<b>Duffryn Trail Improvements</b>		<b>0.28 Miles*</b>		<b>\$ 30,400</b>
1.	New Trail Alignment - 3-5' Wide Hiking Trail	435 LF	\$ 4.50	\$ 1,958
2.	Existing Trail to Remain	737 LF	\$ 1.00	\$ 737
3.	Removal of old Trail Alignment - Soil amendments & Planting	265 LF	\$ 10.00	\$ 2,650
4.	Improved Bridge Crossing	1 LS	\$ 25,000.00	\$ 25,000
<b>ADA Stream Loop Trail</b>		<b>0.36 Miles*</b>		<b>\$ 90,100</b>
1.	New Trail - 5' wide Stone Dust	1,515 LF	\$ 18.00	\$ 27,270
2.	Boardwalk	1,255 SF	\$ 50.00	\$ 62,750
<b>Pine Plantation Loop</b>		<b>0.42 Miles*</b>		<b>\$ 10,900</b>
1.	New Trail - 3-5' Wide Hiking Trail	333 LF	\$ 4.50	\$ 1,499
2.	Existing Trail to Remain	1,019 LF	\$ 1.00	\$ 1,019
3.	Removal of old Trail Alignment - Soil amendments & Planting	832 LF	\$ 10.00	\$ 8,320
<b>Birders Loop</b>		<b>0.44 Miles*</b>		<b>\$ 10,900</b>
1.	New Trail - 3-5' Wide Hiking Trail	1,385 LF	\$ 4.50	\$ 6,233
2.	Existing Trail to Remain	465 LF	\$ 1.00	\$ 465
3.	Removal of old Trail Alignment - Soil amendments & Planting	414 LF	\$ 10.00	\$ 4,140
<b>Mix Hardwood Forest Perimeter Trail Loop</b>		<b>0.92 Miles*</b>		<b>\$ 42,700</b>
1.	New Trail - 3-5' Wide Hiking Trail	1,435 LF	\$ 4.50	\$ 6,458
2.	Existing Trail to Remain	1,177 LF	\$ 1.00	\$ 1,177
3.	Removal of old Trail Alignment - Soil amendments & Planting	1,000 LF	\$ 10.00	\$ 10,000
4.	Improved Bridge Crossing	1 LS	\$ 25,000.00	\$ 25,000
<b>Amenities</b>				<b>\$ 22,800</b>
1.	Interpretative Signage	3 EA	\$ 5,000.00	\$ 15,000
2.	Trail Head Sign	1 LS	\$ 2,000.00	\$ 2,000
3.	Outdoor Classroom - wood logs	1 LS	\$ 2,400.00	\$ 2,400
4.	Bike Rack	1 EA	\$ 1,600.00	\$ 1,600
5.	Log Benches	12 EA	\$ 150.00	\$ 1,800

\*Note distance reflects the walking loop and overlaps with other trail loops

## Forest Management and Restoration

Total Proposed Site Improvements	\$ 481,000
Design & Engineering (10%)	\$ 48,100
Mobilization (3%)	\$ 14,500
Erosion and Sedimentation Control (2%)	\$ 9,700
Construction Contingency (10%)	\$ 48,100
<b>Total Estimated Project Costs</b>	<b>\$ 601,400</b>

Item No.	Item Description	Estimated Quantity	Unit Price	Total Item Amount
<b>Deer Management</b>		<b>4.4 Acres</b>		<b>\$ 244,400</b>
1.	Deer Fencing - 12' high Locust post & woven, knotted, wire mesh	4,350 LF	\$ 55.00	\$ 239,250
2.	Gates - self closing	4 EA	\$ 650.00	\$ 2,600
3.	Educational / Restoration Informational signage	5 EA	\$ 500.00	\$ 2,500
<b>Forest Management Area #1 - White Pine Plantation</b>		<b>4.4 Acres</b>		<b>\$ 50,000</b>
1.	Targeted Invasive Removal Year 1-3 - cost per acre per year	13.2 AC	\$ 1,000.00	\$ 13,200
2.	Restoration Tree Planting Year 4	1 AC	\$ 5,202.00	\$ 5,202
3.	Light thinning, Timber Stand Improvement Year 7	4 AC	\$ 700.00	\$ 3,080
4.	Restoration Tree Planting Year 8	1 AC	\$ 5,202.00	\$ 5,202
5.	Eco Tone Transition Planting	3 AC	\$ 7,750.00	\$ 23,250
<b>Forest Management Area #2 - Mixed Hardwood</b>		<b>4.5 Acres</b>		<b>\$ 27,100</b>
1.	Targeted Invasive Removal Year 1-3 - cost per acre per year	13.5 YR	\$ 1,000.00	\$ 13,500
2.	Restoration Tree Planting Year 4	1 AC	\$ 5,202.00	\$ 5,202
3.	Light thinning, Timber Stand Improvement Year 6	5 AC	\$ 700.00	\$ 3,150
4.	Restoration Tree Planting Year 7	1 AC	\$ 5,202.00	\$ 5,202
<b>Forest Management Area #3 - Mixed Hardwood</b>		<b>17.4 Acres</b>		<b>\$ 106,500</b>
1.	Targeted Invasive Removal Year 1-3 - cost per acre per year	52.2 YR	\$ 1,000.00	\$ 52,200
2.	Restoration Tree Planting Year 4	1 AC	\$ 3,468.00	\$ 3,468
3.	Light thinning, Timber Stand Improvement Year 5	1 EA	\$ 700.00	\$ 700
4.	Restoration Tree Planting Year 6	1 AC	\$ 3,468.00	\$ 3,468
5.	Light thinning, Timber Stand Improvement Year 9	17 AC	\$ 700.00	\$ 12,180
6.	Restoration Tree Planting Year 10	1 AC	\$ 3,468.00	\$ 3,468
7.	Understory Planting	1 AC	\$ 7,750.00	\$ 7,750
8.	Savanah Understory Planting	3 AC	\$ 7,750.00	\$ 23,250
<b>Forest Management Area #4 - Head Water Protection Area</b>		<b>9.4 Acres</b>		<b>\$ 53,000</b>
1.	Targeted Invasive Removal Year 1-3 - cost per acre per year	28.2 YR	\$ 1,000.00	\$ 28,200
2.	Restoration Tree Planting Year 4	1 AC	\$ 3,468.00	\$ 3,468
3.	Restoration Tree Planting Year 6	1 AC	\$ 3,468.00	\$ 3,468
4.	Restoration Tree Planting Year 8	1 AC	\$ 3,468.00	\$ 3,468
5.	Selective Removal of Spruce	9 EA	\$ 700.00	\$ 6,580
6.	Riparian Seccessional Meadow Planting	1 AC	\$ 7,750.00	\$ 7,750