

Daniel Boone Homestead

Environmental & Recreation Study



October, 2022



Prepared For:



October 2022

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Daniel Boone Homestead Environmental and Recreation Study



Prepared By:

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pattern ives llc

Frens and Frens Studios at Pattern Ives

SC #20050.10

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1 Introduction

Project Background

Purpose for Study

The Daniel Boone Homestead is a 579-acre tract of land located in Exeter Township, Berks County and is the birthplace and historic home of pioneer Daniel Boone. The Pennsylvania Historical and Museum Commission (PHMC) acquired the site in 1937 which, in addition to restored period buildings, includes a Visitor Center, miles of trails, picnic pavilions, a lake and areas used occasionally for scout camping. Over the years, PHMC has acquired and moved period structures to the Homestead. These structures were built after the time of the Boone family on the site and convey the lives of the Maudridge and DeTurk families (who later lived on the property), as well as the history and artifacts of the Oley Valley.

In undertaking this study process, Exeter Township's goal is to assist PHMC to enhance the site's historical core while enhancing the overall visitor experience. In addition, the study explores the development of passive recreational facilities within the site and addresses the protection for the site's natural resources, such as wetlands and woodlands, which provide habitat to a diversity of flora and fauna. The public study process has informed the Township and PHMC on how the public uses this site today and what improvements they would like to see in the future.

This Study is the result of a collaboration between the public, project stakeholders, the Township, PHMC, the project steering committee (Committee) and project consultants. This document outlines the study process and provides a vision for the future of the Daniel Boone Homestead.

Study Goals

The study goals were discussed early in the planning process and refined throughout the study. It was universally understood that the site is a unique place that exhibits a snapshot of the history and culture of Exeter Township and the Oley Valley. The site has not reached its full potential and can be enhanced for the enjoyment of generations to come. The study goals are as follows:

- **Preserve and maintain the significant cultural resources, including the landscapes, structures and artifacts, that contribute to the history and identity of the Homestead.**
- **Protect and restore the diverse natural resources, habitats and ecosystems that are home to a variety of flora and fauna.**
- **Ensure a safe and accessible facility with a variety of programs, services and recreational opportunities for visitors of all ages and abilities.**
- **Increase operational effectiveness through partnerships with public and private organizations that share a similar mission and values as the Homestead.**

Study Process

The study is an early step in the improvement process that seeks to develop public consensus for activities and facilities to be included at the Daniel Boone Homestead (see Figure 1.1). The study provides estimates of probable costs of development; and outlines a strategy for phasing improvements and for securing funding from a variety of potential sources. The study is a guidance document and is intended to be flexible enough to adapt to the future desires and needs of the community.

Following the completion of this study, the next step toward implementation is to identify and acquire funding for improvements. Once funding is obtained, detailed design and engineering will commence to develop construction documents. Construction documents will be publicly bid, and a contract awarded for construction. A study is typically implemented in phases, dependent on funding, over a period of years.

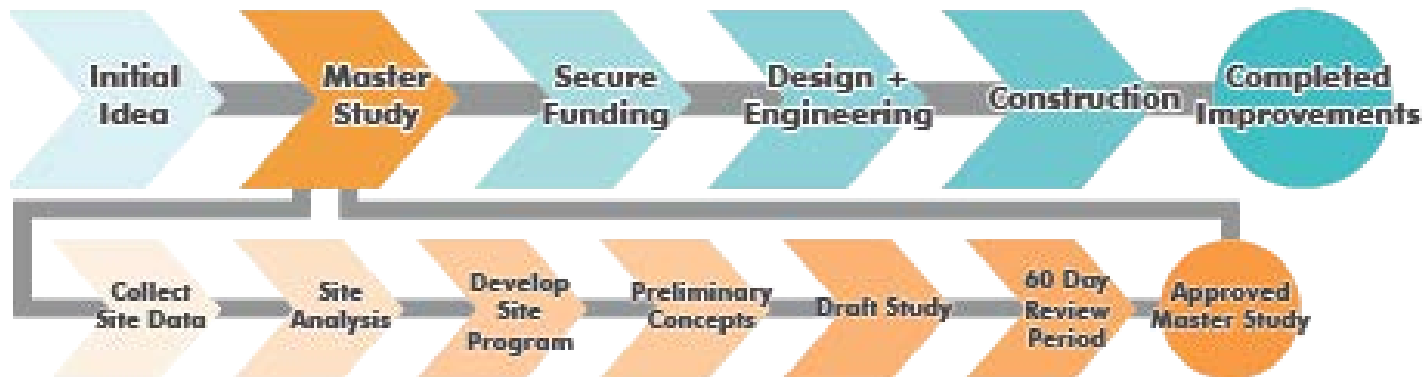


Figure 1.1

Project Team

A project team composed of the Committee, Township staff, PHMC staff and Consultants was formed to guide the public through the study process. The Committee is diverse and offers varied expertise and experience. Committee insights informed and guided the team throughout the process. Township and PHMC staff helped to coordinate the process and provided input and comment on the study.

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, the Township, PHMC and project team.

Resource Environmental Solutions, LLC (RES) is a leading ecological consulting firm, dedicated to bringing the science of ecology to land-use decisions. RES's knowledge of ecological systems provides a solid foundation for creating balanced ecological designs and solutions that are sustainable, cost-effective and enduring. RES study components include an environmental assessment of the Homestead that examined habitats, hydrology and invasive species management and recommendations for an ecological uplift for the site.

Frens and Frens Studio at Patterhn Ives, LLC (F&F) are historic architectural experts and have completed work or provided consultation services for the Homestead in the past. F&F study components include a high-level assessment of 14 historic structures and a preservation/treatment plan for these structures. Other more recent structures were also evaluated along with adaptive reuse recommendations.

Daniel Boone Homestead Associates

The Daniel Boone Homestead Associates is a non-profit community-based organization that assists the PHMC with the operation of the Homestead. Their programming includes guided tours of the Boone home, self-guided tours of the building's exteriors and tours of the grounds. They also offer lectures on how life was like at the Homestead given by members in period attire, provide guided tours for school groups, help in conducting research on different



aspects of the site and help in the care and maintenance of the period gardens. They also assist during live demonstrations and annual events, like the Exeter Township Fall Festival and Hayride, which benefits the Homestead and the Township Parks and Recreation Department.

Site Description and Regional Context

The Daniel Boone Homestead encompasses 579 acres within Exeter Township, Berks County, in the Oley Valley. The site is approximately 7 miles east of Reading, 27 miles south of Allentown and 41 miles northwest of Philadelphia.

The site can be reached via Daniel Boone Road which borders the east side of the site and is off of Perkiomen Avenue/ Benjamin Franklin Highway (U.S. Route 422). The Schuylkill River is located to the south approximately 2 miles from the site.

The regional context map (see Figure 1.2) shows the relationship between Exeter Township and the State of Pennsylvania. Exeter is bordered by Alsace Township directly to the north, Oley Township to the northeast, Amity Township to the east, Birdsboro Township to the southeast, Robeson Township to the south, Cumru Township to the southwest, Mt. Penn

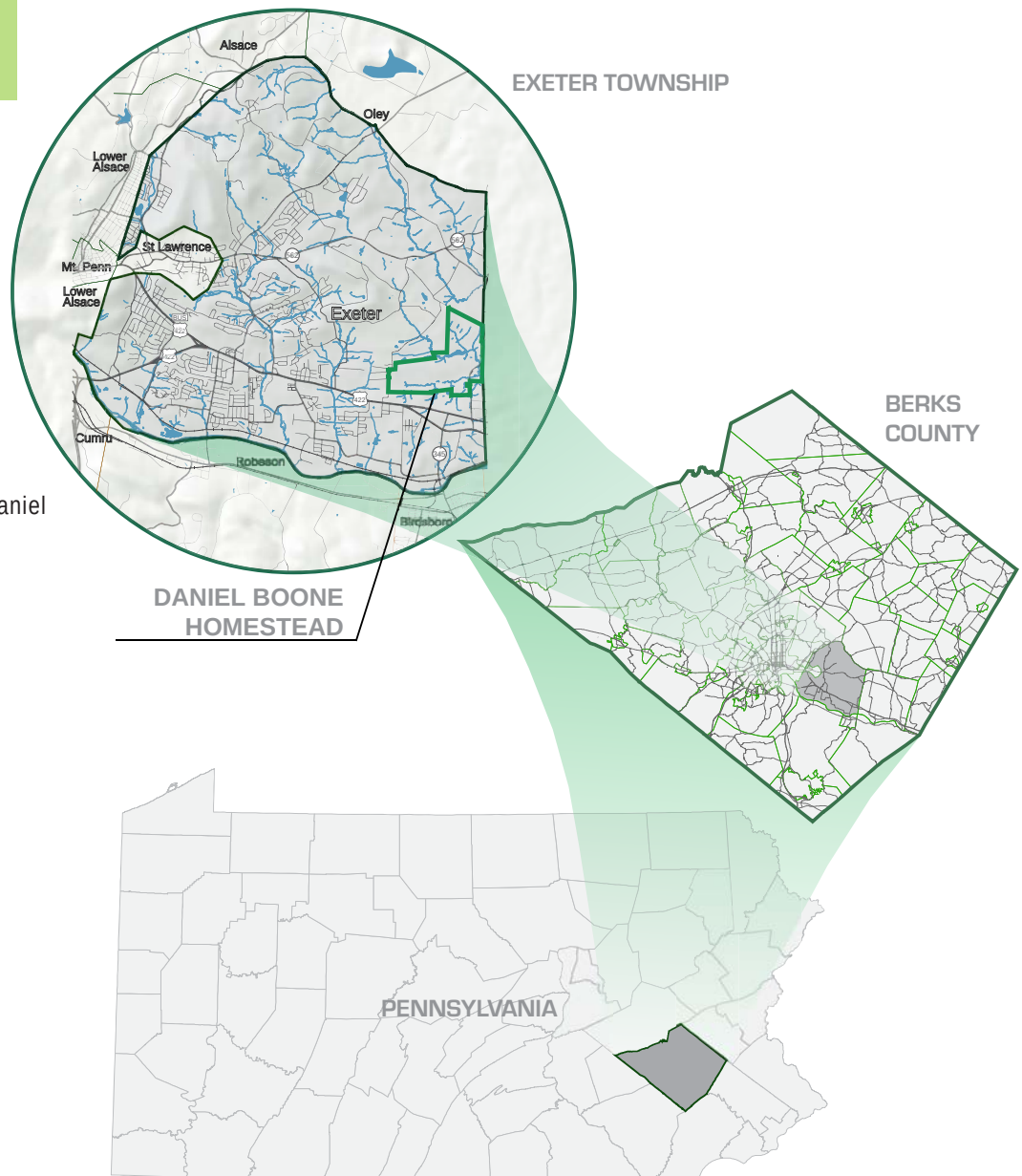
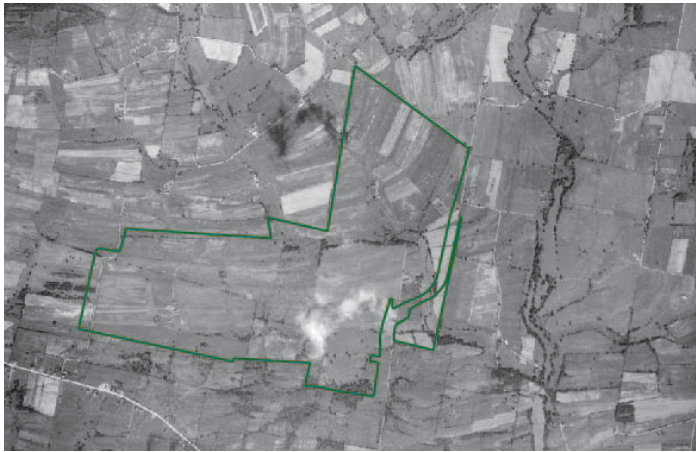


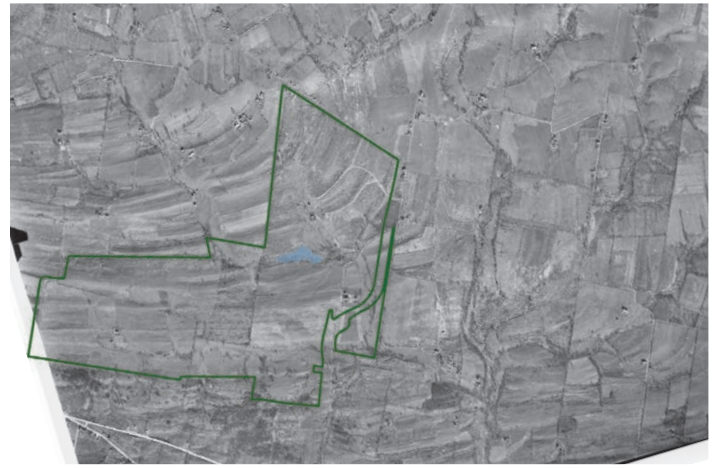
Figure 1.2

Borough directly west and Lower Alsace Township to the northwest. The Schuylkill River is directly along the southern edge of the Township.





1937



1946

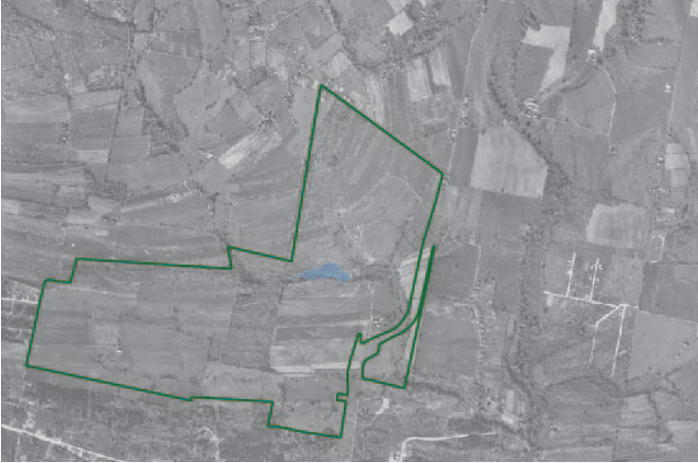
Site History

The Daniel Boone Homestead is significant for not only being the birthplace of Daniel Boone, but it is also important for its architectural and cultural contributions that showcase 18th and 19th Century Oley Valley life. Daniel Boone was a skilled hunter and outdoorsman whose experience in the wilderness helped him explore the Cumberland Gap, a natural pass in the Appalachian Mountains, which led to the colonial settlement of Kentucky and was a steppingstone to American expansion westward.

Daniel Boone's father, Squire Boone, bought the original 250 acres of the Homestead in 1730 and the future frontiersman was born on the site in 1734. Other members of Boone's family also settled around this area of the Oley Valley. Growing up in the woods and landscape of the Homestead helped to hone the young Daniel's outdoor skills and his personal relationship with nature.

In 1750, Squire decided to move his family from the Oley Valley to the Yadkin Valley of North Carolina and sold the northern part of the Homestead, including his house, to William Maugridge and the southern portion of the Homestead to his brother, Joseph Boone. In 1770, the northern 158-acre portion of the Homestead was purchased by Johannes DeTurk, who farmed the land.

After a series of additional transfers in which many of the historic structures fell into disrepair, the property was purchased by Rev. Arthur Vossler and his wife in 1926 with an interest in preserving the farm for historical purposes. Vossler made several improvements



1958



1971

to the site and spearheaded a grassroots effort to preserve the birthplace of Daniel Boone. This culminated in the purchase of 150 acres of the site by the Commonwealth of Pennsylvania in 1937 for \$7,000. Management of the site was turned over to the Pennsylvania Historical Commission (now PHMC). Repairs and improvements to the Boone house began in 1938 as well as the introduction of new signage marking the area as a historic site.

Over the subsequent decades, additional work was completed that laid the foundation for the Homestead as it exists today. This included restoration work on the main house, the physical movement of structures to the site in order to convey a snapshot of 18th and 19th Century Oley Valley life, the construction of new structures like the Wayside Lodge used for Scout camping and restrooms, installation of split-rail fencing, new landscaping and plantings and reconstruction of a historic barn. In the late 1960s, additional land for the Homestead was purchased through Project 70 funds, which were monies used for recreational, conservation or historical purposes.

In 1996, Exeter Township entered into a lease agreement with PHMC to utilize 31 acres of the site on the western periphery for recreational use area known as Pineland Park. Facilities here include a pavilion, restrooms, skate park, basketball court, playground, sports fields and trails.



Site Area

This Study divides the Homestead into four primary areas: the Historic Core, the Meadow Area, the Woodland Area and Pineland Park.

- 1 Bertolet House
- 2 Bertolet Smokehouse
- 3 Homestead Barn
- 4 Blacksmith Shop
- 5 Boone House / Boone Cellar
- 6 Homestead Visitor Center
- 7 Smokehouse
- 8 Craft Shed
- 9 Bertolet Sawmill
- 10 Wayside Lodge
- 11 Maintenance Barn
- 12 DeTurk Education Center
- 13 DeTurk Cemetery

- Legend
- Site Boundary
 - Water
 - Trails
 - Parcels
 - Municipal Boundaries
 - Parks
 - Floodplain
 - Easements
 - Wetlands
 - Agricultural Conservation Easements
 - Topography
 - Site entrance

- Pineland Park
- 1 Skate Park
 - 2 Basketball
 - 3 Playground, Pavilion
 - 4 Parking Area
 - 5 Multi-Use field
 - 6 Baseball field

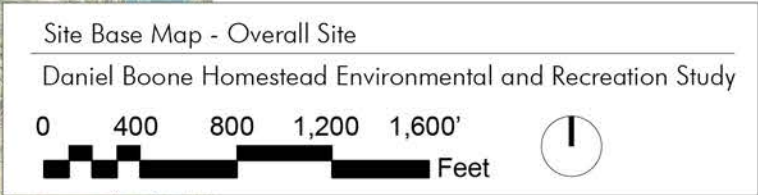
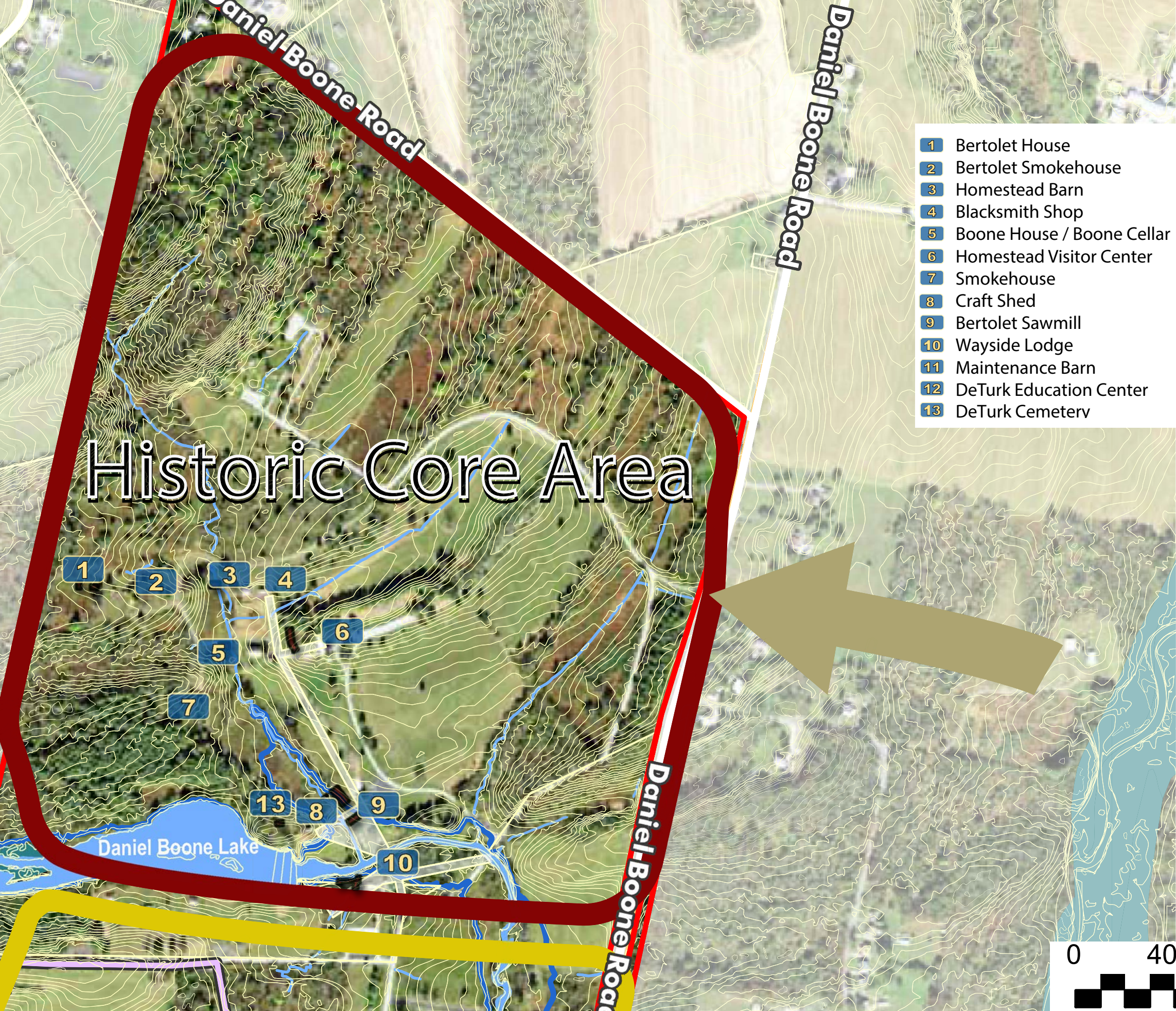


Figure 1.3



Site Background

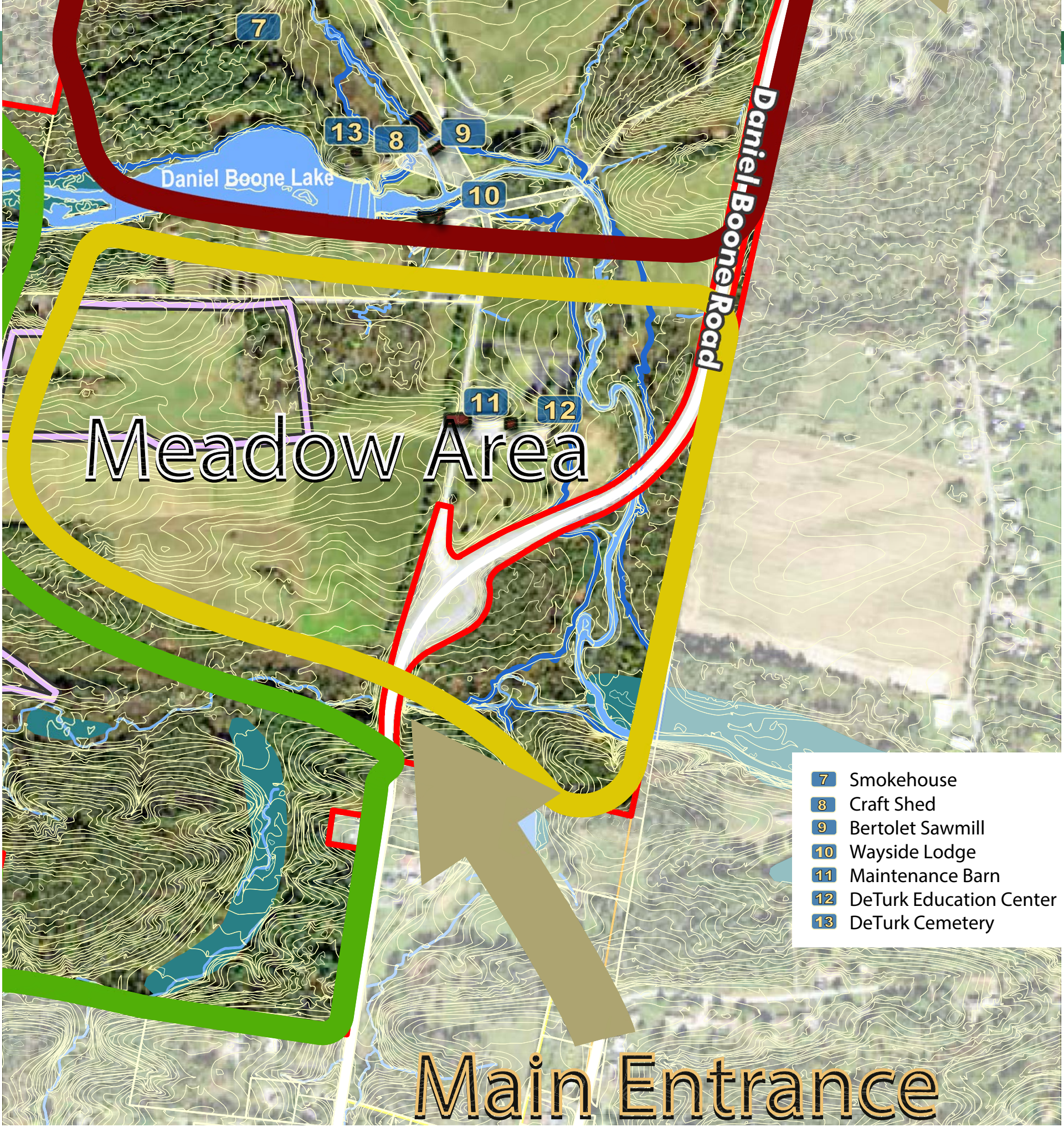
Historic Core

The historic core contains the majority of the historically significant structures of the Site and elements that contribute to the cultural landscape of the Oley Valley (see Figure 1.4). Components of the historic core include:

- Barn Threshing Floor
- Bertolet Bakehouse/Smokehouse
- Bertolet House
- Bertolet Sawmill
- Blacksmith Shop
- Craft Shed
- Daniel Boone House
- Daniel Boone Lake and Dam
- DeTurk Cemetery
- Homestead Barn
- Smokehouse
- Visitor Center

The northern edge of the historic core contains the Caretaker's House, the North Picnic Area and an emergency entrance road along the east adjacent to Daniel Boone Road. Visitors to the site occasionally park along this entrance to use the trails after the main gate is closed.

Figure 1.4



Meadow Area

The meadow area is south of the historic core and contains the main entrance to the site from Daniel Boone Road (see Figure 1.5). Components of the meadow area include:

- DeTurk Education Center
- Maintenance Barn (which also contains PHMC restoration operations)
- South Picnic Area
- Wayside Lodge

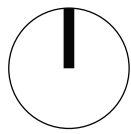
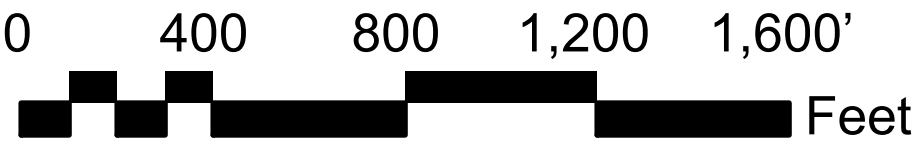
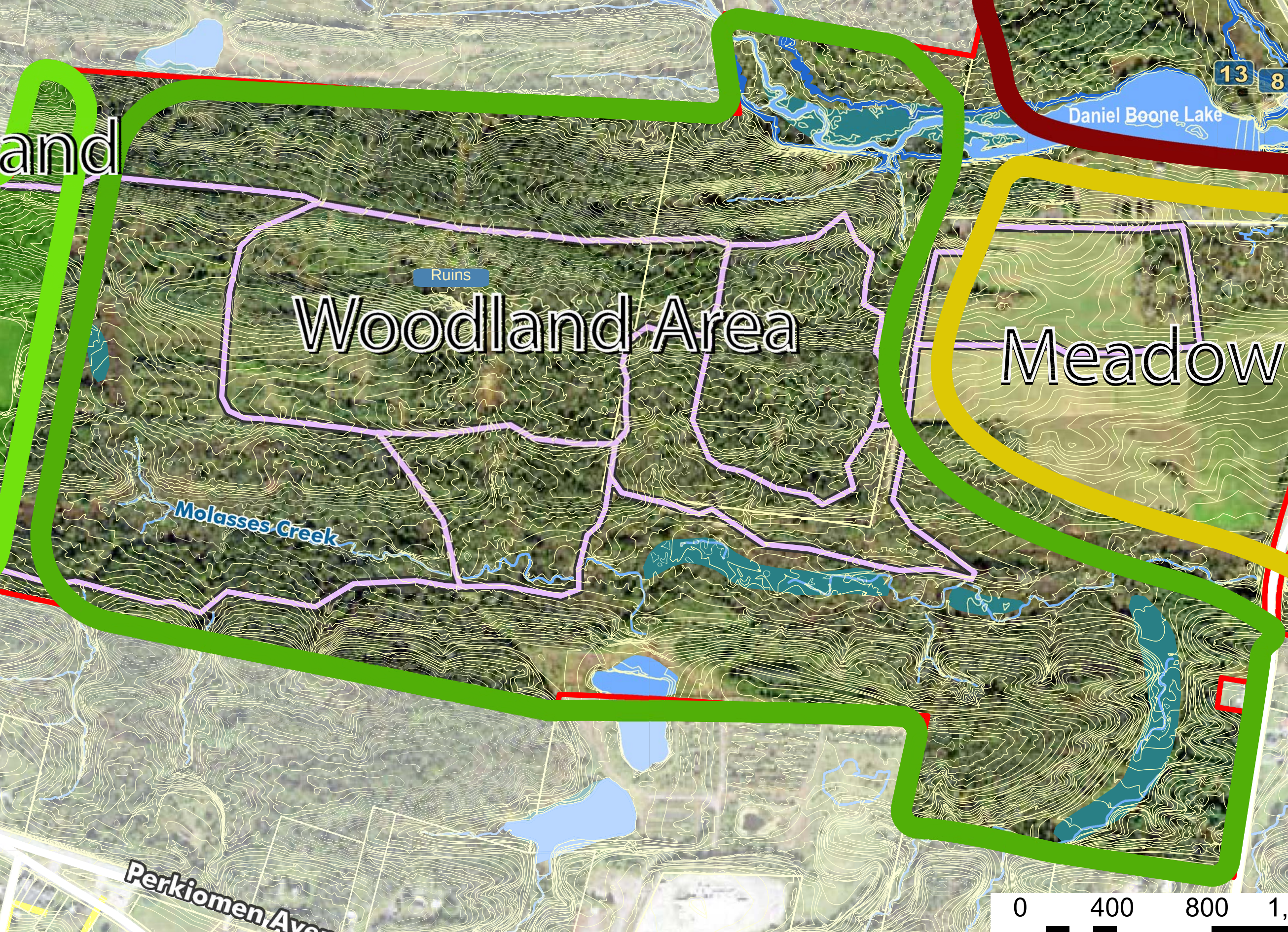


Figure 1.5



Woodland Area

The woodland area lies to the west of the meadow area and is a forested area that contains the majority of the site's hiking and equestrian trails, as well as the ruins of Samuel Boone's (Daniel Boone's uncle) homestead (see Figure 1.6). This area also contains remnants of a nursery which used the site for growing trees.

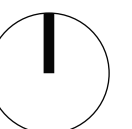
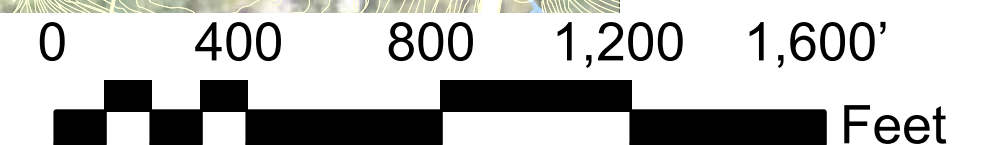


Figure 1.6

Pineland Park

Pineland Park is a 31-acre area on the western edge of the Homestead that is leased by Exeter Township for recreational activities (see Figure 1.7). It contains a baseball/softball field, basketball court, bathroom facilities, trails, grills, a pavilion/rental space, skate park, soccer field, volleyball and a playground. A path from the Homestead traverses the northern edge of Pineland Park and runs parallel to Pineland Road but is not easily accessible. In 2022, the Township will begin work to update the playground and restroom as well as introduce new stormwater Best Management Practices (BMP).

Pineland Park

- 1 Skate Park
- 2 Basketball
- 3 Playground, Pavilion
- 4 Parking Area
- 5 Multi-Use field
- 6 Baseball field



0 400 800 1,200 1,600'
Feet

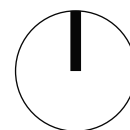


Figure 1.7





2 Inventory & Analysis

Inventory & Analysis

Data Collection and Methodology

The data in this report was compiled from various sources, including Berks County, Exeter Township, PHMC, Pennsylvania Spatial Data Access (PASDA), previous planning studies and field reconnaissance data obtained by the consultant.

Fields maps and planning documents were created using Geographic Information Systems (GIS) base mapping. This information was combined with base aerial photography, municipal boundaries, roadways, natural features, parcel data and other identifying features.

Site Reconnaissance

The consultant team conducted several site reconnaissance visits. Site photographs, measurements and field observations were gathered during these trips. Consultants visited the site again throughout the spring and summer months to gather additional data on the historic structures as well as on natural resources to better understand the seasonal changes of habitats and vegetation.

Public Participation

Community input is a critical component of all successful studies. The consultants worked with the project steering committee and project team to tailor the public participation process to the project. The 12-month process provided the team with extensive access of citizens' observations, needs, and ideas for the Homestead and critical feedback on concepts and plans.





ADA Sitewalk

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Exeter planning future of Daniel Boone Homestead

The historic core is what we are looking to preserve.

Tom Rader Feb 25, 2021 Updated 13 hrs ago

EXETER TWP., Pa. – The **Daniel Boone Homestead** in Exeter Township is the focus of preservation plans to be discussed in a handful of virtual meetings next month.

"We are looking for a plan for the future that preserves the historic core, brings awareness to the property and gives us ways and ideas we can preserve the property for the future, but also bring more recreational opportunities," said Laurie Getz, assistant township manager.

Getz said there are no plans for residential or commercial development but that the township may look to expand trails and potential picnic areas after getting more public input.

"It really is sort of a map for how we can better utilize the property in the future, and there are a lot of intricacies to it," Getz said. "The historic core is what we are looking to preserve."

The property is owned by the state, which is also involved in the preservation process. The township is matching a grant it received from the state to put toward the plans.

"It's a huge, beautiful property with so much history to it," Getz said, "and it's really a way we are looking to expand it and give a little bit of that history to Exeter."

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What do you think?
Would you ever consider buying or selling a home through an online platform, such as Zillow?
☐ Yes, I would consider it
☐ Maybe, I'm not sure
☐ No, I would not consider it
☐ Other / Does not apply

Today
Mostly sunny
Tonight
Becoming cloudy with a light rain or drizzle, especially along and north of Interstate 76.
Tomorrow
Cloudy with some rain and drizzle through midday; a little mix may linger early in the morning in the higher elevations.

RIGHT NOW
30°
Sunny
Humidity: 65%
Cloud: Clear
Coverage: 27%
Wind: 12 mph
UV Index: 4
Forecast: Sunny (64-80)
AFT: 64°
Sunset: 05:50:02
PM

69 News Press Coverage

The public participation process included four (4) public meetings, five (5) project steering committee meetings, nine (9) key person interviews, an online opinion survey, and an online Wiki Mapping public participation tool. (See Figure 2.1 for the project schedule.) Meeting notes and attendance sheets can be found in the appendix of this report. Due to the Covid-19 epidemic, meetings and interviews were held virtually in order to adhere to social distancing protocols. Refer to Figure 2.1 for the project schedule.

Committee Meeting 1 – January 12, 2021

The consultant focused on collecting background information for the site and discussing site components. The consultants led a brainstorming session to gather goals, facts, and concepts for the Homestead.

Committee Meeting 2 – February 25, 2021

An updated site analysis was presented at the second committee meeting along with demographic data for Exeter Township. Consultants also discussed the initial observations from the natural resources inventory and the process for the historical structures assessment. The team presented information on the positive economic and environmental impact provided by parks and open space to Berks County from the *County's Return on Environment* report.

Public Meeting 1 – March 9, 2021

The project team presented an overview of the study process. Site inventory and analysis were presented that highlighted site characteristics. Demographic data, the natural resources inventory and historic structures assessment were also discussed, and the positive benefits of parks and open space were also discussed. The consultants then led a brainstorming activity session for the Homestead, gathering the public goals, facts, concepts and ideas for potential partners. These ideas are contained in the appendix of this report.

Committee Meeting 3 – April 29, 2021

The consultant presented the study goals, project survey results to date, the draft architectural building assessment findings; and updates on the natural resources inventory and analysis. Initial site concepts were presented, and the committee discussed the elements and opined on those that were liked and disliked.

Public Meeting 2 – May 27, 2021

The consultant team presented the site work completed to date and the preliminary site concepts. The team also presented study goals, survey results to date, the draft architectural building assessment and updates on the natural resources inventory and analysis. The consultants led a discussion about the Homestead concepts to gather public input on the ideas.

Committee Meeting 4 – September 27, 2021

The consultant team presented takeaways from the key person interviews, updated survey results, initial preservation treatments for the historic structures and an update on the ecological site assessment with preliminary findings and recommendations. Draft study concepts were presented, and the committee provided feedback on the study.

Public Meeting 3 – October 11, 2021

This meeting was in conjunction with an Exeter Township Board of Supervisors meeting held in-person at the Township building. The consultants presented a summary of the draft study along with cost estimates.

Committee Meeting 5 – November 30, 2021

The consultant team reviewed the draft study comments with the Committee and further discussed study recommendations.

Public Meeting 4 – November 14, 2022

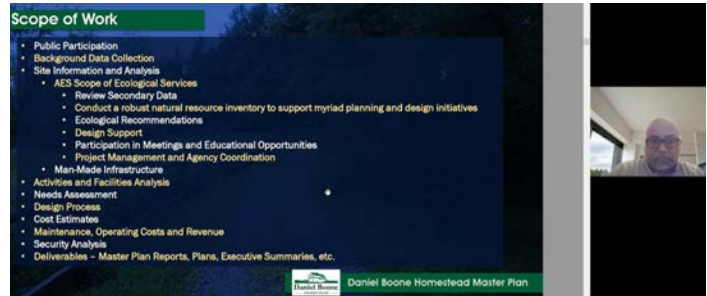
At this meeting, which was held during a Board of Supervisors meeting, PHMC officials discussed the ways in which the Study can benefit the site and the Township.

Key Person Interviews

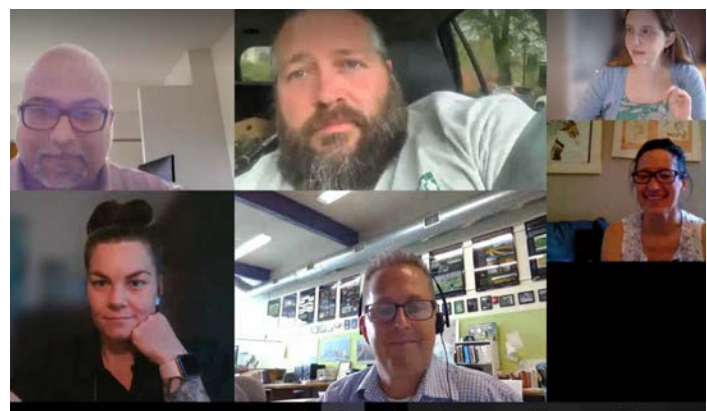
Nine (9) key person / key organization interviews were conducted during the study process. The interviews provided input from key persons and organizations in the area; including those who have responsibilities in the operations and safety at the Homestead; PHMC staff; a regional conservation organization; a regional tourism bureau; staff from an elected representative's office and local residents. A record of key person interviews can be found in the appendix of this report. Overall, the interviews provided support for the study.



Public Meeting 1 - 03.09.21



Committee Meeting 3- 04.29.21



Committee Meeting 4- 09.27.21

Project Schedule

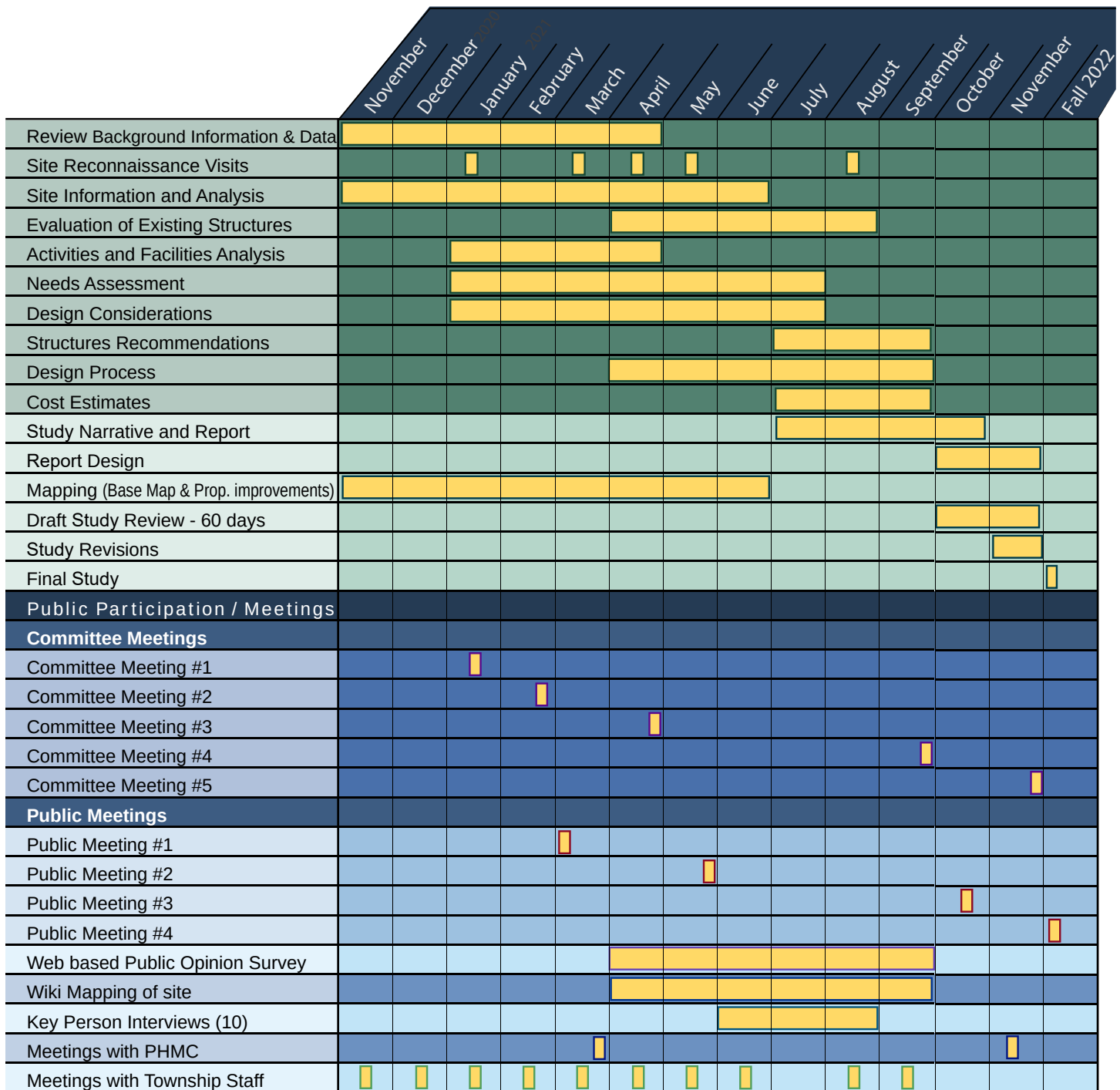


Figure 2.1

Public Opinion Survey

Citizens in Exeter Township and adjacent municipalities took part in an on-line public opinion survey to provide information on their current recreational habits, their usage of the Homestead facilities and what they would like to see added or changed at the Homestead. The survey was available online from February to September 2021.

A total of 163 individuals participated in the survey. Most of the respondents (47%) were Exeter residents and most (64%) were between the ages of 25-54. In the past 3 years, 77% of respondents have visited the Homestead and of the 23% who have not visited, 48% have not visited because there were no events / activities of interest to them, 32% have not visited because they haven't had the time and 25% have not visited due to other reasons, mainly not knowing what activities or programs are available at the site.

Interestingly, about half (46%) who visit the Homestead have not visited Pineland Park, which suggests Homestead visitors may not be aware of nearby recreational resources. An overwhelming majority (66%) strongly agree that the preservation of unique wildlife and plant habitats and species is important to the use and enjoyment of the Homestead.

Respondents were asked what new or improved facilities they would recommend: the number one answer was improved trails followed by connector trails to off-site trail systems. Respondents were also asked to recommend any new or improved activities or events and the top response was additional community events, like Community Day or fall hayrides. This was followed by living history/ immersive cultural programs, wildlife tours, historic / recreated garden / agricultural programs and educational programs. Selected survey responses are illustrated on the following pages, and the full survey results can be found in the appendix of this report.

The Daniel Boone Homestead WikiMap website offered another dynamic tool for public interaction. Through the interactive map participants were able to pin and draw their site observations, pictures, and ideas directly onto the site map.



Daniel Boone Homestead Public Opinion Survey

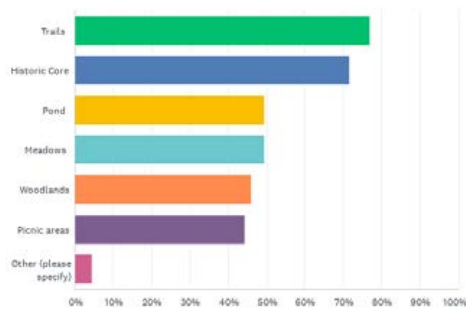
Demographics

1. What is the name of the municipality in which you live?

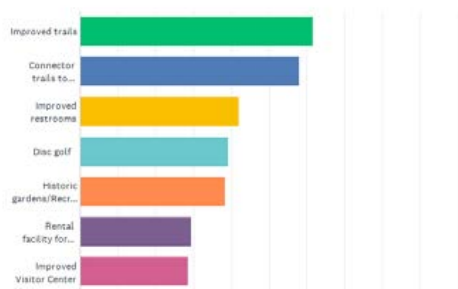
- ☐ Exeter Township
- ☐ St Lawrence Borough
- ☐ Amity Township
- ☐ Robeson Township
- ☐ Birdsboro Borough
- ☐ Union Township
- ☐ Lower Alsace Township
- ☐ City of Reading

Public Opinion Graphics via Survey Monkey

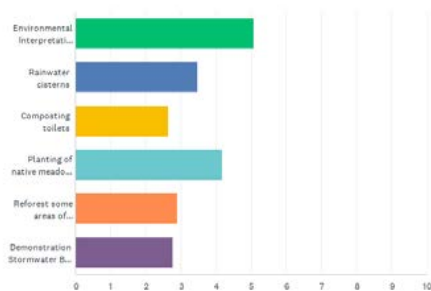
Q8 Which locations do you visit at the Daniel Boone Homestead? (Please check all that apply)



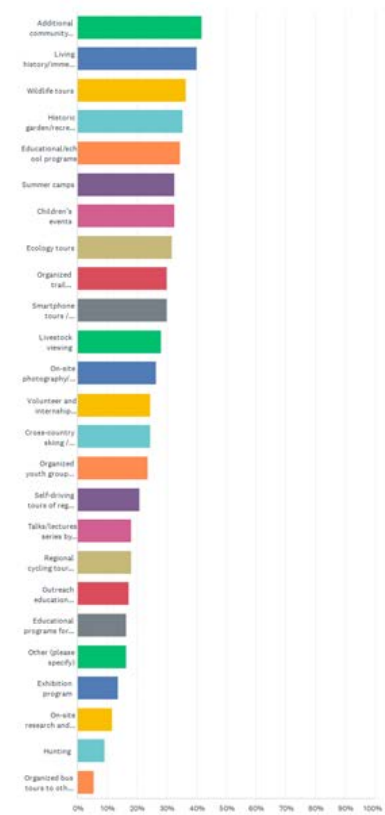
Q10 What new or improved facilities at Daniel Boone Homestead do you recommend? (Please check all that apply)



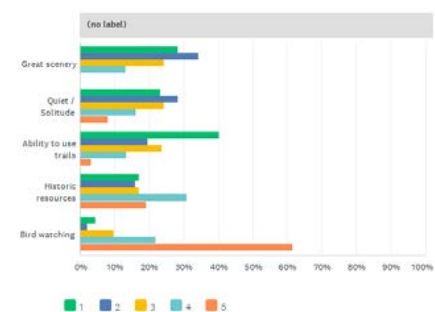
Q16 Rank the priority of ecologically driven facilities to be considered for the site, with one (1) being most important to you.



Q11 If you could create or recommend any new or improved activities or events at Daniel Boone Homestead what activities or events would you recommend? (Please check all that apply)



Q17 What are the qualities you like most about the Daniel Boone Homestead? Please rank in priority order, with one (1) being the most important to you.



Demographics

Population

The population of Exeter Township is 25,466 (2020), a 2% increase from the 2010 Census of 24,951, which is an 18% increase from the 2000 Census figure of 21,187. Berks County has a current population of 428,849 (2020), a 4% increase from the 2010 population of 411,442, which is a 10% increase from the 2000 population figure of 373,638.

Ages 20-64 is the largest cohort in Exeter Township, followed by ages 5-19, ages 65 and older and ages 5 and under. Between 2010 and 2019 there was a slight decrease in population for ages under 65 years while the number of those who are 65 and older grew by 33 (Figure 2.2). By comparison, in Berks County, the age cohort distribution is the same as Exeter's (Figure 2.3). The median age of Exeter Township is 43.7, which is higher than the median age of 39.9 in Berks County. This demographic information shows that improvements at the Daniel Boone Homestead need to account for recreational opportunities for both aging and younger populations.

Most residents in Exeter Township identify as White (82%), followed by Hispanic or Latino at 9%, Black/African Americans at 4%, Two or More Races at 3%, Asians at 2% and Other Races at less than 1% (Figure 2.4). Berks County as a whole is more diverse than Exeter Township as 68% identify as White, 23% identify as Hispanic or Latino, 4% identify as Black/African American, 3% identify as Two or More Races, 1% identify as Asian and less than 1% identify as Other Races (Figure 2.5).

The median household income in Exeter Township is \$82,889, a 20% increase from the 2010 figure of \$69,093. This figure is also 30% higher than the Berks County median household income of \$63,728, 34% higher than the state figure of \$61,744 and 32% higher than the national median household income of \$62,843 (Figure 2.6).

4.6% of the population in Exeter Township live below the poverty rate (defined as people who lack sufficient income or material possessions for their needs). This is lower than Berks County

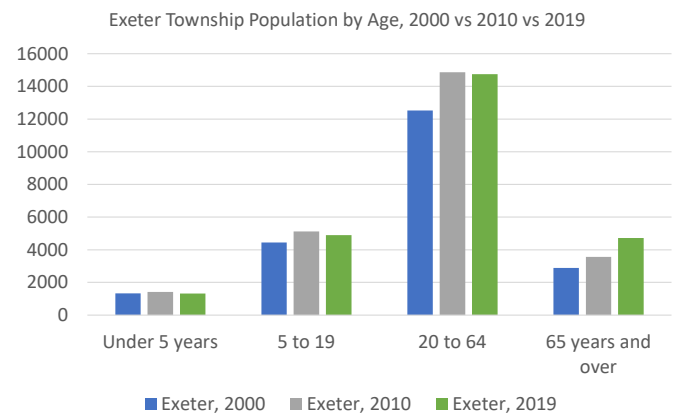


Figure 2.2

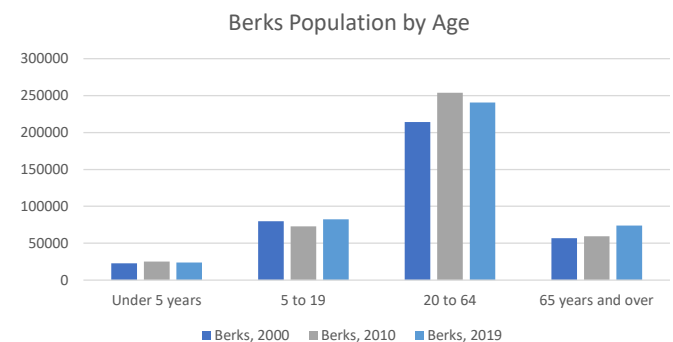


Figure 2.3

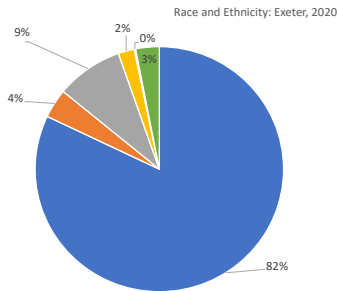


Figure 2.4

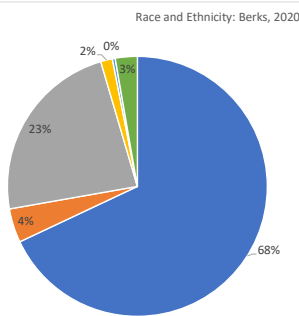
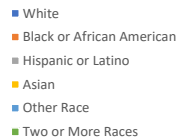


Figure 2.5



with 10.1% living below the poverty rate (Figure 2.7).

This information suggests Township residents may have larger disposable income than County residents for recreational purposes and related activities.

Households

Exeter Township has 9,588 households with an average of 2.64 persons per household. 60% of the households are occupied by married couples. Within Berks County, there are 154,712 households with an average of 2.62 person per household. Just over half of households are occupied by married couples, with female households and non-family households making up much of the rest.

Education

92% of the residents in Exeter Township have received a high school diploma or higher compared to only 87% within Berks County. Exeter Township also has a higher percentage of residents with bachelor's degrees or higher at 34% compared to 25% within the County.

Median income: 2019 vs 2010

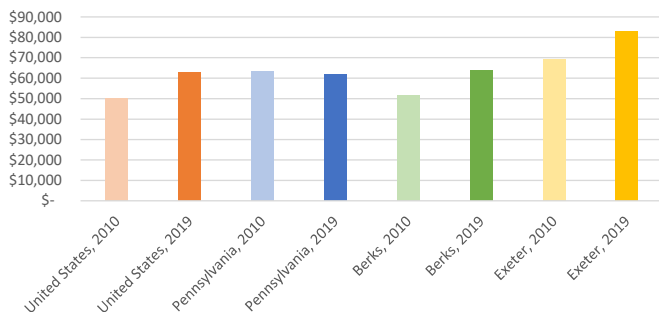


Figure 2.6

Percentage of Population Below the Poverty Level: Berks County vs. Exeter Township

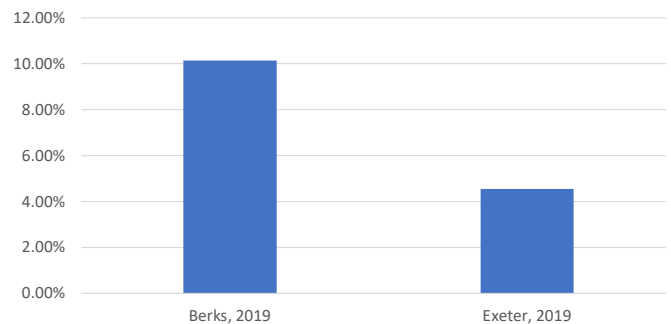


Figure 2.7

Regional Natural Resources

The Berks County Natural Heritage Inventory Update (2014) provides detailed information on the many natural resources that lie within Berks County. The eastern half of the County contains many forest patches that are greater than 25 acres in size, this includes the woodlands area of the Homestead and a large wooded area in the northwest section of the Township.

There are three Natural Heritage Areas within Exeter Township: 1. Monocacy Creek in the northern half of the Township; 2. The Reiffton South Settling Basin Site in the southern portion of the Township along the Schuylkill River; and 3. Neversink Mountain, a large, wooded hill spread out on the western edge of Exeter and surrounding municipalities, including Reading. Monocacy Creek is a Natural Heritage Area of statewide significance and in this location contains forested wetlands that support grasses in danger of population decline. The Reiffton South Settling Basin is a Natural Heritage Area of statewide significance. It is a coal comb desilting basin on the banks of the Schuylkill River, adjacent to one of the Township's parks, the Trout Run Sports Complex, and supports habitat for a plant species of concern. Neversink Mountain is a Natural Heritage Area of regional significance. It contains an array of habitats and supports two butterfly species of concern and seven plant species of concern.



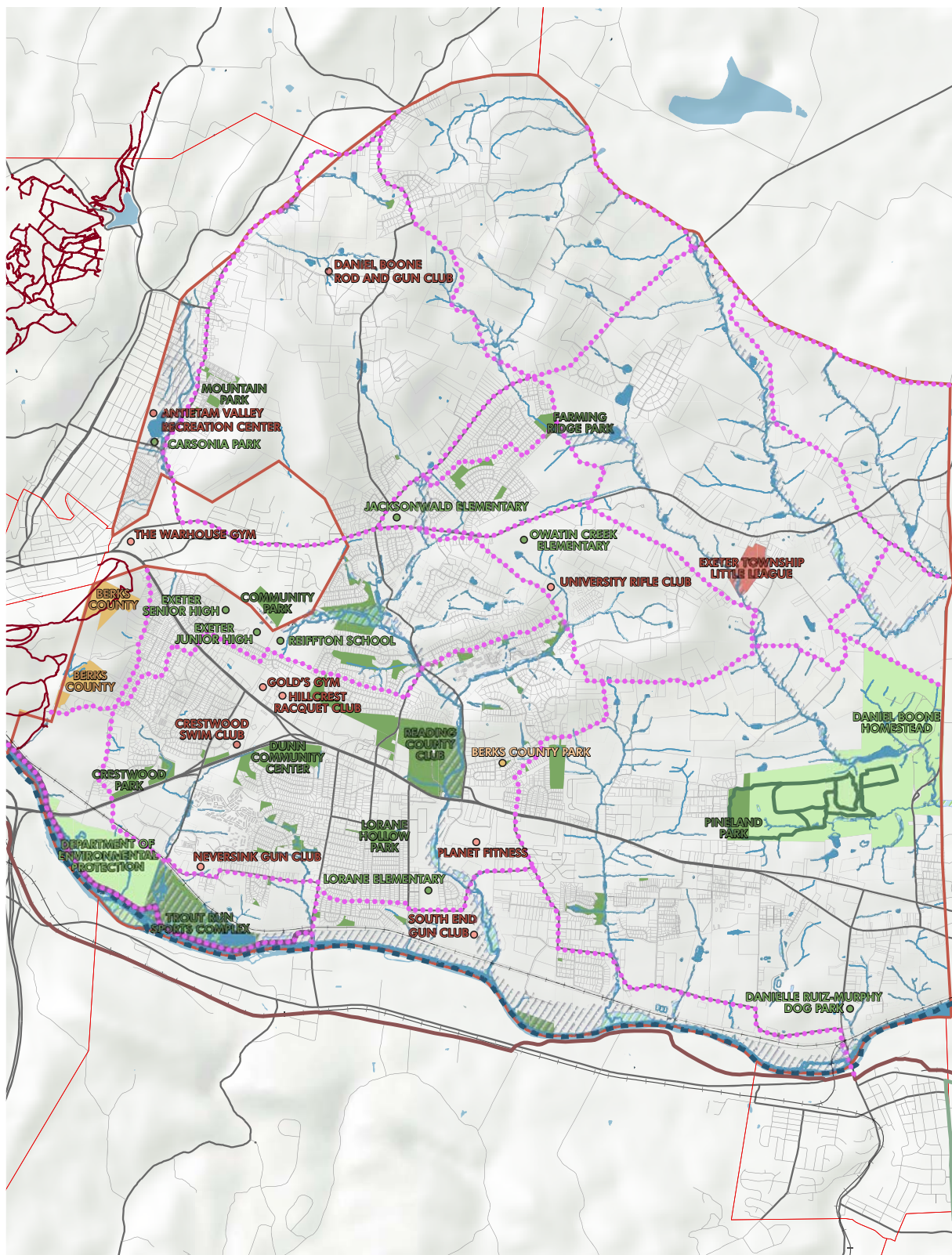
Regional Historic and Cultural Features

In addition to the Daniel Boone Homestead, numerous other historic and cultural resources are present throughout the Township. These include the Village of Lorane, the Union Traction Company Trolley Line and a number of structures listed on the National Register of Historic Places.

The Village of Lorane was established in 1835. In 1860, the Philadelphia & Reading railway built a station in the village, called Exeter Station, which was located purposely between Birdsboro and Reading. In 1900 the name of the station and post office was changed to Lorane. Today the framework of the village remains, although the station has since closed down.

The Union Traction Company Trolley Line bisected the Township and ran east to west through the Oley Valley. Union Traction founded Carsonia Park, a recreational area in Lower Alsace and Exeter Townships, as an amusement center and destination for its trolley line. Carsonia Park operated as an amusement park from the late-1800s to the mid-1900s. The trolley line was abandoned and much of its alignment has returned to a naturalized state or been purchased and developed. Some evidence of the old trolley can be found just east of Carsonia Park. The Park also contains the oldest and largest swimming pool in Berks County.

Exeter also has eight places listed on the National Register of Historic Places. This includes the Daniel Boone Homestead, the Reading Country Club and the home of Mordecai Lincoln, the great-great-grandfather of Abraham Lincoln.



Exeter Comprehensive Park, Recreation, and Open Space Plan

May 2018

- Municipal Boundary
- Water Bodies
- FEMA Floodplains
- Wetlands
- Roadway
- Rail Line

Land Ownership

- State Land
- County Land
- Township Land
- Private Recreation

Trails

- Schuylkill River / Thun Trail
- Exeter Scenic Trail
- Schuylkill River Water Trail
- Daniel Boone Homestead Equine Trail
- Mount Penn / Neversink Mountain Trails
- Strava Heat Map Routes

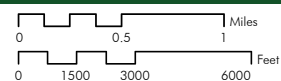


Figure 2.8

Exeter Township Parks & Recreation Facilities

The Exeter Township Parks system has eight parks and recreation sites, including the Dunn Community Center. The Township also owns and operates the Reading Country Club. These parks have a variety of facility types and amenities (Figure 2.8).

1. Community Park – 15-acre park that is located in St. Lawrence Borough but is owned by the Exeter School District. Includes one baseball/softball field, two basketball courts, one bathroom facility, one horseshoe pit, one multipurpose field, two pavilions/rental spaces, five tennis courts, one soccer field and a youth play area. The Park also has biking/hiking paths and picnic grills.

2. Crestwood Park – 8-acre park located in the southwest section of the Township adjacent to Route 422. It contains one informal multipurpose field and an informal parking lot.

3. Dunn Community Center – 2-story building located just off of Route 422. It includes the Exeter Community Library and can be rented out for events. Recreational classes are also held at the facility.

4. Farming Ridge Park – 8-acre park located in the northern half of the Township. It includes a basketball court, bathroom facilities, one multipurpose field, one pavilion/rental space, two tennis courts, one soccer field and one playground.

5. Lorane Hollow Park – 12-acre park located in the southern half of the Township. It contains a baseball/softball field, basketball court, bathroom facilities, grills, a horseshoe pit, pavilion/rental space, two tennis courts, soccer field and playground.

6. Mountain Park – 2.6-acre park located in the northern half of the Township. It includes one basketball court and one playground.

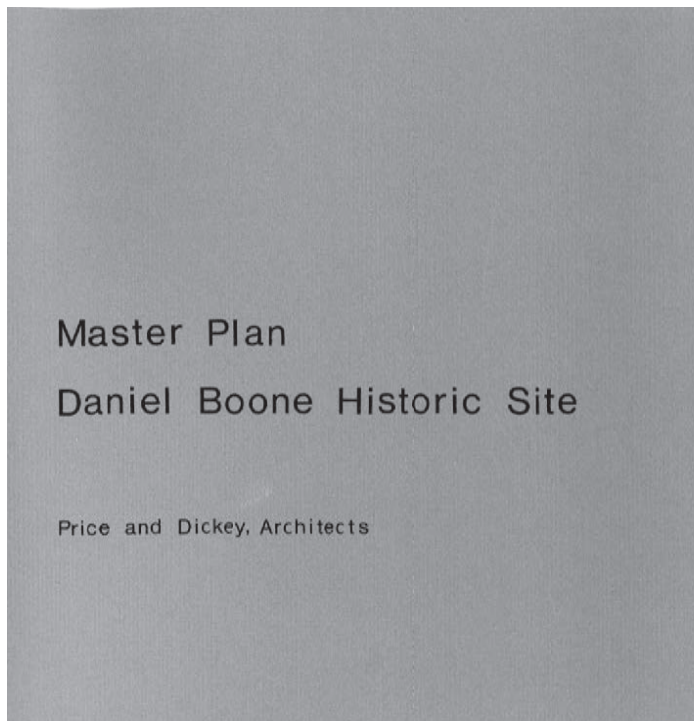
7. Pineland Park – 31-acre park that is part of the western edge of the Homestead and is leased by the Township for recreational use. It contains a baseball/softball field, basketball court, bathroom facilities, trails, grills, a pavilion/rental space, skate park, soccer field, volleyball court and a playground.

8. Trout Run Sports Complex – 113-acre park located in the southern half of the Township along the Schuylkill River. It includes four baseball/softball fields, bathroom facilities, two football fields, grills, three multipurpose fields and a pavilion/rental space.

9. Reading Country Club – A par-70 course located off of Route 422 that also includes a driving range and clubhouse that is used for catered events.

In addition to these parks, the Exeter Scenic Trail runs through the southern portion of the Township. It is a 2.3-mile route that is situated along the north shore of the Schuylkill River and has a trailhead in Trout Run, with connections to Neversink Mountain in the west. The Schuylkill River Trail (SRT) is also in close proximity to Exeter. Noted as the Thun Trail, this is a portion of the SRT that runs from West Reading to the Montgomery County Community College in Pottstown. The stretch nearest Exeter is a four mile portion between Birdsboro and Gibraltar.

Relevant Planning Documents



Master Plan for the Daniel Boone Historic Site (1968)

This plan was developed to determine the best utilization of the land available at the Homestead. One major recommendation was to relocate the road which ran along the north-south axis of the site to the eastern edge of the site. This ultimately became Daniel Boone Road. The objectives of the Plan are to:

- Provide an appropriate and dramatic setting for the interpretation of Boone's personality and career
- Recreate the 18th Century wilderness environment as closely as possible
- Provide opportunities for youthful camping experiences in this environment
- Recreate the 18th Century problems of transportation and their solutions
- Introduce working displays of both frontier and developed agricultural systems

Joint Comprehensive Plan for Amity Township, Exeter Township, St. Lawrence Borough (2005)

The Townships of Amity and Exeter and the Borough of St. Lawrence undertook this joint comprehensive plan as a way to examine regional planning in the face of development trends and to pursue common planning goals. This Study for the Daniel Boone Homestead helps to address the following goals:

- Natural and Scenic Resources Goal - Protect, conserve, sustain and enhance the natural and scenic resources of Amity, Exeter, and St. Lawrence for the benefit and enjoyment of current and future generations
- Historic and Cultural Resources Goal - Preserve and enhance the historic, architectural, and cultural heritage of Amity, Exeter and St. Lawrence
- Open Space and Recreation Goal - Provide open space within the municipalities through the preservation and acquisition of farmland, river and stream corridors, woodlands and hills, and the development and retention of recreation areas and parks

THE JOINT COMPREHENSIVE PLAN FOR AMITY TOWNSHIP EXETER TOWNSHIP ST. LAWRENCE BOROUGH

October 2005

Berks County Greenway, Park and Recreation Plan (2007)

This plan helps to set the framework for providing open space, greenways and recreation opportunities as the County grows in the future. The Study for the Homestead helps to address the following goal:

- Protection and preservation of historical sites and districts based on their status or eligibility for the National Register of Historic Places

The Business of Nature: The Return on Environment in Berks County (2015)

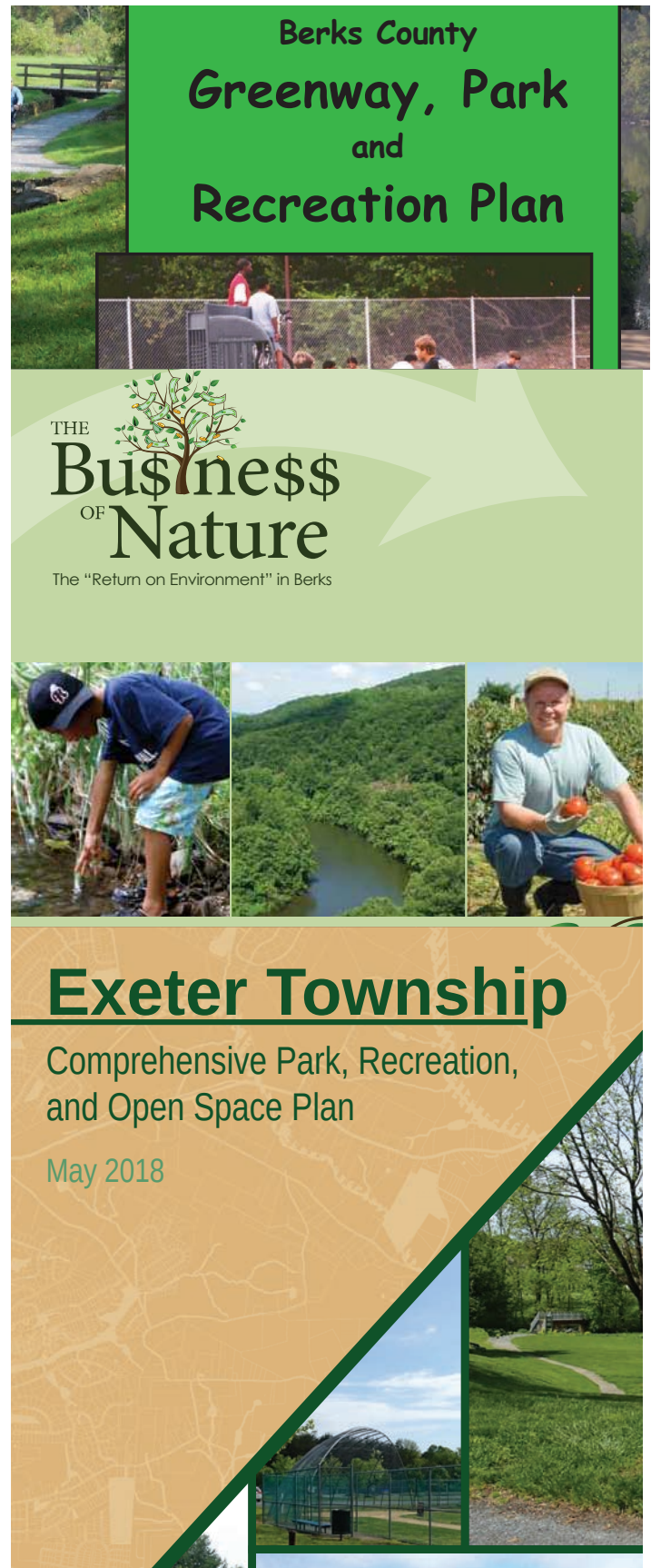
This report outlines the economic benefits of protected open space. Some of the positive impacts are:

- Camping contributes \$47 million to the Berks economy annually
- Wildlife watching contributes \$84 million to the Berks economy annually
- Headwater and riparian areas provider over \$3,000 per acre to the local economy each year in ecosystem services
- Plants and trees along streams provide \$77 million of flood control in Berks

Exeter Township Comprehensive Parks, Recreation and Open Space Plan (2018)

This plan was developed to effectively plan for park, open space, trails and other recreational facilities for current and future Township residents. This Study for the Homestead helps address the following goals:

- Protect and enhance open space areas, environmentally sensitive lands, and historic and cultural resources
- Create equitable and accessible recreational opportunities that can be enjoyed by people of all ages and abilities
- Promote and market park and recreation events, schedules, and programming through a variety of distribution channels
- Pursue funding opportunities in order to implement desired park and recreation improvements





- This Study also supports the Comprehensive Parks, Recreation and Open Space Plan recommendation of working with PHMC to preserve and enhance the Daniel Boone Homestead.

Pennsylvania Statewide Historic Preservation Plan: 2018-2023 (2018)

The purpose of this plan is to provide a framework of activities and goals that will help Pennsylvanians better understand historic preservation and its benefits and to satisfy the State's historic preservation planning obligations. The four goals of the Statewide Historic Preservation Plan are:

- Implement the statewide historic preservation plan as a resource that provides solution-oriented steps for preservation outcomes
- Use the power of planning to transform Pennsylvania's historic places into vibrant and diverse communities
- Position Pennsylvania to better respond to new preservation challenges and opportunities in the 21st century
- Invest in the future of Pennsylvania through the commonwealth's historic places and the people and programs that protect and celebrate them

Berks County Comprehensive Plan 2030 Update (2020)

Part of the vision of this Plan is to protect the County's rich agricultural land and heritage, expand its parks and trail systems, and promote the settlement of its population in a reinvigorated City of Reading and in boroughs and townships planned to emphasize higher density and more intimate walking-biking friendly communities. The Study for the Homestead helps to address the following goals:

Historic and Cultural Resource Goals

- To preserve and promote community, cultural, historical, and aesthetic elements that identify Berks County as a special place to live and work
- To promote and protect the people, places, and things that make Berks County distinctive to its residents and visitors
- To recognize historic preservation and cultural resources as a means of retaining community character, providing affordable housing, and assisting economic development



Land Use Goals

- To preserve, protect, and create a diverse open space network and provide adequate recreational opportunities for county residents
- To protect all environmental resources





Existing Facilities and Structures

There are seven structures within the historic core of the Daniel Boone Homestead. For a full description of these structures, please refer to the Frens & Frens Studio at Patterhn Ives report in the appendix.

1. The Bertolet House (Bertolet Log Cabin) - The Bertolet Log Cabin is a one-and-one-half story log dwelling originally constructed c. 1737 at a nearby Oley Valley homestead and moved to the Daniel Boone Homestead in 1968. The log cabin was situated northeast of the Daniel Boone Home, along with the relocated Bertolet Smokehouse. The log cabin and the stone foundation are generally in good condition.

2. The Bertolet Smokehouse - Adjacent to the Bertolet House is the Bertolet Smokehouse, also originally constructed at a nearby Oley Valley parcel and relocated to the Daniel Boone Homestead in 1968. The Smokehouse is a small rubble stone structure, open on the west gable end, with a beaver-tail clay tile roof. The open gable end provides access to the full width cooking hearth and bake oven. The Smokehouse is in good condition.

3. Homestead Barn - The Homestead Barn is a small bank barn measuring 43 feet long by 31 feet wide situated north of the Boone House. Portions of the barn are original to the Boone Homestead. The timber frame is clad with vertical board siding and sits on rubble stone foundation walls banked into the hillside. The threshing floor doors and ramp open to the north and the lower-level stables face south toward the Boone House. The Homestead barn is in very good condition. The wood roof has recently been replaced and is in excellent condition, along with recent repairs made to the wood board siding and windows, all in excellent condition.

4. Blacksmith Shop - The Blacksmith Shop was constructed in Amityville c. 1769 and moved to the Daniel Boone Homestead in 1968. The one-story log structure is comprised of two sections: a main log structure with a gabled roof and a smaller log addition at the west end with a shed roof. The Blacksmith Shop is in good condition. Regular and very recent restoration of the architectural woodwork including windows and doors has taken place within the last year and is in very good condition.

5. Homestead Smokehouse - The Homestead Smokehouse is situated just southeast of the Boone House and is a one-and-one-half story stone structure with beaver tail clay tile roof. The Smokehouse is in good condition.

6. Boone House - The centerpiece of the historic core, the Boone House is a stone farmhouse comprised of two main sections and constructed in three major campaigns. The earliest portion of the house, c. 1730, is the cellar of the two-bay section on the west end. On top of this cellar was the original log cabin of the Boone family. Added to the log dwelling c. 1790 was the two-story, three-bay stone section to the east. The log structure was later demolished down to the stone foundation and the two-story, two-bay stone section on the west was constructed in its place by the 1800s. The Boone House is in excellent condition. As the highlight of the historic resources on the property, the house benefits from consistent and skilled maintenance.

7. Visitor Center - The existing Visitor Center, situated approximately 100 yards east of the Boone House, is comprised of several building sections, the earliest dating back to the 1930s. The 1930s stone structure now identified as a cross-gable off the rear façade was enveloped with several later building campaigns. The Visitor Center has grown incrementally since the 1938 acquisition of the site by the Commonwealth of Pennsylvania into the hodge-podge of additions that comprise the building today.

In addition, there are also ten structures located outside the historic core.

1. Bertolet Sawmill - The Bertolet Sawmill is located south of the Boone House and was constructed in the late eighteenth or early nineteenth century on a nearby Oley Valley property and moved to the Boone Homestead in 1972. The sawmill was in regular use until the 1940s and has been in operation on the Boone site for milling demonstrations in the recent past. The Sawmill is in good condition. The heavy timber components exhibit checking and weathering but are in very good condition. The wood shingle roof is in poor condition.

2. Craft Shed - The Craft Shed, just east of the Sawmill, is a 20th century frame structure finished with vertical board siding and wood

shingle roofing. The structure is set on concrete block piers and is used in conjunction with small group activities. The shed is in fair condition.

3. Utility Building No. 1 - Sited up a low rise and west of the Sawmill is this small utility structure that formerly housed two public restrooms. The one-story rubble stone structure with wood shingled gable roof was constructed in the 1930s and intended to emulate historic outbuildings in the area. The durable finishes of this Utility Building are generally in good condition.

4. Utility Building No. 2 - Also situated on the rise just above the Sawmill is another Utility Building constructed in the 1930s of v-notched logs with chink and daub and a wood shingle gable roof. Like its neighbor, the wood shingle roof is in fair condition.

5. Utility Building No. 3 - Just west of the trail from the Sawmill to the Bertolet House sits a small Utility Building banked into the sloping hill. This one-story rubble stone structure with wood shingled gable roof was convincingly constructed in the 1930s to resemble a historic outbuilding. The Utility Building is in good condition.

6. Wayside Lodge - The Wayside Lodge is a one-story log and frame structure constructed in the 1930s but designed to suggest a composition of four or five building sections that evolved over time. The Wayside Lodge is in good condition. The wood roof has been installed within the last 10 years and is also in very good condition.

7. DeTurk House - The DeTurk House was constructed c. 1812 and is a two and one-half story banked farmhouse measuring 43 feet wide and 33' deep with a walk-out kitchen in the cellar. The DeTurk House was rehabilitated as a Visitor Center in the 1970s and later changed use to staff offices and storage. Unfortunately, in the process of adapting the building to office and meeting uses over the years, much of the interior integrity of the building has been lost, including replacement and reconfiguring of the main stairs.

8. DeTurk Springhouse - Behind the DeTurk House sits a small nearly square stone springhouse with a wood shingle gable roof. The east gable end of the building has been finished with stucco. The building currently houses the chlorinating system for the surrounding water lines. The stone structure is in good condition, requiring limited spot-pointing as needed.

9. DeTurk Barn / Maintenance Building - The DeTurk Barn is a large timber frame barn measuring over 100' long and 45' deep. The four-bay timber frame of the threshing floor sits on a rubble stone foundation, banked into the hillside. Rehabilitation of the barn in the 70s transformed the lower level into offices, storage and restrooms for the maintenance department. At the threshing floor, approximately one-third of the area serves as a workshop for the PHMC Preservation Services Department.

10. DeTurk Barn Outbuilding - Just outside the southeast corner of the paddock walls sits a small wood frame structure with standing seam metal on a gable roof. Though a farm outbuilding of similar size was located near this site, this structure was constructed in the 1990s to initially house a groundwater testing and remediation system but now serves as storage for the maintenance department. The building is in good condition, requiring attention to regular painting cycles to extend the service life of the wood finishes.

Zoning & Surrounding Land Uses

The Daniel Boone Homestead lies in the Agricultural Preservation District of Exeter Township (Figure 2.9). Part of the purpose of this district is to protect and promote the continuation of agriculture in areas with primary agricultural lands and to protect and stabilize the essential characteristics of these areas. Permitted uses in this district include all forms of agriculture, forestry activities, farm dwellings, conservation uses, rural businesses, seasonal outdoor recreational activities and outdoor recreation uses including parks, picnic grounds, horse riding trails, hiking trails, trails for nonmotorized bicycles, fishing, shooting and hunting clubs and camps.

The surrounding land use is predominantly agriculture, open space and low-density residential to the north of the site, a

combination of low and medium-density residential and open space to the west of the site, additional open space and the commercial corridor of Route 422 south of the site and low-density residential to the east of the site in adjacent Amity Township.

Circulation and Access

The site is bordered by Daniel Bone Road to the east and north. The road runs from Perkiomen Avenue/ Benjamin Franklin Highway (Route 422), which is the commercial corridor in the Township, to a fork two miles north where the road splits into Meetinghouse Road and Weavertown Road, which connect to points in northeastern Berks County. The two-lane road is maintained by PennDOT and the speed limit in front of the Homestead is 40 miles per hour.

The site is bordered by Pineland Road to the west, which provides access into Pineland Park. The road runs for approximately two miles from Route 422 to an intersection with Daniel Boone Road. The two-lane road is maintained by the Township and the speed limit in front of Pineland Park is 40 miles per hour.

The main entrance to the Homestead is along Old Daniel Boone Road, right off of Daniel Boone Road, approximately three-quarters of a mile north of Route 422. Old Daniel Boone Road is the main road through the site and provides access to the historic structures outside and inside the historic core. As it approaches the historic core, the road becomes a one-way counterclockwise loop with a spur that continues on to the north picnic area. The loop provides access to the main parking area for the Visitor Center and historic core structures.

There are six formalized parking areas providing 196 spaces within the Homestead:

- 56 spaces adjacent to the maintenance barn
- 33 spaces at the Wayside Lodge
- 25 spaces at the picnic grove
- 55 spaces at the Visitor Center (including 4 ADA spaces)
- 13 spaces in the north parking area's southern lot
- 14 spaces in the north parking area's northern lot

There are also two gravel lots near the south picnic area; one lot

ZONING LEGEND

Exeter Township

- Municipal Boundary
- AP – Agricultural Preservation
- FI – Flexible Industrial
- HC – Highway Commercial
- R – Rural
- SR0 – Suburban Residential 0
- SR2 – Suburban Residential 2

Amity Township

- LDR – Low Density Residential
- MHP – Mobile Home Park
- RC – Rural Conservation

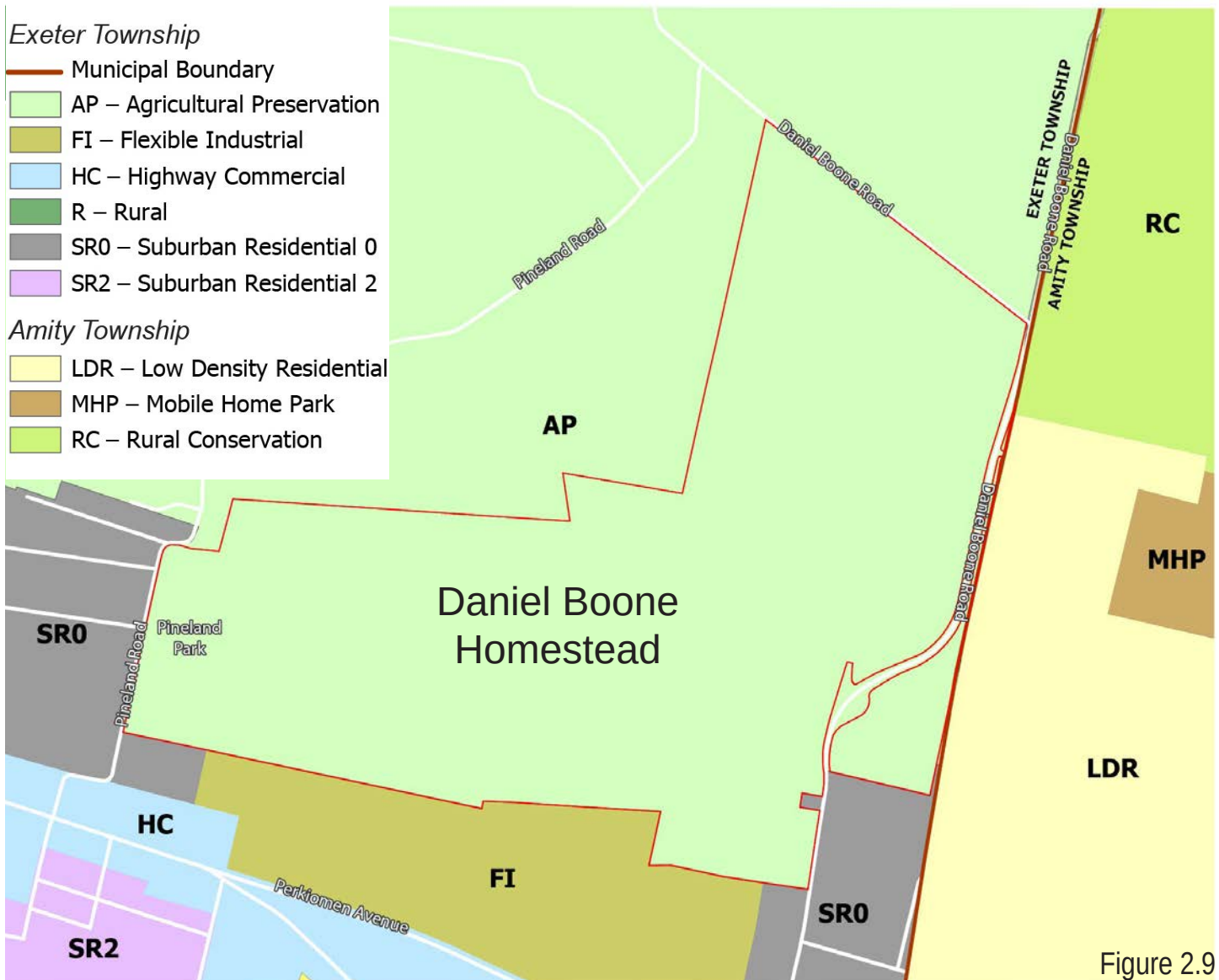


Figure 2.9

provides parking for horse trailers; the second lot provides parking for the picnic area and access to the bridle trails. In addition to these lots, visitors at the site use the meadow area south of the Visitor Center parking area as overflow parking during events and festivals. This, however, tends to damage the meadow due to the sensitive underlying soils.

There are approximately four miles of bridle trails at the site that are used by both equestrians and hikers. Visitors to the site also utilize the paved roads around the historic core for walking and hiking. Many of the existing trails do not meet ADA recommendations. The rolling topography creates a hilly landscape that many of the

trails traverse. In addition, some trails also go through sensitive habitats, such as wetlands. In addition to the bridle/hiking trails, there is also a sensory trail located off of Old Daniel Boone Road near the picnic grove, just below the large meadow south of the main parking lot. This trail is a quarter-mile roped loop trail that is designed for the visually impaired. It is interspersed with placards describing the wildlife of the site in both braille and large print.



Figure 2.10

Geology and Soils

The Daniel Boone Homestead is located in the Piedmont Province within the Gettysburg-Newark Lowland Section. The area is dominated by rolling lowlands, shallow valleys and isolated hills. Underlying geology includes valleys of limestone and dolomite separated by shale and sandstone. Information for the various soil types was acquired from the United States Department of Agriculture's online Web Soil Survey.

Site soils include: Abbottstown silt loam (AbA), Croton silt loam (CwA), Penn channery silt loam 3 to 8 percent (PeB), Penn channery silt loam 8 to 15 percent (PeC), Penn-Klinesville channery silt loam (PkD), Readington silt loam 0 to 3 percent (ReA) and Readington silt loam 3 to 8 percent (ReB) (Figure 2.10).

Abbottstown silt loam (AbA) – This soil is 0% to 3% in slope and makes up approximately 5% of the site. The soil is shallow with 6 to 18 inches to the water table, 18 to 22 inches to the fragipan and 46 to 50 inches to lithic bedrock. This soil is somewhat poorly drained with no ponding.

Croton silt loam (CwA) – This soil is 0% to 3% in slope and makes up approximately 9% of the site. The soil is shallow with 0 to 6 inches to the water table, 18 to 20 inches to the fragipan and 40 to 60 inches to lithic bedrock. This soil is poorly drained with occasional ponding.

Penn channery silt loam (PeB) – This soil is 3% to 8% in slope and makes up approximately 31% of the site. The soil is more than

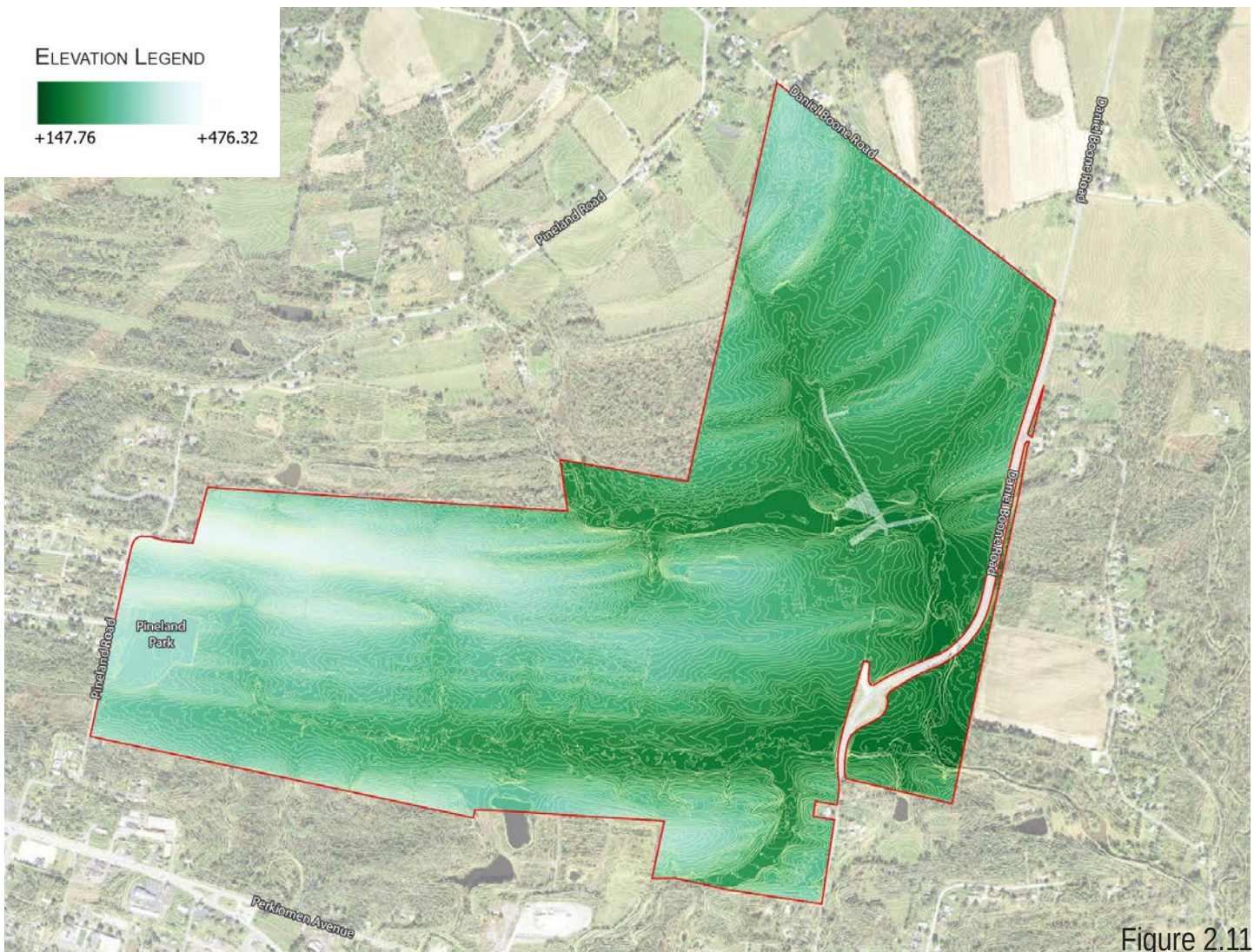


Figure 2.11

80 inches to the water table and 20 to 40 inches to lithic bedrock. This soil is well drained with no ponding.

Penn channery silt loam (PeC) – This soil is 8% to 15% in slope and makes up approximately 35% of the site. The soil is more than 80 inches to the water table and 20 to 40 inches to lithic bedrock. This soil is well drained with no ponding.

Penn-Klinesville channery silt loam (PkD) – This soil is 15% to 25% in slope and makes up approximately 8% of the site. The soil is more than 80 inches to the water table and 20 to 40 inches to lithic bedrock. This soil is well drained with no ponding.

Readington silt loam (ReA) – This soil is 0% to 3% in slope and makes up approximately 10% of the site. The soil is 18 to 36 inches to the water table, 20 to 36 inches to the fragipan and 40 to 70 inches to lithic bedrock. This soil is moderately well drained with no ponding.

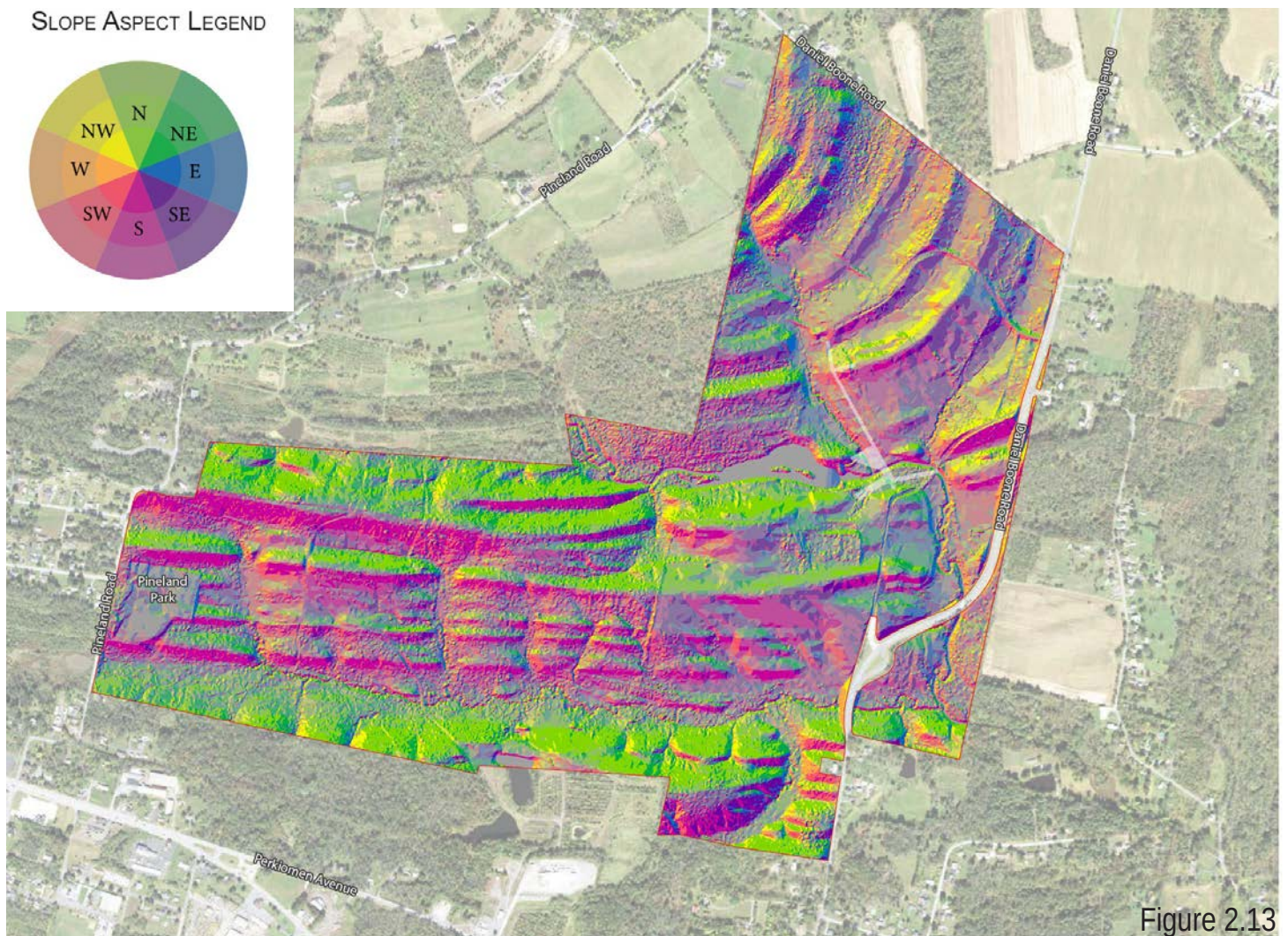
Readington silt loam (ReB) – This soil is 3% to 8% in slope and makes up approximately 2% of the site. The soil is 18 to 36 inches to the water table, 20 to 36 inches to the fragipan and 40 to 60 inches to lithic bedrock. This soil is moderately well drained with no ponding.

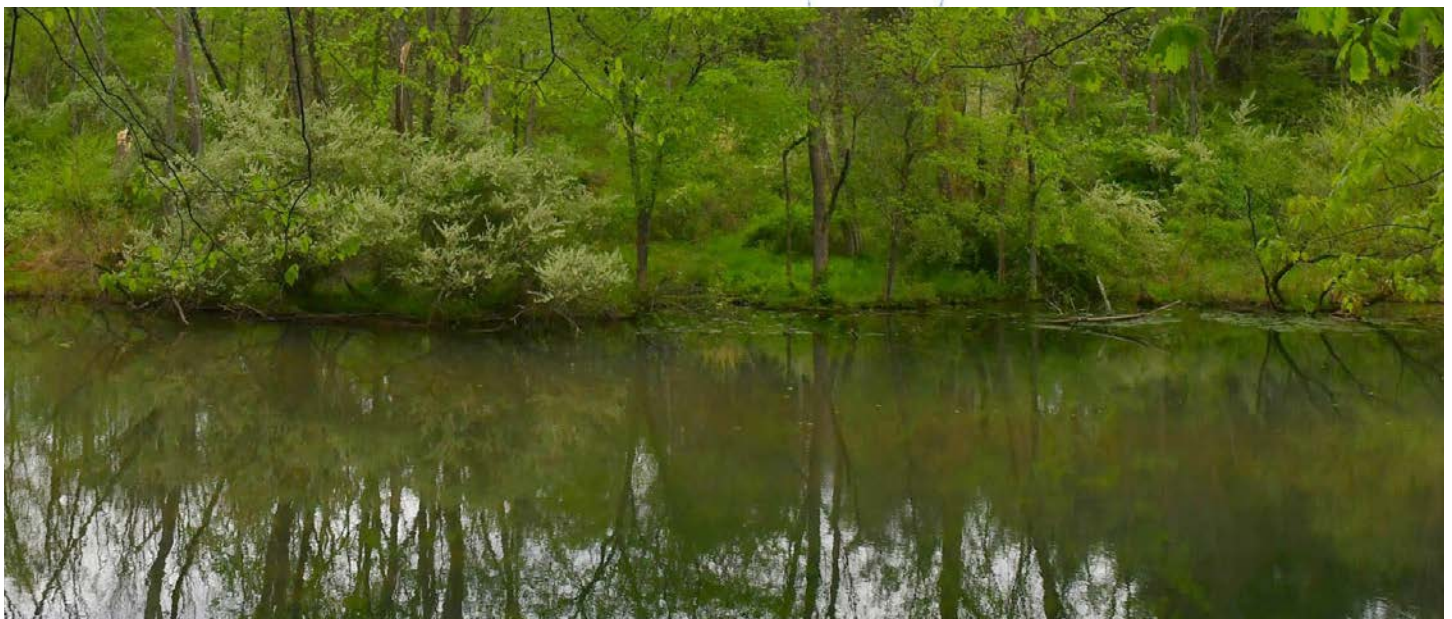
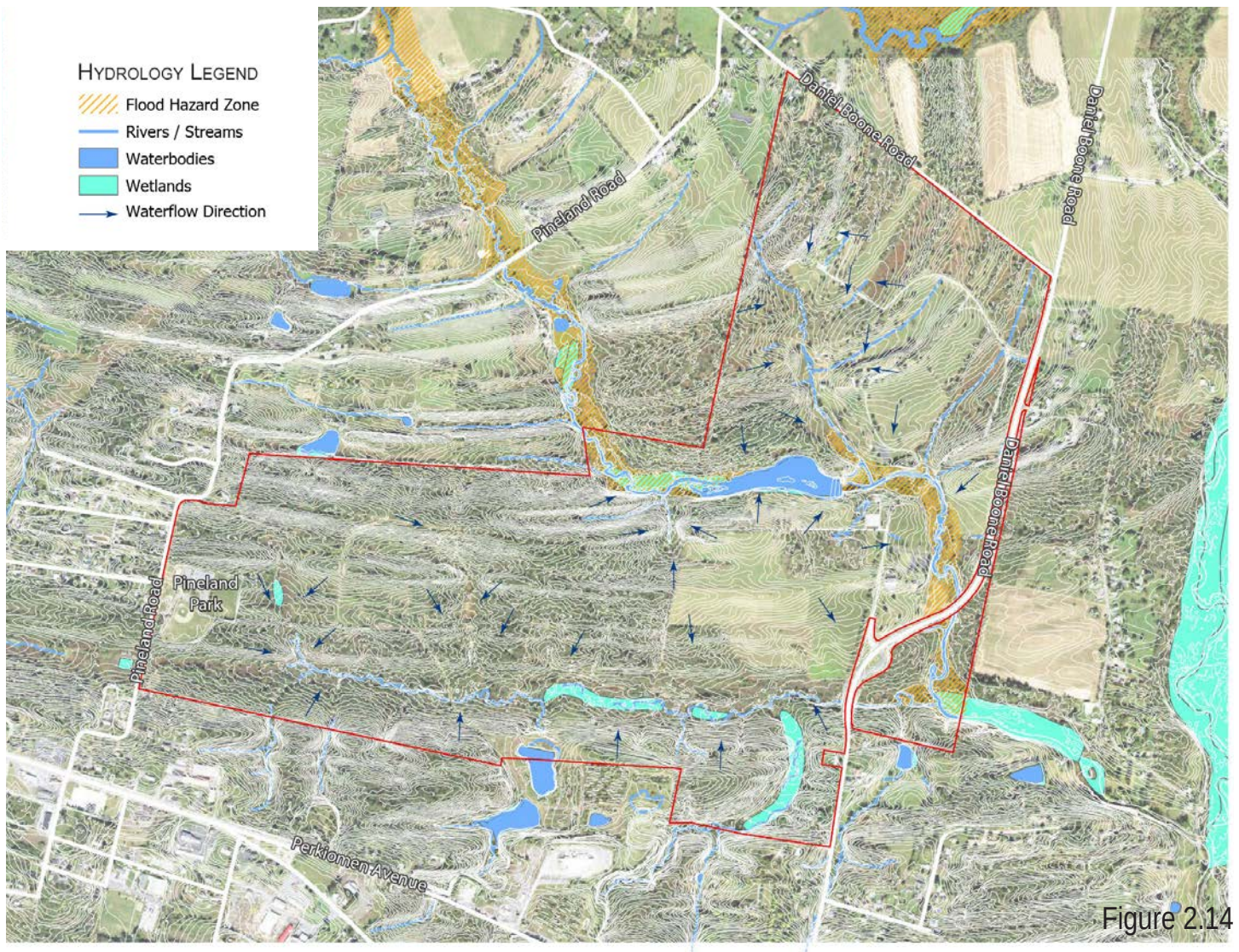
Topography

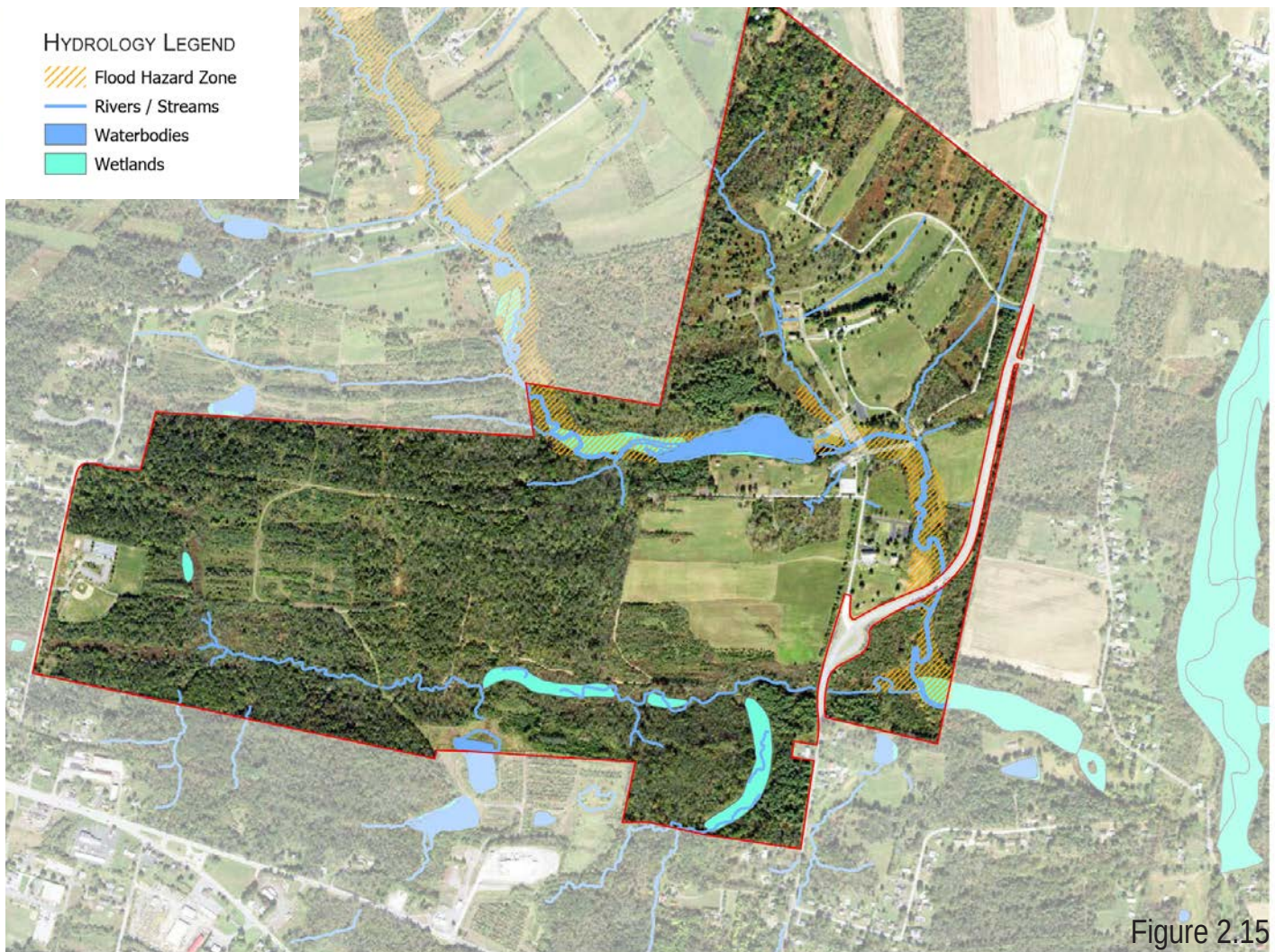
Site elevation ranges from approximately 147 feet to approximately 476 feet above sea level (Figure 2.11). The northern part of the site in the woodland area is dominated by north-facing steep slopes greater than 25 percent (Figure 2.12). These steep slopes are also prevalent in the southern portion of the woodland area. The center of the area is characterized by south-facing slopes that are between 5 percent and 15 percent.

The northern edge of the site is characterized by a series of peaks and valleys that transition from very steep to generally shallow gradients from northwest to southeast (Figure 2.13).









Hydrology

The Daniel Boone Homestead is located within the Schuylkill River watershed which is part of the larger Lower Delaware River drainage basin. Within the site, the Owatin Creek and Molasses Creek feed into the Monocacy Creek basin east of the site (Figure 2.14). Daniel Boone Lake, which was formed when the Owatin Creek was dammed, is approximately 4.5 acres in size and is the source of power for the Bertolet Sawmill when it is operating for demonstrations. In 2021, the PA Department of General Services began a project to dredge the lake in order to alleviate the build-up of silt. Additional work will include the installation of a sediment trap and inspection of the dam, spillway, wing walls and stilling basin. The lake is currently used for fishing and skating.

According to FEMA flood hazard information, the Owatin Creek to the east and west of the lake is located in Flood Zone A, which is a high-risk area that has a 1% annual chance of flooding (Figure 2.15).

Wetlands are also present on the site and are concentrated in two locations. One area is just to the west of the lake and the other is in the southern section of the site adjacent to Molasses Creek. These wetlands are typically saturated by surface or groundwater and can contain diverse plant species and animal habitats. Wetlands also act as natural filters and can help control pollutants entering water sources during rain events.

Flora & Fauna

RES conducted a robust inventory of the Daniel Boone Homestead. Results included the identification of 142 bird species, 11 amphibians, 12 reptiles and 18 mammal species. Also identified were hundreds of plant species. Habitat types include forests, pastures/fields, wetlands and stream resources. A detailed summary of the existing site flora and fauna can be found in the RES report located in the appendix.

Environmental Issues

The biggest threats to the site from an ecological perspective are:

- Fall and Winter Deer Browse (no survivorship in woody plant regeneration)
- Spring and Summer Deer Herbivory (greatly reducing diversity of native wildflowers, grasses, and sedges)
- Invasive plants (many)
- Invasive invertebrates (hemlock woolly adelgid, spotted lanternfly, earthworms, etc.)
- Management/Land Use (timing and frequency of mowing, ditching and draining wetlands, etc.)

The full RES report located in the appendix addresses recommendations for each management unit of the site.

PNDI description

Pennsylvania Natural Diversity Inventory (PNDI) is maintained by a collaboration of state agencies with the goal of identifying and protecting our states rare and endangered species. A PNDI report was performed as part of the grant application for this study and can be found in the appendix of this report.



Opportunities and Constraints

There is much potential for improvements at the Homestead. Due to the variety of resources on the site, different users enjoy the different resources. For example, the historical significance structures of the Homestead can be experienced and enjoyed by one user group while the recreational and open space amenities can be enjoyed by other users. Opportunities exist to create a user experience that provides for recreational activities while continuing to educate users on the importance of the historic, cultural and natural resources on the site that are enjoyed by all user types.

There is potential to protect, enhance and interpret a series of habitats existing on the site, which, through management and restoration, can add vast diversity to the site and surrounding region. The goal of maintaining and enhancing site ecology can be combined with offering recreational opportunities. Development and location of recreational amenities and trails should consider the following:

- Trail and trail connections should be ADA accessible where possible
- Important historic and scenic view sheds should be reinforced and protected
- Natural habitats and natural resources should be as minimally disturbed as possible

The introduction of new amenities should be accompanied by the addition of new wayfinding signage and interpretive signage. New wayfinding can assist visitors who may be unaware where particular structures are located or who may confuse one specific structure with another due to similar architectural styles and the absence of existing signage. New interpretive signs can also educate visitors on the history and significance of structures and natural habitats. These can be augmented with QR codes which can supplement the information on the signs with material on the user's smart phone and can also direct users on what they can do to help protect sensitive historic and natural environments. The study makes recommendations for the locations of a basic system of wayfinding signage.





*3 Activities & Facilities Analysis and Study
Recommmendations*

Community Needs, Uses and Priorities

As noted under the purpose of this Study at the beginning of this report, the Daniel Boone Homestead is an underutilized resource in the Exeter community and region. One key reason for the Township undertaking this Study is to make the Homestead better known and to promote increased use and enjoyment and to foster improved site conditions, especially outside of its historic core for compatible passive recreational activities. Even prior to the Covid-19 pandemic, previous Township plans have shown a need for greater availability of passive recreational facilities such as hiking trails, bird-watching and nature observation areas and opportunities for local residents to be outdoors and enjoy the natural world.

The Homestead's current passive recreational facilities are somewhat limited. Pedestrians must share vehicular driveways, a condition that is not ideal; many existing off-driveway paths are located poorly and are not sustainable over the long-term; meadows and other areas of the site are ecologically degraded and cannot support the potentially robust and diverse collection of flora and fauna that is possible on the Homestead. The proposed ecological uplift for the site will also support increased visitation to the Homestead of its open space and passive recreational opportunities. People who visit the site for those reasons will also, as an intended "by-product", develop an appreciation of the historic core and all that it has to offer.

The life and legacy of Daniel Boone is unique in America, and it is a story that is engaging in its own right but also has direct connections to the natural world. This story has incredible relevance today as climate change confronts society. The dependence of people on the land and the environment in Boone's time has a direct connection to today's environmental challenges. Similarly, study recommendations for repurposing and adaptive reuse of



some existing facilities at the Homestead will likewise bring visitors to the site for other reasons besides history. However, these visitors will become cognizant of the Boone legacy and story.

Obviously, all of the strictly “non-historical” recommendations of the Homestead that are designed to increase use and visitation to the site for activities generally referred to as passive recreation should have the added effect of engaging more and more visitors in the unique history of the Homestead. Increased use of the Homestead should also help justify and support increased capital expenditures by PHMC (and its sister agencies). The recommendations contained in this report support the overall priority for this Study of encouraging and developing continued agency support for the Homestead.

Design Guidelines

The Study considers a number of generally accepted and, in some cases, legislated design standards. While some of these standards cannot be fully articulated until detailed designs for the park are completed, they are listed here as a reference for future design stages of the Homestead.

Universal Design Standards (Accessibility)

The Americans with Disabilities Act (ADA) Standards for Accessible Design serve as a base line accommodation standard for building accessibility in the United States. These are standards mandated by Federal statute.

There are additional standards which exceed ADA. Universal Design (UD) is defined as “the design of products and environments to be usable by all people, to the greatest extent possible without the need for adaptation or specialized design” (Center for Universal Design, North Carolina State University). Universal design is meant to be adaptable to various building types, learning environments and communities. UD is driven by seven core principles:

Equitable Use. The design is useful and marketable to people with diverse abilities. For example, a website that is designed to be accessible to everyone, including people who are blind and use screen reader technology, employs this principle.

Flexibility in Use. The design accommodates a wide range of individual preferences and abilities. An example is a museum that allows visitors to choose to read or listen to the description of the contents of a display case.

Simple and Intuitive. Use of the design is easy to understand, regardless of the user’s experience, knowledge, language skills, or current concentration level. Science lab equipment with clear and intuitive control buttons is an application of this principle.



Perceptible Information. The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities. An example of this principle is captioned television programming projected in a noisy sports bar.

Tolerance for Error. The design minimizes hazards and the adverse consequences of accidental or unintended actions. An example of a product applying this principle is software applications that provide guidance when the user makes an inappropriate selection.

Low Physical Effort. The design can be used efficiently, comfortably and with minimum fatigue. Doors that open automatically for people with a wide variety of physical characteristics demonstrate the application of this principle.

Size and Space for Approach and Use. Appropriate size and space is provided for approach, reach, manipulation and use regardless of the user's body size, posture, or mobility. A flexible work area designed for use by employees who are left- or right-handed and have a variety of other physical characteristics and abilities is an example of applying this principle.

Sustainable Design Standards

Choices in materials can affect the stewardship of a site or larger ecosystem. Every material has a life cycle cost with implications for water and energy use as well as their carbon footprint. Close consideration of the sustainability of a material's life cycle can have far-reaching implications. Best sustainability practices that may be applicable to the Homestead include the following:

- Re-use of existing site materials.
- Purchase local and sustainably produced plants and materials.
- Consider the full life cycle of materials. Consider the end life cycle of a product. Can it be deconstructed and reused?
- Work towards zero net waste in demolition, construction, and management.
- Strive to harvest solar energy and reusing greywater and stormwater.
- Mitigate the impacts of site development while improving the environment.

Trails and Sidewalks

New and improved trails are the major proposed facilities proposed for the Homestead. The Study opinion survey indicated walking and hiking are the major reason visitors come to the site and new and improved trails and the passive recreational opportunities they provide should continue to be the primary facility type that attracts visitors to the site.

The site design will require a hierarchy of trails and walkways across the Homestead.

Wherever possible, it is recommended that these trails and walkways conform to the minimum standards of the Americans with Disabilities Act (ADA) as previously discussed and that these facilities also be Universally accessible. In many locations, this will require



Currently, many visitors utilize the Homestead roads for walking

that walkways and trails be paved with durable, low maintenance materials such as asphalt, concrete, stone dust or pavers. The level of use and desired attention to detail will inform material choices during design and engineering. Attention must also be paid to the context of Historic Core of the Homestead. However, it is recommended that ADA and/or Universal accessibility should be a priority in the historic core. The context of the Daniel Boone Homestead as an outdoor museum is very important as the historic structures help to tell this important story. However, this is not intended to be a true historically accurate setting. Accordingly, while trail and walkway materials choices need to be sympathetic to this setting, it is most important to provide Universal access to these resources wherever feasible.

The width of trails and walkways will vary greatly based on location and use.

Single Track / User Hiking Trails

Both single use hiking and equestrian trails are proposed for the Homestead. These trails should range from 1 to 3-feet wide with 1 to 2-foot shoulders. Most of these trails will be earthen surface and in the case of hiking trails – in areas of poor drainage – they

may need to be supplemented with wood chips surfacing or small section of boardwalks.

These native surface hiking and equestrian trails will be appropriate in many areas of the Homestead. These compacted earthen surfaces are often used to navigate the site in environmentally sensitive areas. These trails do not often meet ADA requirements; however, ADA trail guidelines for hiking and equestrian trails should be referenced when determining final trail alignments.

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

- Improved / proposed trails should generally follow a 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).
- Out-sloping or Cross slope: An out-sloped tread is one that is lower on the outside or downhill side of the trail than it is on the inside or bankside. Out-sloping lets water sheet across the trail naturally. The tread should be out-sloped at 5 percent. For ADA compliant trails, maximum cross slope should be 2%.



Example of an accessible trail

- 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 constructed rock, log or earthen structure or placed perpendicular to the trail. Waterbars will intercept water flows along a trail and divert flows into vegetated areas. Waterbars do require maintenance and upkeep compared to other trail design devices and should be implemented where other methods will not work to alleviate trail erosion.

Mown Trails

Mowed trails are often used in naturalized meadow areas and are low cost to implement but require regular maintenance in the form of mowing. These trails are not ADA compliant and may become muddy with heavy use. Trail crossslopes should range from 2 to 5 percent. These can be permanent or temporary trails.

ADA-Compliant Asphalt Trails

Asphalt trails and walkways are proposed to provide an ADA-compliant trail within the Homestead. A primary loop trail is proposed for the Homestead and this trail is recommended to be 10 feet wide. The material provides a level stable walkway while minimizing maintenance in areas where slopes will exceed 3 percent. Trail shoulders should be 2-feet in width. One option discussed during the Study was to provide asphalt with red aggregate that results in a red asphalt surface, reflecting the native “red” shale soils. This treatment is recommended in the historic core of the Homestead to replace existing red gravel, that is not ADA accessible. The historic core trails are recommended to be a minimum width of 8 feet. For other trails, 5 to 6 foot widths are recommended to conform with required passing widths. Trails benches can be located at regular intervals to allow users to stop and rest.

ADA Compliant Stone Dust Trails

In areas of longitudinal slopes no greater than 3%, 5 to 10-foot wide compacted stone dust trails are also an option to provide an ADA-compliant trail option within the Homestead. In key locations the placement of boulders or logs along the edge can help prevent the migration of stone dust material. It should be noted that stone dust trails will require significantly more maintenance than



Example of a shared use trail

asphalt trails. For single use walking trails a width of 5-feet with 1-foot shoulders is appropriate. For shared use trails a width of 10-feet with 2-foot shoulders are recommended. This width will accommodate higher level of user groups such as dogwalkers and families with strollers. Along trails benches are recommended at regular intervals to allow users to stop and rest.

Sidewalks

Although minimum sidewalk width can be 3 feet to minimum ADA standards, it is recommended that sidewalks be from 5-feet to 8-feet wide depending on the level of use. In some areas of the site walkways may be incorporated into plaza or sitting areas. Access to the Homestead Visitor Center, proposed events barn, DeTurk House, restrooms and other areas they should be a minimum 5-foot width will accommodate ADA wheelchair passing standards. Gradients should not exceed 4.99 percent.

If the 3-foot minimum sidewalk width is utilized, a passing space should be provided at least every 1000 feet. Tread obstacles not to exceed a 2-inch-high maximum. Trail cross slope not to exceed 2-percent maximum and trail running slope (trail grade) should meet one or more of the following:

- 4.99% or less for any distance

- Up to 8.33-percent for 200-foot length maximum distance between resting intervals
- Up to 10-percent for 30-foot length maximum distance between level, resting intervals
- Up to 12.5-percent for 10-foot length maximum distance between level, resting intervals
- No more than 30% of the total trail length may exceed a running slope of 8.33%

Trail Signage should be provided indicating the length of the trail or trail segment noting surface type and difficulty as easy, moderate, or strenuous.

Native Plant Material & Invasive Plant Removal

The use of native plants supports the vision of enhancing the natural ecosystems at the Daniel Boone Homestead. The plan for the site should include forest and shrubland restoration; shrub and herbaceous plant understory restoration; meadow establishment; wetland enhancement; and streambank and riparian buffer plantings. Habitat restoration in some areas of the site should include native plant buffers and screen plantings. Native plant materials can create an attractive landscape that will help minimize long-term maintenance costs. Native plants are generally resistant to most pests and diseases and once established, require little or no irrigation or fertilizers. In addition to the above benefits, native plants provide food and habitat for indigenous fauna.

Disturbed lands and farm fields often allow invasive plant materials to establish on a site, and this has been the case at the Homestead. A program for controlling invasive plant species should be undertaken in conjunction with restoration plantings. Specific recommendations regarding establishment and management of site habitat restoration can be found elsewhere in this report. Please refer to the RES report in the appendix.

Stormwater Best Management Practices (BMPs)

Developed by the Pennsylvania Department of Environmental Protection (PADEP), The Pennsylvania Handbook of Best



Example of a swale stormwater BMP

Management Practices for Developing Areas offers numerous solutions for handling on-site stormwater. Best Management Practices (BMPs) that might be implemented at the Homestead could include:

- protect / utilize natural stormwater flow runoff direction;
- habitat restoration;
- soil amendments;
- native tree planting, rain garden & bio-swales;
- detention/infiltration facilities; and,
- the use of porous surfaces in the parking areas, or trails. These facilities require site-specific soil tests to determine site suitability and the infiltration rates of the existing soils.

Incorporation of these BMPs into Homestead improvements will have a direct positive impact on preserving and enhancing water quality. The opportunity for education exists through the placement of interpretive signage to educate visitors about watershed water quality and how BMPs can positively impact all sites.

Construction Permits

Erosion & Sedimentation Control

Erosion and Sedimentation Controls Plans are required for projects that create more than 5,000 square feet of earth disturbance. The Berks County Conservation District is delegated by the Department of Environmental Protection to conduct certain activities for the Erosion and Sediment Pollution Control (ESPC) program and the National Pollutant Discharge Elimination System (NPDES) program for stormwater discharges from construction activities in Berks County. Also, DEP Rules and Regulations state that a municipality or county which issues building, or other permits shall notify the Department or Conservation District within 5 days of receipt of an application for a permit involving an earth disturbance activity consisting of 1 acre or more. With the exception of local stormwater approvals and authorizations, a municipality or county may not issue a building or other permit or approval until an NPDES or E&S permit, if necessary, has been obtained from the Conservation District or DEP.

The NPDES Permit is a federal permit that is administered at the state level, and the overall goal of the NPDES permit is to improve water quality. Projects that disturb over one (1) acre of land require an NPDES permit for Stormwater Discharges Associated with Construction Activities.

The permit plans are divided into two (2) parts. The Erosion & Sedimentation Pollution Control plans (ESPC) are to be implemented by the contractor throughout construction activities until the site is stabilized by permanent plant growth. The Post Construction Stormwater Control Plans (PCSC) are to be constructed during the project and maintained by the site owner for the life of the project.

DEP Chapter 105 Water Obstruction & Encroachment General Permits

In addition to NPDES permit, Pennsylvania Department of Environmental Protection may require Chapter 105 Water Obstruction & Encroachment General Permits. These permits are required when construction activities impact existing waterways and wetlands. These may be required where improved trails cross creeks and intermittent streams on the Homestead.

Design Elements & Proposed Facilities

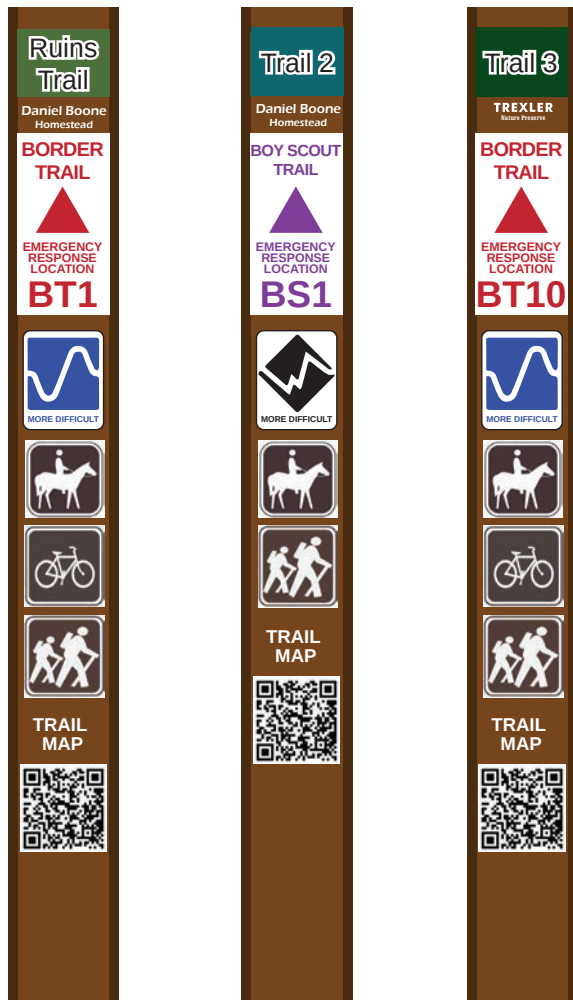
Signage

Interpretive Signage

There are numerous opportunities for various types of interpretive signage at the Daniel Boone Homestead. The Study offers the opportunity to plan for interpretive signage to educate the public on the history and natural processes of the site. These signs can take many forms. On site or static signage can vary in size and should be designed to appropriately fit within the natural and or historic setting of the Homestead. The Study recommends 4 to 6 interpretative signs in the natural areas of that site that can focus on the following topics:

- Habitat Restoration – meadows; forest; wetlands and others
- The importance of protecting stream headwaters
- Site History – plant and animals that were present when Boone walked the property
- Wildlife – Snakes; birds; deer; and others
- Forest Stewardship Practices
- Wildlife Management

These Interpretive signs can be linked by smart device via QR codes which could provide ever-changing content about the wide variety of things to be interpreted. Links could also be provided for self-directed walking / hiking tours of the Homestead with content prepared by PHMC. In addition, 4-6 signs could be installed in the historic core that focus on historic interpretation and historic education.



Example of trail wayfinding signage

Trail Wayfinding

Trail Wayfinding signage is an important element for both the first-time visitor and those who come to the Homestead frequently. Information on trail wayfinding can include:

- Mileage markers
- Trail difficulty
- Denote historical or natural resource points of interest

Similar to interpretive signs, trail markers also include links to on-line information and presentations.

Site Furnishings

Site furnishings provide additional amenities and create a sense of uniformity in the Homestead's landscape. Some of these improvements include benches, trash receptacles, signage, bike racks, and dog waste stations. In high use areas these amenities should be chosen to be durable and blend seamlessly into the historic and natural landscape and meet ADA design standards. In other areas such as along more remote hiking and equestrian trails these amenities may be as simple as a log bench or boulder.

Habitat Boxes

Man-made fauna habitats in the form of wildlife boxes are encouraged to encourage habitats for bats, native birds, and native bees. Wildlife boxes can be potential projects for local boy scouts, girl scouts, and volunteer groups.



Example of habitat boxes

Study Recommendations

Following completion of a thorough site and ecological analysis of the Homestead; consideration of proposed program elements from the project committee and public; and a review of draft concepts and recommendations by the committee, stakeholders and public; the consultant team developed a series of recommendations for the Daniel Boone Homestead. The following is a description of the major improvement recommendations for the Homestead described element by element. Please refer to the plan map to understand the locations of these recommendations (Figure 3.1).

Feasibility Studies

Before certain facility improvements are introduced and built, the following feasibility studies should be developed in order to determine specific needs, requirements and locations.

Educational Space Feasibility Study

A feasibility study should be prepared to determine a suitable facility for educational purposes and programming. This study would analyze existing facilities, such as the Craft Shed, for their use as long-term educational spaces based on their size, location, access and amenities. This feasibility study should be tied to the evaluation of the Visitors Center and its options for the long-term.

Existing Restrooms Feasibility Study

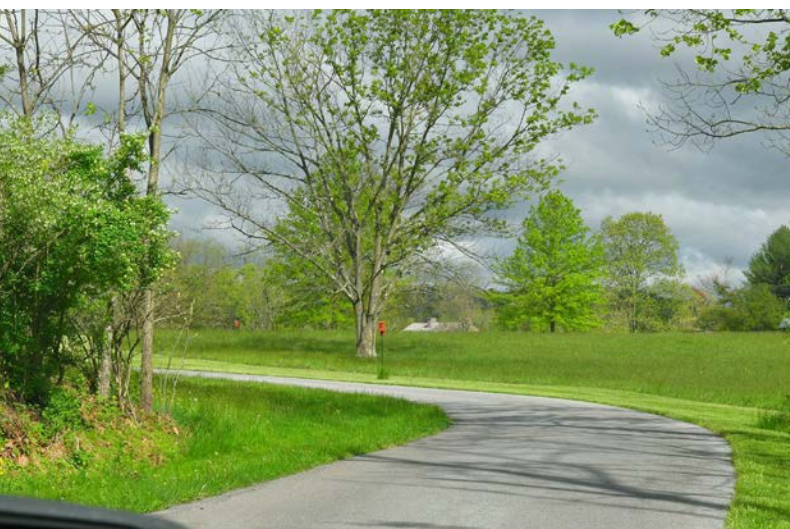
A feasibility should be prepared to assess remote restroom facilities sitewide to help determine the number, type and location of facilities needed and whether they are / would be year-round or seasonal use facilities.

Existing Parking and Access Feasibility Study

A feasibility study should be prepared to assess existing parking lots and access routes to site amenities to help determine the need for additional parking facilities and access improvements.

Feasibility Study for a New Maintenance Facility / Accessibility Study for DeTurk Education Center

The Homestead should work with consultants to prepare a feasibility study for a new maintenance center. The feasibility study would assess and evaluate the conditions of the current facility and determine whether it is necessary and present a plan for a potential new facility (recommended in the Study to be located north of and below the existing barn) in order to adequately meet the maintenance needs of the Homestead. In conjunction with this feasibility study, an accessibility study for the DeTurk Education Center should also be prepared to ensure what ADA compliant access upgrades would need to be completed before the building could be utilized for future event space.

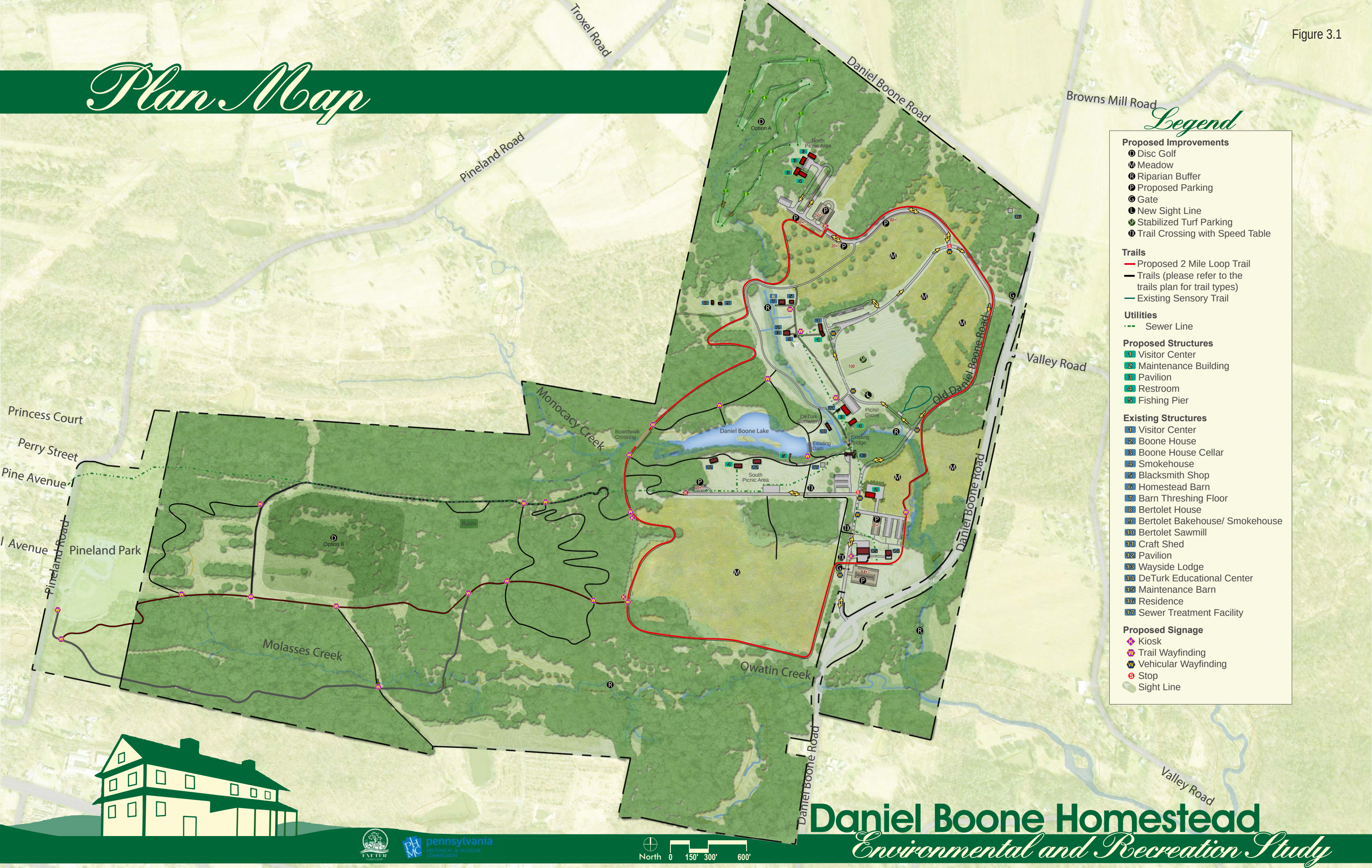


BEFORE - Obstructed view of the Boone House from the loop road



AFTER - Unobstructed view of the Boone House, after grading, from the reverse entry loop

Plan Map

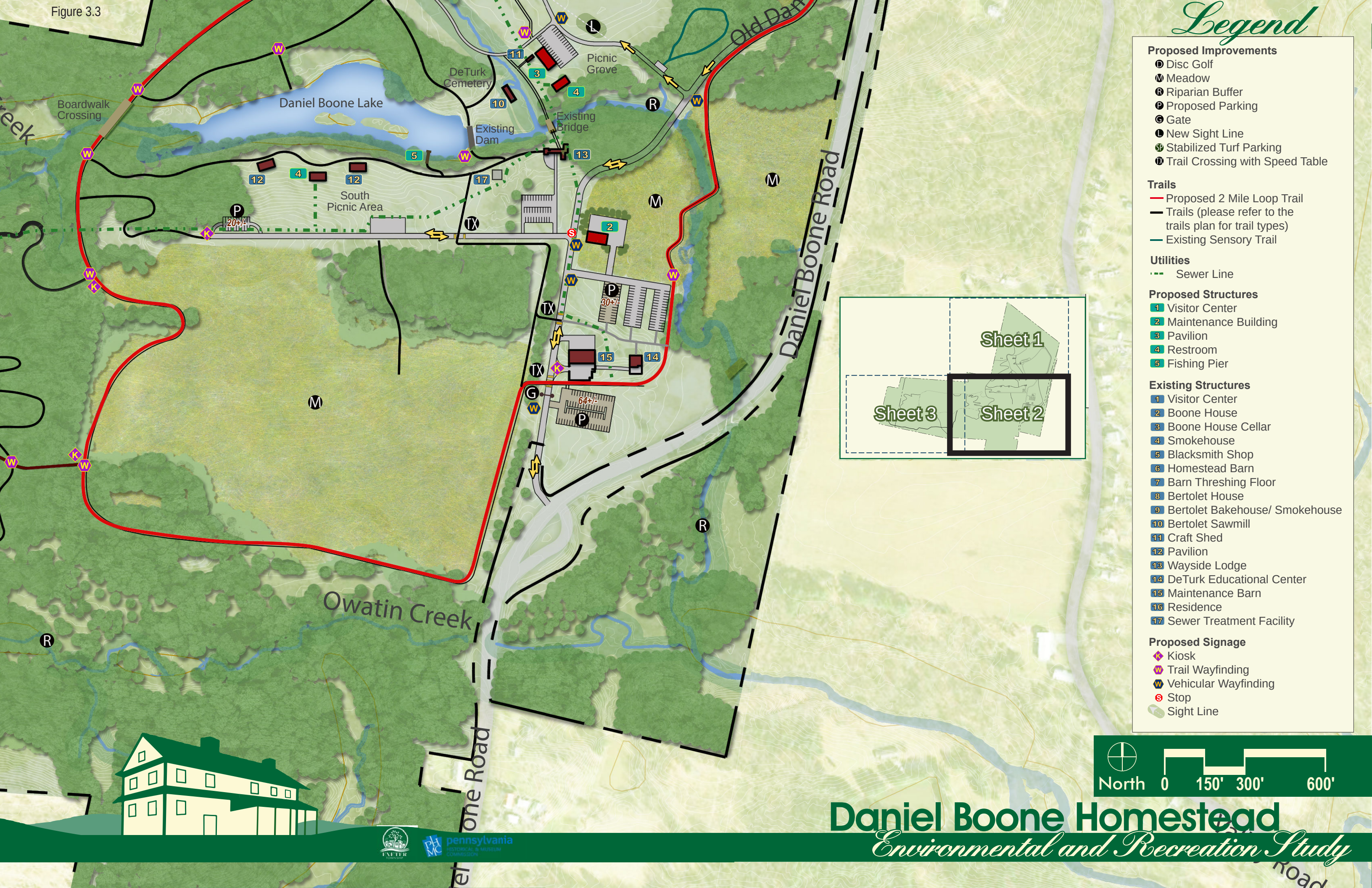


Daniel Boone Homestead Environmental and Recreation Study

Figure 3.2



Figure 3.3



Legend

Proposed Improvements

- Disc Golf
- Meadow
- Riparian Buffer
- Proposed Parking
- Gate
- New Sight Line
- Stabilized Turf Parking
- Trail Crossing with Speed Table

Trails

- Proposed 2 Mile Loop Trail
- Trails (please refer to the trails plan for trail types)
- Existing Sensory Trail

Utilities

- Sewer Line

Proposed Structures

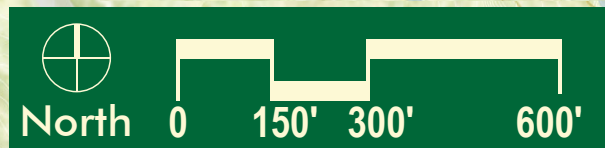
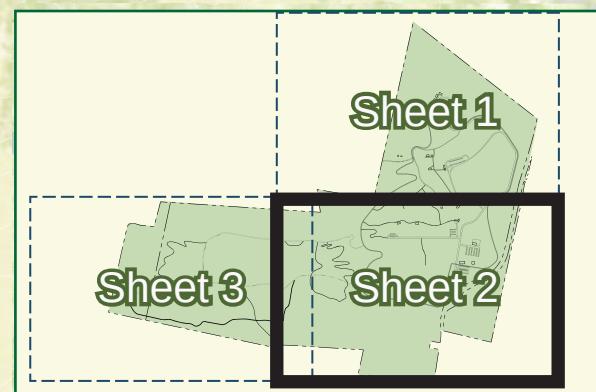
- Visitor Center
- Maintenance Building
- Pavilion
- Restroom
- Fishing Pier

Existing Structures

- Visitor Center
- Boone House
- Boone House Cellar
- Smokehouse
- Blacksmith Shop
- Homestead Barn
- Barn Threshing Floor
- Bertolet House
- Bertolet Bakehouse/ Smokehouse
- Bertolet Sawmill
- Craft Shed
- Pavilion
- Wayside Lodge
- DeTurk Educational Center
- Maintenance Barn
- Residence
- Sewer Treatment Facility

Proposed Signage

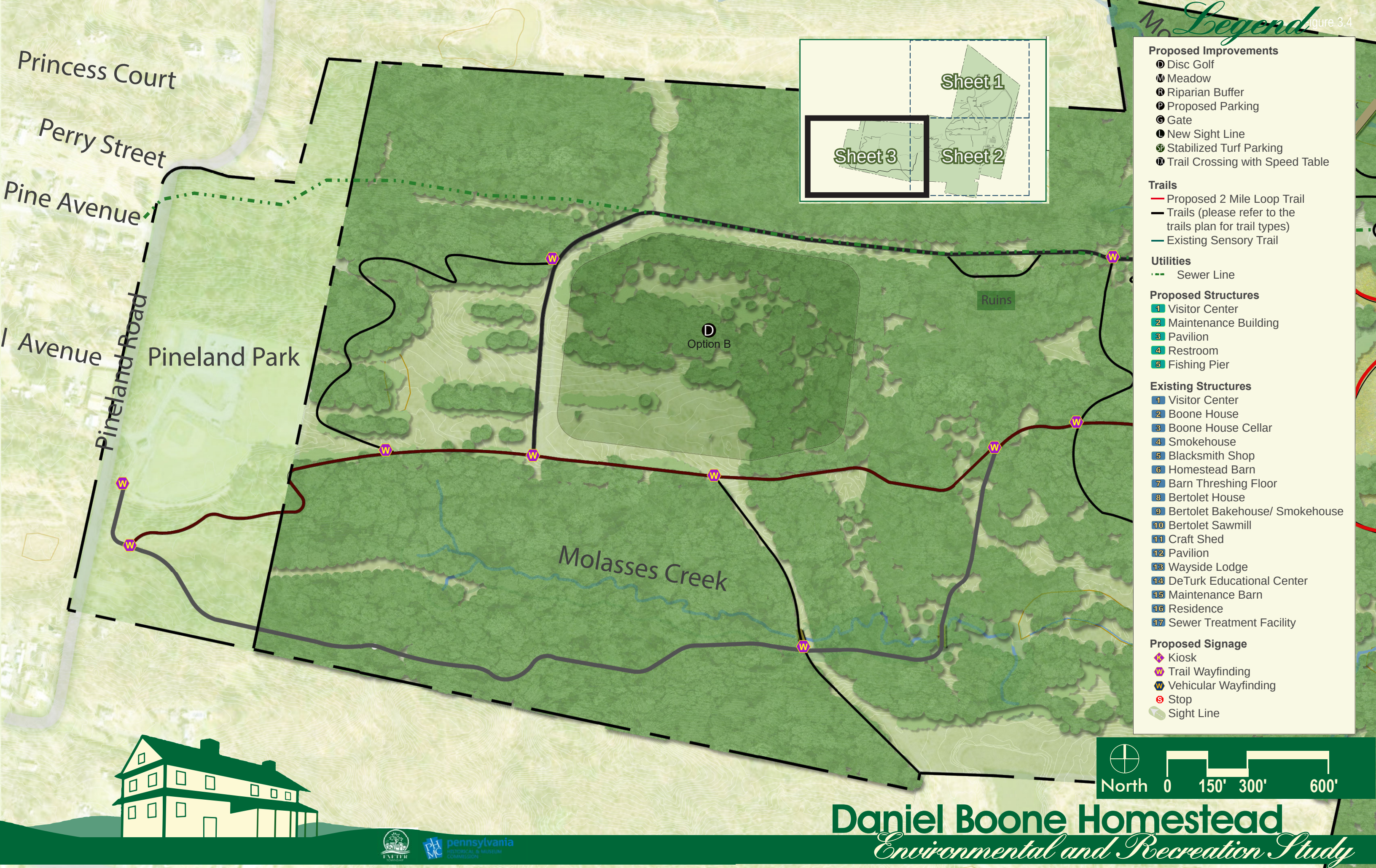
- Kiosk
- Trail Wayfinding
- Vehicular Wayfinding
- Stop
- Sight Line



Daniel Boone Homestead

Environmental and Recreation Study





Reverse the Entry Direction

The current site automobile entrance from Daniel Boone Drive takes visitors past the current maintenance barn, DeTurk House and Wayside Lodge along a winding driveway toward the historic core via a loop road. The loop road brings visitors in a counterclockwise direction through wooded and open areas and eventually delivers guests to a parking area in front of the Visitor Center. There are no views from the automobiles for visitors of the historic core structure, which are located behind and below the Visitor Center (which actually blocks these very important features from view). The consultant team heard many times from PHMC staff that first time visitors sometimes come to the Homestead and cannot easily find the historic core structures, most notably the Daniel Boone House.

The Study recommends keeping this one-way driveway loop but reversing its direction to clockwise. This (along with some minor grading of the meadow) will allow visitors arriving by motor vehicle a direct and impressive view of the Daniel Boone House – the raison d'être for this historic site. Proceeding a bit further, the historic house will be temporarily hidden from view for a few seconds, then revealed again as the driveway gently curves around to the right, delivering visitors the Visitor Center parking area.

Northern Area of Historic Core

Currently the northern area of the Homestead historic core consists of hay fields and wooded areas (some of this area is quite wet), a parking area with parking, a pit toilet in poor condition, picnic

areas and few other improvements. The following improvements are recommended (Figure 3.2).

Update Restrooms

For the North Picnic Area, the recommendation is to replace the existing restrooms, as they are beyond repair. Additionally, the site was recently linked to the area's sewage system, so these facilities should be tied to the new system as well.

Repair / Replace Pavilions

The existing pavilions (two) are past their useful lives and should be replaced with new rustic structures.

Plan Structured Overflow / Event Parking

When the Homestead is host to large events, such as historical reenactments, boy scout jamborees, or Exeter Township community days, overflow parking is often needed.

One option could be a large overflow lot in the Northern Picnic Area. In addition, stabilized turf parking spaces immediately adjacent to the drive aisle can provide additional parking.

The large meadow area east of the Visitor Center, in the area contained by the loop driveway, can also benefit from stabilized turf. When conditions are dry, this area currently works relatively well. However, the site's shale soils tend to hold water and do not drain quickly, so wet conditions can make parking here problematic



Example of riparian stream corridor planting

and can cause significant damage to meadow and compact soils. An option could be to create a large area of stabilized turf to accommodate up to 100 cars. This will require an area of approximately 35,000 SF – roughly 185 feet by 185 feet. The area should be marked in the field. When not utilized for parking, the area will appear just like any meadow. This area can also serve the Homestead for field boy scout camping, historic reenactments and other special events.

Create a Disc Golf Course

A nine-hole disc golf course is recommended for this northern area. The disc golf “targets” are discrete and the impact on the natural landscape is minimal. This is a popular low impact, low cost passive sport activity and will bring a new user group to the Homestead.

Convert Hay Areas to Warm Season Grass Meadows

The current meadow areas are “hay” grass which is a monoculture species that has almost no ecological or habitat value. The study recommends that this meadow be converted to native warm season grasses that will add an ecological uplift and create habitat for nesting birds. See ecological recommendations in the appendix.

Add Riparian Stream Corridor Planting

Like most of the Homestead, invasive plants are everywhere. Over time, these invasives need to be removed and replaced with native species. This is especially important in the site’s riparian corridors as these plants can protect water quality. See ecological recommendations in the appendix.

Convert North Site Entrance to Emergency and Special Event Access Only

Currently, visitors park in front of and along the road at this location to access the site after hours when the site entrance gate is closed. This is a dangerous condition, as speeds along the road are high and the road shoulders where visitors are parking are narrow. This road shoulder should receive fencing, bollards, boulders, plantings or other appropriate barriers to deter parking here. New improvements at the main entry of the Homestead will safely allow parking and pedestrian access when the gate is closed.

Implement ADA Updates

Where feasible, all of the proposed improvements should be ADA compliant.

Historic Core

Install 2-Mile ADA-Compliant Multiuse Loop Trail

As noted in the public opinion survey, walking and hiking is the most mentioned reason for visiting the Homestead and currently, walkers must share driveways with motor vehicles. A new 10 foot wide, asphalt surface loop trail is recommended to facilitate an all-weather trail surface (Figure 3.2).

Visitor Center Options

The idea of a new and/or renovated Visitor Center has been a discussion within PHMC for at least 20 years. Plans and architectural drawings for a new Visitor Center addition were prepared by PHMC and DGS in 2009. There were earlier studies also. However, the project never went forward. This Study also examined the options for a new visitor center in regard to options for its location on the site. Obviously, more detailed study and programming is required by PHMC on the full consideration of a new facility. There are three simplified options noted in the study for the long-term.

- Construction of a new visitor center in the location of the current building.
- Construct an addition to existing building
- Construct a new building in a new location, slightly to the south and east of the existing building location

This evaluation should be tied to the feasibility study for an education space / facility and a new building should not be constructed unless the existing facility has a new use, such as an educational facility, depending upon the evaluation.

Install a New Pavilion and Restrooms Near Craft Shed for Educational Programming

The pavilion and restroom at the Picnic Grove will allow more frequent use and educational events in the area of the historic sawmill and pond. This will also serve trail users in this part of the Homestead. This recommendation is dependent on the feasibility study of the existing restrooms.

Meadow Area

New Maintenance Facilities

The current barn as a maintenance center for the Homestead is a very inefficient building and current maintenance staff are well aware of the shortcomings of this building. However, the barn is magnificent. The upper floor with its cathedral-like ceiling is a great, inspiring space and it would be wonderful to make this space open to the public.

If a new maintenance facility is determined to be feasible, it is recommended to be located north of and below the existing barn (Figure 3.3). This area has been graded many years ago for parking (that was never constructed) and a new maintenance building in this location can be easily located here, along with the requisite maintenance yard area. A simple vegetation screening buffers and filters views of the utilitarian function and uses.

Based on other PHMC maintenance facilities, the new maintenance facility will require 3,000 square feet of conditioned office, storage, and workspace, and 2,500 square feet of unheated vehicle and equipment storage space. The PHMC workshop, which serves the architectural woodwork restoration needs of all PHMC historic sites, is anticipated to require 2,000 square feet of conditioned space.

Convert Existing Maintenance Barn and DeTurk Educational Center

The DeTurk Barn has served as the site maintenance building for the Daniel Boone Homestead since the 1970s, yet its appearance at the historic site entrance remains visually problematic. The threshing floor level (upper floor) of the bank barn houses the PHMC Preservation Services workshop and the stable level (lower level) houses the repair, storage, and office facilities of the site maintenance department. The paddock on the south side of the barn is an outdoor parking area for site maintenance equipment and is the first visual element encountered by the site visitor.

If it is determined that moving the site maintenance function and PHMC workshop out of the DeTurk Barn and into a new maintenance building is feasible, this then frees the barn to become a new event space and catering facility. Both levels of the barn open onto grade, and the levels can be connected by stairs and an elevator, providing full accessibility to the building. For the largest events, a

tent could be placed either in the paddock or immediately north of the threshing floor doors. The ground floor perimeter can readily be insulated for four-season use, allowing restrooms and catering kitchen to be located at the lower level. The threshing floor can also be converted to four-season use, but at great expense or great loss of integrity. Barns can be insulated and still retain their “barn character” by creating a double-wall system in which the insulation is buried between what appears to be the original exterior board siding and what appears to be the interior face of that siding. Alternately, the upper level could more readily and less-expensively be adapted to three-season use, which is the preferred option.



Example of historic site exhibit



Example of interpretive signage at a historic site

In addition, based on the findings of the accessibility study, the DeTurk Education Center should be upgraded with ADA compliant access before it can be utilized for future event space.

Install a New Pavilion and Update Restrooms at the South Picnic Area

One recommendation for the South Picnic Area is to install a new pavilion to compliment the existing two pavilions. An option for the restroom would be to demolish it and construct a new restroom that is tied to the new sewer system. This recommendation is dependent on the feasibility study of the existing restrooms.

Provide for After House Pedestrian / Trail Access

The Homestead has long experienced the use of the site's trails after the outdoor museum is closed. PHMC is fine with this use. However, many after-hours visitors park along the existing road, either at the main entrance or further north at the emergency access driveway. This creates a less than ideal condition, as vehicle speeds are high on the roadway and there can be rutting and damage to these turf areas when the soil is wet. A new parking area (40 cars) is recommended just south of the existing maintenance barn with a gate located on the driveway, just north of this parking area. This will allow safe parking for these visitors while keeping the site secure from after-hours motor vehicles. The proposed 2-mile loop trail will go past this parking area.

Woodland Area

The Woodland Area is partially the site of a former tree nursery and provides an interesting landscape of native, invasive and introduced plant species. (See ecological assessment.) Several improvements are suggested for this area (Figure 3.4).

Restore / Create Samuel Boone Homestead Ruins

Daniel Boone's uncle built a house in this area, and the ruins of this homestead are still visible in the landscape. The Study recommends recreating (or reimagining) this home and interpreting it for visitors. Interpretive signage and other simple means of telling this story should be explored.

Remove Impaired Trails

There are several trails and several section of trails, primarily in the wet areas of the site, near some small tributaries that are not sustainable as active use trails. These trail segments should be removed and revegetated to keep visitors out of these sensitive landscapes.

Install Multiuse Accessible Trail / Hiking Trails

It is recommended that a new multiuse ADA accessible trail be installed in this area that will permit access from the west (and Pineland Park) to the Homestead. Additionally, other earthen surface hiking trails are recommended in other parts of this area of the Homestead (described in the next section). These other hiking trails will provide a variety of hiking experiences in an area of the site with significant topographical variations.

Restore Woodland Habitat in Former Nursery Stock Area

This area should be reforested as per the ecological uplift report recommendations.

Create a Disc Golf Course

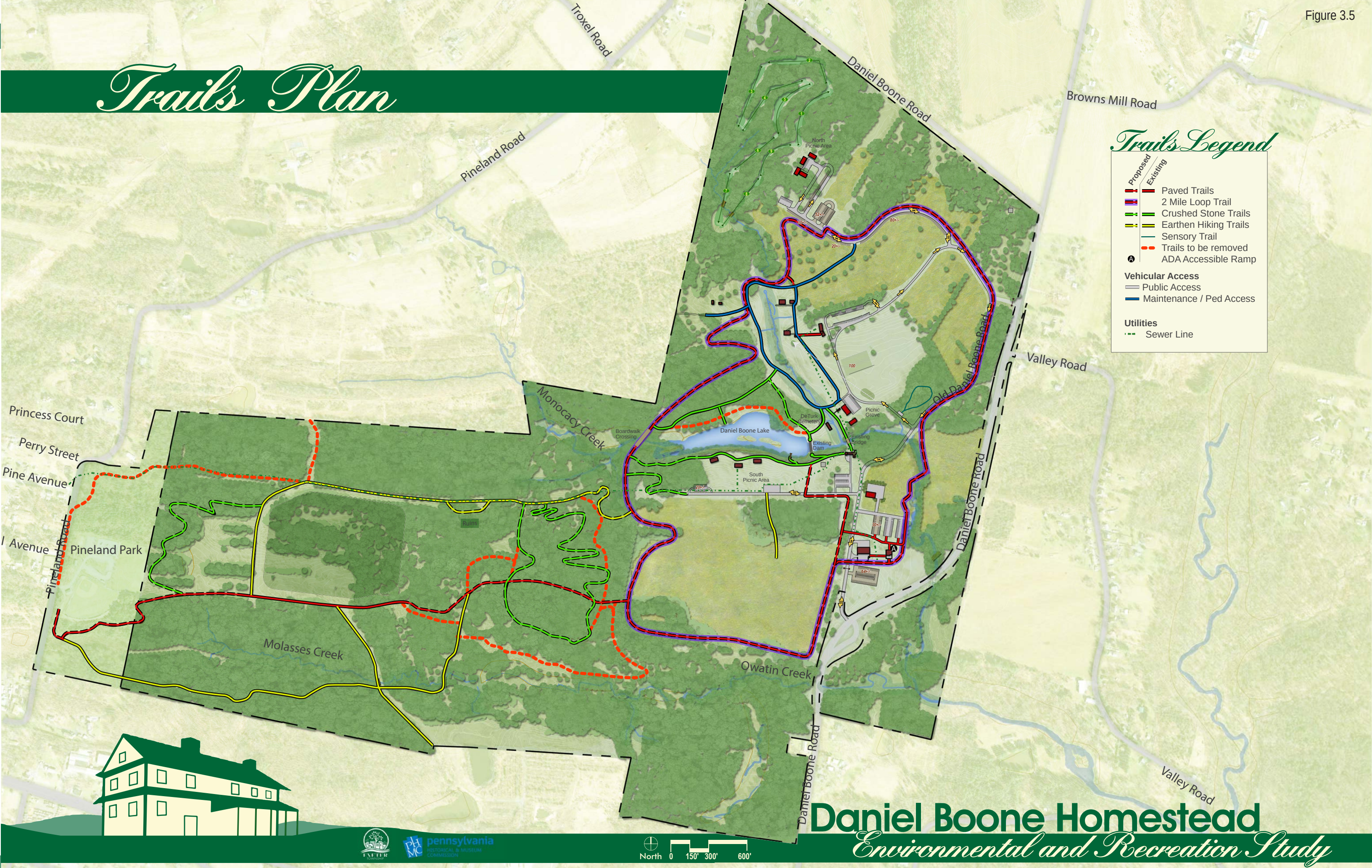
An area near Pineland Park can be an alternate location for a none hole disc golf course.

Proposed Trails Plan

Many of the existing trails at the Daniel Boone Homestead do not meet ADA recommendations. The rolling topography creates a hilly landscape which many of the trails traverse. The trails plan recommends that several of the trails be rerouted to follow gentle slopes and maintain a < 6% or less grade. Some of the existing trails have been eliminated due to environmental concerns. Those trails go through sensitive habitats, such as wetlands.

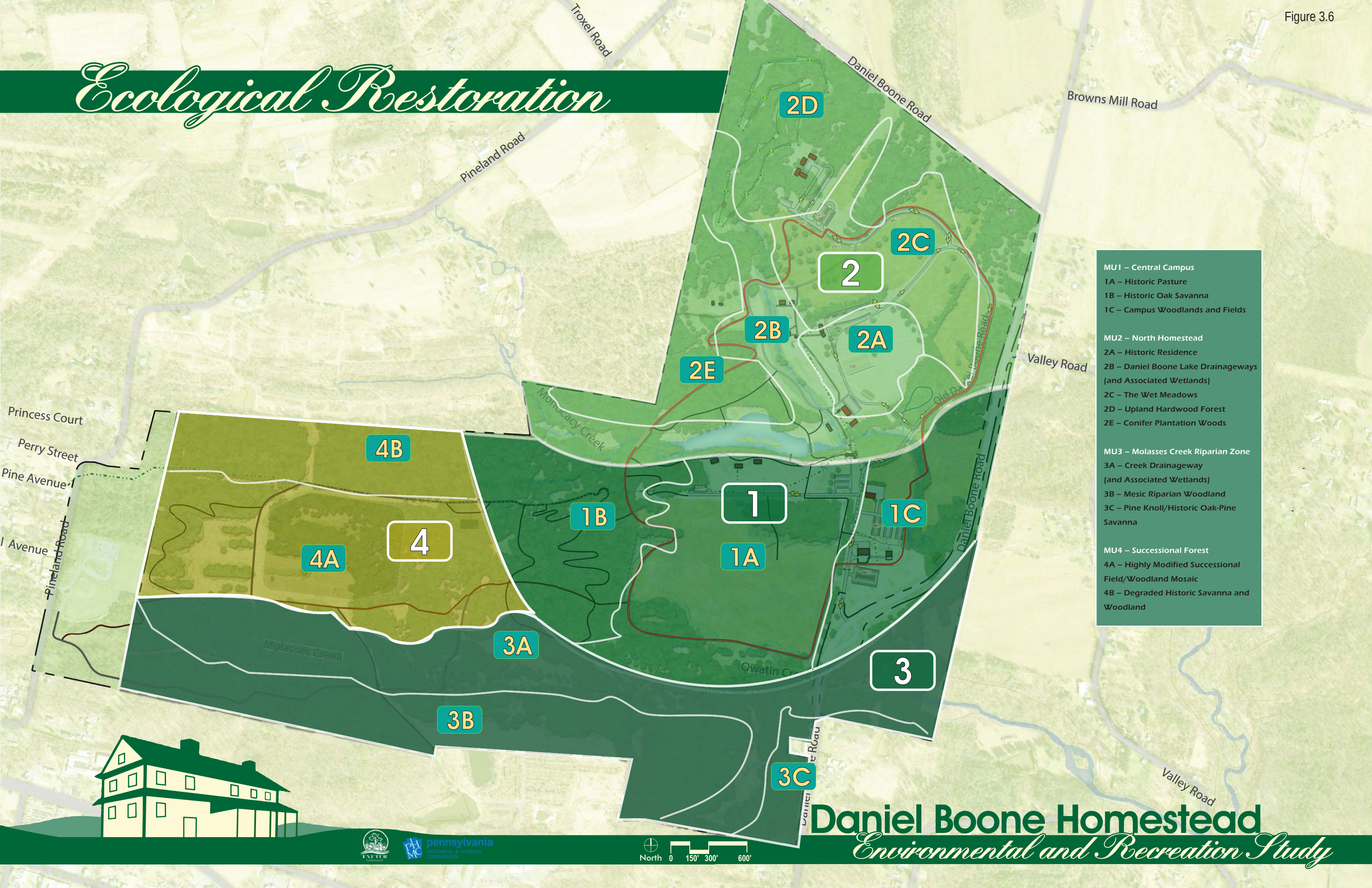
The routes highlighted in red on the trails plan (Figure 3.5) are 10' wide multiuse trail for all users. The trail surface would be a red bituminous surface in keeping with the local geology and feel of the Homestead. This trail would include a 4' crushed stone shoulder suitable for equine use. Not only will the paved surface work well for people with all abilities, it will also act as a network system that gives access to the entire site for maintenance purposes.

Trails Plan



Daniel Boone Homestead
Environmental and Recreation Study

Ecological Restoration



Maintenance vehicles such as a side by side (gator), or a small truck will be able to use this trail while not causing rutting or disturbance to the natural surfaced trails.

Green highlighted trails are a crushed stone surfaced that are 8' wide, and 2' cleared shoulders on either side. This trail will maintain grades of no more than 6%.

Trails highlighted in yellow are natural earthen surface hiking trails that will be below 8% grade. The trails will be cleared to be 8' wide to provide good visible site distance, and clear 10' overhead for equestrian use.

Dashed red trails are the alignments that have been eliminated due to steep grades and encroach into sensitive habitats.

Ecological Assessment

The Ecological Assessment was prepared by the team's biologists and ecologists from RES. The report divided the site into several management units and specifies a plan for each area (Figure 3.6). Each management unit identifies existing conditions and wildlife value, then presents recommendations in coordination with the Study. The four management units and select recommendations are noted below:

1. MU1 - Central Campus. This portion of the site includes the existing maintenance building, the historic pasture, and the old oak savanna farther to the west. The overall goal is to restore these habitats to habitats that are consistent with the ecology of the Daniel Boone Era. Recommendations include: eradicating invasive species; stopping the frequent mowing of the fields; sowing native savanna habitat species; and converting most of the mowed lawn areas to native meadows/prairie plants.

2. MU2 - North Homestead. This section of the site is quite complex, with a series of Homestead buildings, springs, wet meadows, headwater streams and seepage wetlands, upland hardwood forest, conifer plantation, and a manmade lake (and associated dam structure to support the saw mill). This is truly where ecology and cultural elements blend and can be married programmatically. Recommendations include: adding apple tree varieties around the Boone House that may be period appropriate; designing, permitting and installing a functional stream and wetland restoration project

from the upper reaches through to the exit from the site in the southeast; plugging ditches to flood meadows more regularly; and controlling/removing invasives especially in the flatter low lying areas between the hillslope and the trail by the lake.

3. MU3 - Molasses Creek Riparian Zone. This MU spans the southernmost sections of the site and basically runs along the Molasses Creek tributaries and primary run. Surprisingly steep topography is cloaked within tangles of invasive plant colonies. There are also some nice and intact floodplain wetland meadows, upland forested knolls, and other ecological delights. Recommendations include: studying, designing, permitting and constructing a functional stream restoration plan for the drainageway; cleaning the area around the Samuel Boone Homestead ruin and enacting ecological restoration; and selectively removing invasives and select trees.

4. MU4 - Successional Forest. Perhaps the most peculiar of all sections, this area constitutes the western woods at the Boone Homestead. Here, there is significant manipulation from what appears to be many decades, if not centuries, of human influence on the topography, plant community, and structure. Recommendations include: controlling known invasive plant thickets with physical and chemical interventions; flagging all mature native trees; and sowing seed and planting woody material consistent with plantings in other management units.

Please refer to the appendix for the complete Ecological Assessment.

Existing Building Assessment

The Existing Building Assessment was prepared by the team's historic architects from Frens and Frens Studio at Patterhn Ives. In addition to the recommendations for the Visitor Center, Maintenance Barn and DeTurk House described earlier in this chapter, the report contains a survey for the structures inside and outside the historic core and recommended preservation treatments. Survey data includes overall building size, materials and condition. Various recommendations for the structures include minor repairs to chinking and logs, spot replacement of shingles and clay tile, repointing of foundations, interior stucco repairs, repairs to siding and trim board and ADA access. Please refer to the appendix for the complete Building Assessment.





4 Implementation & Funding

Cost Estimates of Capital Improvements

Detailed cost estimates of proposed capital improvements are provided in the report. The estimated cost for improvements at the site is \$2,524,435. Additionally, the estimate includes “construction costs.” These are estimated as a percentage of the total improvement cost and they include contractor mobilization at 1%, construction surveying at 3%, erosion and sediment control at 1% and construction contingency at 10%. “Construction costs” are estimated at \$353,421. Costs for design and engineering are estimated at 15% or \$378,665. The total project improvement costs are therefore estimated at \$3,256,522.

In addition to site improvement costs, building costs for the site structures, picnic shelters, pavilions and restrooms are estimated to cost \$9,649,209. These costs include options for a rehabilitated or new Visitor Center, new maintenance building, maintenance barn and DeTurk house rehabilitated for event space and maintenance costs for the remaining structures. Costs for ecological improvements are also included.

Figure 4.1 shows costs per improvement type. Unit costs were established based on construction costs for similar projects and reflect prevailing wage rates that are required for publicly funded construction projects. Please refer to the next few pages for detailed cost estimates.

Project Phasing

Improvements at the Daniel Boone Homestead will be implemented in several phases over a period of years as funding becomes available and or public/ private partnerships are developed. Generally, it will be less challenging to obtain site improvement funding than funding for new or improved buildings. The recommended implementation schedule is shown in Figure 4.2.

Proposed phasing decisions will be based on several factors including:

- Projects appropriate for Exeter Township (or other local governments) to act as applicants on behalf of PHMC. The Daniel Boone Homestead Associates (DBHA) may also act

as an applicant for PHMC benefit. As a non-profit organization the DBHA will have access to funding sources dedicated for non-profit organizations. Other government entities, such as Berks County, could be enticed to participate. Other adjoining municipalities might also be included as partners, or at least lend support to grant applications by others.

- Public/private partnerships. These will be especially important for the conversion of the existing maintenance barn and DeTurk House into facilities to host events, parties, and business meetings. While the agency requirements for these uses at the Homestead may be cumbersome, the benefits of successful partnerships in this regard may prove to be invaluable. These types of uses at the Homestead will increase the interest in the site and historical mission of PHMC. We believe that this increased use and enjoyment of the facility will help PHMC in justifying increase state investment in this historical site.
- PHMC priorities for the many proposed improvements as contained in this Study. Based on project priorities, PHMC can determine how the Daniel Boone Homestead fits within the agency’s system-wide priorities – and then work through their internal process and with the Pennsylvania Department of General Services (DGS) to request capital funds to design and building improvements through the DGS process.
- PHMC policy decisions will be key in implementing a site management program to protect and enhance the site’s natural resources. One key decision point is how PHMC wishes to control the deer population toward mitigating ecological damage by these herds. Whether it be through a partnership with the PA Game Commission or through culling by local hunters, this site management decision will have an important impact on creating an ecological uplift for the site.

Total Proposed Site Improvements	\$ 2,524,435
Mobilization (1%)	\$ 25,244
Construction Surveying (2%)	\$ 50,489
Erosion and Sedimentation Control (1%)	\$ 25,244
Construction Contingency (10%)	\$ 252,444
Total Proposed Site Improvements	\$ 2,877,856
Design and Engineering (15%)	\$ 378,665
Total Estimated Project Costs	\$ 3,256,522

Item No.	Item Description	Estimated Quantity	Unit Price	Total Item Amount
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1.	Driveways, Trails, Walkways and Parking	Total Number	Sub Total	\$ 2,251,856
1.1	Multi-use ADA "2 Mile" Loop Trail, 10' Wide: 12,156 LF	121,560 SF	Sub Total	\$ 880,986
a	Grade Subbase	13,507 SY	\$ 2.19	\$ 29,580
b	6" 2A Aggregate Subbase	13,507 SY	\$ 10.95	\$ 147,898
c	Grade and Compact Aggregate Subbase	13,507 SY	\$ 1.64	\$ 22,151
d	2" Asphalt Base Course	13,507 SY	\$ 27.38	\$ 369,813
e	2" Wearing Course	13,507 SY	\$ 16.43	\$ 221,915
f	Post and Rail Fence	2,843 LF	\$ 21.90	\$ 62,255
f	Drainage	1 LS	\$ 27,375.00	\$ 27,375
1.2	Asphalt ADA Trail to Pineland Park , 10' Wide: 5,057 LF	50,570 SF	Sub Total	\$ 351,111
a	Grade Subbase	5,619 SY	\$ 2.19	\$ 12,305
b	6" 2A Aggregate Subbase	5,619 SY	\$ 10.95	\$ 61,527
c	Grade and Compact Aggregate Subbase	5,619 SY	\$ 1.64	\$ 9,215
d	2" Asphalt Base Course	5,619 SY	\$ 27.38	\$ 153,845
e	2" Wearing Course	5,619 SY	\$ 16.43	\$ 92,318
f	Drainage	1 LS	\$ 21,900.00	\$ 21,900
1.3	Stone Dust Path to Ruins, 8' Wide: 1,071 LF	8,568 SF	Sub Total	\$ 30,275
a	Excavation	159 CY	\$ 27.38	\$ 4,344
b	Subbase 4" Depth (No. 2a)	119 SY	\$ 10.95	\$ 1,299
c	Geotextile, Class 4, Type A	8,568 SY	\$ 2.19	\$ 18,764
d	Stone Dust Aggregate AASTHO #10 - 2 inch depth	53 CY	\$ 54.75	\$ 2,896
e	Seed and Stabilize - 2 foot shoulders both sides	13,508 SF	\$ 0.22	\$ 2,972
			Total	\$ 30,275
1.4	Native Surface Hiking Trail 3' wide 1' shoulder: 9,617 LF	48,085 SF	Sub Total	\$ 102,889.84
a	Clear, Grubb & Grade	5,343 SY	\$ 16.43	\$ 87,782
b	Seed and Stabilize - 1 foot shoulders both sides	18,900.00 SF	\$ 0.22	\$ 4,158
c	Drainage	1 LS	\$ 10,950.00	\$ 10,950
1.5	Parking Lot- Disc Golf - 52 Spaces	21,379 SF	Sub Total	\$ 177,619
a	Excavation	792 CY	\$ 27.38	\$ 21,680
b	6" 2A Aggregate Subbase	396 CY	\$ 54.75	\$ 21,676
c	Grade and Compact Aggregate Subbase	2,375 SY	\$ 1.64	\$ 3,896
d	2" Asphalt Base Course	2,375 SY	\$ 32.85	\$ 78,033
e	2" Wearing Course	2,375 SY	\$ 21.90	\$ 52,022
f	Handicap Parking Sign	1 EA	\$ 312.08	\$ 312
1.6	Parking Lots -Hiking Trail Parking - 20 Spaces	6,652 SF	Sub Total	\$ 55,793
a	Excavation	246 CY	\$ 27.38	\$ 6,746
b	6" 2A Aggregate Subbase	123 CY	\$ 54.75	\$ 6,744
c	Grade and Compact Aggregate Subbase	739 SY	\$ 1.64	\$ 1,212
d	2" Asphalt Base Course	739 SY	\$ 32.85	\$ 24,280
e	2" Wearing Course	739 SY	\$ 21.90	\$ 16,187
f	Handicap Parking Sign	2 EA	\$ 312.08	\$ 624

Figure 4.1

1.7	Parking Lots - De Turk Barn - 30 Spaces	9,609 SF		Sub Total	\$	80,317
	a	Excavation	356 CY	\$	27.38	\$ 9,744
	b	6" 2A Aggregate Subbase	178 CY	\$	54.75	\$ 9,742
	c	Grade and Compact Aggregate Subbase	1,068 SY	\$	1.64	\$ 1,751
	d	2" Asphalt Base Course	1,068 SY	\$	32.85	\$ 35,073
	e	2" Wearing Course	1,068 SY	\$	21.90	\$ 23,382
	f	Handicap Parking Sign	2 EA	\$	312.08	\$ 624
1.8	Parking Lots -South Lot - 64 Spaces	27,671 SF		Sub Total	\$	230,738
	a	Excavation	1,025 CY	\$	27.38	\$ 28,060
	b	6" 2A Aggregate Subbase	512 CY	\$	54.75	\$ 28,055
	c	Grade and Compact Aggregate Subbase	3,075 SY	\$	1.64	\$ 5,042
	d	2" Asphalt Base Course	3,075 SY	\$	32.85	\$ 100,999
	e	2" Wearing Course	3,075 SY	\$	21.90	\$ 67,333
	f	Handicap Parking Sign	4 EA	\$	312.08	\$ 1,248
1.9	Meadow Overflow Parking - 100 Spaces	35,000 SF		Sub Total	\$	161,669
	a	Excavation	1,269 CY	\$	27.38	\$ 34,745
	b	6" 2A Aggregate Subbase	648 CY	\$	43.80	\$ 28,382
	c	Geotextile	35,000 SF	\$	2.19	\$ 76,650
	d	6" Topsoil	648 CY	\$	21.90	\$ 14,191
	e	Seed	35,000 SF	\$	0.22	\$ 7,700
1.10	Roadside Overflow Parking - 130 Spaces	26,000 SF		Sub Total	\$	120,629
	a	Excavation	963 CY	\$	27.38	\$ 26,367
	b	6" 2A Aggregate Subbase	481 CY	\$	43.80	\$ 21,068
	c	Geotextile	26,000 SF	\$	2.19	\$ 56,940
	d	6" Topsoil	481 CY	\$	21.90	\$ 10,534
	e	Seed	26,000 SF	\$	0.22	\$ 5,720
1.11	Vehicular Gate	2		Sub Total	\$	10,950.00
		Vehicular Gate	2 EA	\$	5,475.00	
1.12	Pedestrian Crosswalk New at Grade	3		Sub Total	\$	13,534.80
	a	Crosswalk - Zebra Striped	1.00 EA	\$	2,409.00	\$ 2,409.00
	b	Signage - Crossing ahead & Yield to Crosswalk	4.00 EA	\$	251.85	\$ 1,007.40
	c	ADA landing with Detectable Warning Surface (no curbs)	40.00 SF	\$	27.38	\$ 1,095.20
				Cost / EA	\$	4,511.60
1.13	Speed Table	3		Sub Total	\$	32,850.00
	a	Speed Table	3 EA	\$	10,950	
1.14	Existing Parking Lots			Sub Total	\$	2,496.64
	a	Handicap Parking Sign	8 EA	\$	312.08	\$ 2,497
2.	Disc Golf			Sub Total	\$	34,559
2.1	Disc Golf Area	43,000 SF				
	a	Clearing and Grubbing	4,778 SY	\$	5.48	\$ 26,182
	b	Baskets	9 QTY	\$	547.50	\$ 4,928
	c	Tee Boxes	9 QTY	\$	109.50	\$ 986
	c	Signage	9 QTY	\$	273.75	\$ 2,464
3.	Plantings			Sub Total	\$	149,008
	Meadow Seeding	38 AC		\$	3,942.00	\$ 149,008
4.	Site Furnishings			Sub Total	\$	89,013
4.1	Benches	8 EA		\$	1,971.00	\$ 15,768
4.2	Trash Receptacles	15 EA		\$	985.50	\$ 14,783
4.3	Water Fountains	5 EA		\$	3,832.50	\$ 19,163
4.4	Bike Racks	4 EA		\$	821.25	\$ 3,285
4.5	Kiosk	5 EA		\$	1,727.91	\$ 8,640
4.6	Trail Wayfinding	22 EA		\$	547.50	\$ 12,045
4.7	Vehicular Wayfinding	7 EA		\$	1,095.00	\$ 7,665
4.8	Stop Sign	2 EA		\$	547.50	\$ 1,095
4.9	Interpretive Signage	6 EA		\$	1,095.00	\$ 6,570

Figure 4.1 (cont.)

Daniel Boone Proposed and Repaired Structures Cost Estimate

Total Proposed Building Improvements	\$ 7,365,809
Mobilization (1%)	\$ 73,658
Construction Contingency (15%)	\$ 1,104,871
Total Proposed Building Improvements	\$ 8,544,338
Design and Engineering (15.0%)	\$ 1,104,871
Total Estimated Project Costs	\$ 9,649,209

Item No.		Item Description	Estimated Quantity	Unit Price	Total Item Amount
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1.	Buildings & Structures				Sub Total	\$ 7,339,528.58
1.1	Visitor Center				Sub Total	\$ 1,456,350
	a.	Rehabilitate existing VC first-floor	2400	SF	\$ 219.00	\$ 525,600
	b.	Construction of addition	1700	SF	\$ 547.50	\$ 930,750
1.2	Visitor Center - NEW OPTION (not in total)				Sub Total	\$ 1,986,898
	a.	Demolish existing VC	2400	SF	\$ 32.85	\$ 78,840
	b.	Construction of new VC	4100	SF	\$ 465.38	\$ 1,908,058
1.3	Maintenance Building / Area				Sub Total	\$ 1,437,225
	a.	Construction for Maintenance Department	7,500	SF	\$192	\$1,437,225
		& PHMC Workshop				
1.4	DeTurk Barn Rehabilitation for Event Space				Sub Total	\$ 2,321,126
	a.	Threshing Floor	4,565	SF	\$274	\$ 1,249,669
	b.	Lower Level	3,914	SF	\$274	\$ 1,071,458
1.5	DeTurk House Rehabilitation				Sub Total	\$ 1,073,970
	a.	All three floors	4,359	SF	\$246	\$ 1,073,970
1.6	Bertolet House				Sub Total	\$ 2,102
	a.	Replace deteriorated chink & daub	12	LF	\$33	\$ 394
	b	Replace missing or chewed shingles (attic stock)	4	EA	\$164	\$ 657
	b	Epoxy consolidate log end	1	LS	\$1,051	\$ 1,051
1.7	Bertolet Smokehouse				Sub Total	\$ 953
	a.	Replace broken roof tiles (attic stock)	3	EA	\$164	\$ 493
	b	Repoint base of wall at north wall	12	SF	\$38	\$ 460
1.8	Homestead Barn				Sub Total	\$ 7,654
	a.	Repoint open joints at northwest corner and below north doors	37	SF	\$33	\$ 1,215

Figure 4.1 (cont.)

	b.	Reset rubble masonry at west ramp wall	1	LS	\$657	\$ 657
	c.	Replace split jamb and missing dowel at south window	1	LS	\$1,314	\$ 1,314
	d.	Reinstall pintle at north doors	1	LS	\$526	\$ 526
	e.	Repair crack at north wall interior	1	LS	\$1,314	\$ 1,314
	f.	Install wire mesh at open eaves	1	LS	\$2,628	\$ 2,628
1.9	Blacksmith Shop				Sub Total	\$ 5,519
	a.	Replace chink & daub at east wall	120	LF	\$33	\$ 3,942
	b.	Replace barge board on north shed	1	LS	\$526	\$ 526
	b.	Epoxy Consolidate one log end	1	LS	\$1,051	\$ 1,051
1.10	Boone House				Sub Total	\$ 10,205
	a.	Repoint perimeter of southwest doorframe	1	LS	\$526	\$ 526
	b.	Repair stucco at interior party wall	1	LS	\$1,577	\$ 1,577
	c.	Replace failing ceiling boards at cellar	1	LS	\$526	\$ 526
	d.	Provide Dutchman repair to stone tread	1	LS	\$1,577	\$ 1,577
	e.	Refasten chairrail to wall in S. parlor	1	LS	\$526	\$ 526
	f.	Spot repoint deteriorated mortar joints	100	SF	\$55	\$ 5,475
1.11	Bertolet Sawmill				Sub Total	\$ 41,391
	a.	Replace wood shake roof	1,260	SF	\$33	\$ 41,391
1.12	Utility Building No. 1				Sub Total	\$ 3,099
	a.	Repace gable end window	1	EA	\$1,916	\$ 1,916
	b.	Replace 3 chewed shingles	1	LS	\$526	\$ 526
	c.	Replace chewed barge board	1	LS	\$657	\$ 657
1.13	Utility Building No. 2				Sub Total	\$ 1,183
	a.	Replace 3 chewed shingles	1	LS	\$526	\$ 526
	b.	Replace deteriorated barge board	1	LS	\$657	\$ 657
1.14	Wayside Lodge				Sub Total	\$ 3,745
	a.	Replace deteriorated chink & daub	18	LF	\$33	\$ 591
	b.	Epoxy consolidate log ends	1	LS	\$3,154	\$ 3,154

Figure 4.1 (cont.)

1.15	Small Picnic Shelters - 30' x 60' North				Sub Total	\$ 87,972.30
	a.	Concrete pads, Structures	3.00	EA	\$ 25,820.10	\$ 77,460.30
	c.	Picnic Tables - 50% ADA	4.00	EA	\$ 2,628.00	\$ 10,512.00
1.16	Pavilion and Restroom 70' x 30' Picnic Grove		1		Sub Total	\$ 275,667
	a.	Pavilion and restroom	1	LS		\$273,750
	b.	Sewer Connection	50	LF	\$22	\$1,095
	c.	Water connection	50	LF	\$16	\$822
					Cost/ EA	\$275,667
1.17	Pavilion and Restroom 70' x 30' South		1		Sub Total	\$ 281,416
	a.	Pavilion and restroom	1	LS		\$273,750
	b.	Sewer Connection	200	LF	\$22	\$4,380
	c.	Water connection	200	LF	\$16	\$3,286
					Cost/ EA	\$281,416
1.18	Pavilion and Restroom 70' x 30' North		1		Sub Total	\$ 319,746
	a.	Pavilion and restroom	1	LS		\$273,750
	b.	Sewer Connection	1200	LF	\$22	\$26,280
	c.	Water connection	1200	LF	\$16	\$19,716
					Cost/ EA	\$319,746
2.	Demolition				Sub Total	\$ 26,280.00
		Pit Toilet	1	LS		\$ 10,950
		Pavilion	4	EA	\$ 3,832.50	\$ 15,330

Figure 4.1 (cont.)





	SCENARIO 1	SCENARIO 2	SCENARIO 3
Total Proposed Ecological Improvements	\$ 1,393,424	\$ 3,816,111	\$ 3,816,111
Mobilization (1%)	\$ 13,934	\$ 38,161.11	\$ 38,161.11
Equipment and ODCs (2.5%)	\$ 34,836	\$ 95,403	\$ 95,403
Total Estimated Project Costs	\$ 1,442,193	\$ 3,949,675	\$ 3,949,675

Item No.	Item Description	Estimated Quantity	Unit Price	Total Item Amount	Total Item Amount	Total Item Amount
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1.	Central Campus	Total Number	Sub Total	\$ 192,447
1.1	Historic Pasture	80 AC	Sub Total	\$ 67,069
a	Mow less frequently (and never from May 1 -Aug 31)	80 AC	\$ -	\$ -
b	Eradicate Invasive Woody Plants in Pasture and adjacent forested patches (winter brush)	15 AC	\$ 1,642.50	\$ 24,638
c	Eradicate Invasive Herbaceous Plants in Pasture (spring foliar)	75 AC	\$ 273.75	\$ 20,531
d	Seed	80 AC	\$ 109.50	\$ 8,760
e	Maintain (years 1-4)	80 AC	\$ 109.50	\$ 8,760
f	Maintain (years 5-10)	80 AC	\$ 54.75	\$ 4,380
g	Cattle Grazing Option (rancher to cover expenses)^	80 AC	\$ -	\$ -

1.2	Historic Oak Savanna	80 AC	Sub Total	\$ 109,500
a	Flag Savanna Trees	80 AC	\$ 27.38	\$ 2,190
b	Eradicate Invasive Plants in Savanna (winter brush)	80 AC	\$ 821.25	\$ 65,700
c	Eradicate Invasive Plants in Savanna (spring foliar)	80 AC	\$ 273.75	\$ 21,900
d	Seed	60 AC	\$ 109.50	\$ 6,570
e	Maintain (years 1-4)	80 AC	\$ 109.50	\$ 8,760
f	Maintain (years 5-10)	80 AC	\$ 54.75	\$ 4,380
1.3	Campus Woodlands and Fields	10 AC	Sub Total	\$ 15,878
z	Lawn to Meadow Conversion	10.00 AC	\$ 1,095.00	\$ 10,950.00
b	Invasive hedgerow removal	2.00 AC	\$ 1,642.50	\$ 3,285.00
c	Maintain (years 1-4) (per year)	10.00 AC	\$ 109.50	\$ 1,095.00
d	Maintain (years 5-10) (per year)	10.00 AC	\$ 54.75	\$ 547.50

Figure 4.1 (cont.)



2.	Northern Homestead	Total Number		Sub Total	\$ 416,101	\$ 1,360,538	\$ 1,360,538
2.1	Drainageways and Wetlands	3,000 SF		Sub Total	\$ 123,735.30	\$ 1,010,685.30	\$ 1,010,685.30
	a	Design, Permit, and Install Full Stream Restoration	3,000.00 LF	\$ -	\$ -		
	a1	Stream and Wetland Mitigation Bank Approach*	3,000.00 LF	\$ 32.85	\$ 98,550.00		
	a2	MS4 Approach**	3,000.00 LF	\$ 328.50	\$ 985,500.00		
	a3	Not tied to stormwater or mitigation initiatives***	3,000.00 LF	\$ 328.50	\$ 985,500.00		
	b	Monitoring (years 0-10) (per year)	1.00 year	\$ 13,687.50	\$ 13,687.50		
	c	Maintain (years 1-4) (per year)	60.00 ac	\$ 109.50	\$ 6,570.00		
	d	Maintain (years 5-10) (per year)	60.00 ac	\$ 82.13	\$ 4,927.80		
2.2	The Wet Meadows	60 AC		Sub Total	\$ 57,488		
	a	Mow less frequently (and never from May 1 -Aug 31)	60 AC	\$ -	\$ -		
	b	Eradicate Invasive Woody Plants in Pasture (winter brush)	10 AC	\$ 821.25	\$ 8,213		
	c	Eradicate Invasive Herbaceous Plants in Pasture (spring foliar)	60 AC	\$ 547.50	\$ 32,850		
	d	Seed Multiple mixes (in appropriate conditions)	60 AC	\$ 109.50	\$ 6,570		
	e	Maintain (years 1-4) (per year)	60 AC	\$ 109.50	\$ 6,570		
	f	Maintain (years 5-10) (per year)	60 AC	\$ 54.75	\$ 3,285		
	g	Cattle Grazing Option (rancher to cover expenses)	60 AC	\$ -	\$ -		
2.3	Upland Hardwood Forest	50 AC		Sub Total	\$ 229,403		
	a	Winter Brush	60 AC	\$ 1,642.50	\$ 98,550		
	b	Clustered Plantings	5,000 plants	\$ 21.90	\$ 109,500		
	c	Seeding	60 SY	\$ 109.50	\$ 6,570		
	d	Maintain (years 1-4) (per year)	60 SY	\$ 164.25	\$ 9,855		
	e	Maintain (years 5-10) (per year)	60 SY	\$ 82.13	\$ 4,928		
2.4	Conifer Plantation	20 AC		Sub Total	\$ 62,963		
	a	Selective Harvest/Removal	15 AC	\$ 1,642.50	\$ 24,638		
	b	Clustered Plantings	1,500 plants	\$ 21.90	\$ 32,850		
	c	Seeding	20 AC	\$ 109.50	\$ 2,190		
	d	Maintain (years 1-4) (per year)	20 AC	\$ 109.50	\$ 2,190		
	e	Maintain (years 5-10) (per year)	20 AC	\$ 54.75	\$ 1,095		
					a1	a2	a3
3.	Molasses Creek Riparian Zone	Total Number		Sub Total	\$ 543,964	\$ 2,022,214	\$ 2,022,214
3.1	Molasses Creek Drainageway	5,000 SF		Sub Total	\$ 189,435	\$ 1,667,685	\$ 1,667,685
	a	Design, Permit, and Install Full Stream Restoration	5,000.00 SY	\$ -	\$ -		
	a1	Stream and Wetland Mitigation Bank Approach*	5,000.00 SY	\$ 32.85	\$ 164,250		
	a2	MS4 Approach**	5,000.00 SY	\$ 328.50	\$ 1,642,500		
	a3	Not tied to stormwater or mitigation initiatives***	5,000.00 SY	\$ 328.50	\$ 1,642,500		
	b	Monitoring (years 0-10) (per year)	1.00 SY	\$ 13,687.50	\$ 13,688		
	c	Maintain (years 1-4) (per year)	60.00 AC	\$ 109.50	\$ 6,570		
	d	Maintain (years 5-10) (per year)	60.00 AC	\$ 82.13	\$ 4,928		

Figure 4.1 (cont.)



3.2	Mesic Riparian Woodland Restoration	80 AC	Sub Total	\$	308,536
	a Winter Brush	80 AC	\$ 1,095.00	\$	87,600
	b Clustered Plantings	5,000 plants	\$ 43.80	\$	219,000
	c Seeding	80 AC	\$ 2.19	\$	175
	d Maintain (years 1-4) (per year)	80 AC	\$ 21.90	\$	1,752
	e Maintain (years 5-10) (per year)	80 AC	\$ 0.11	\$	9
3.3	Pine Knoll/Historic Savanna	15 AC	Sub Total	\$	45,993
	a Selective Harvest/Removal (and woody brushing)	10 AC	\$ 2,737.50	\$	27,375
	b Clustered Plantings	500 plants	\$ 27.38	\$	13,690
	c Seeding	15 AC	\$ 164.25	\$	2,464
	d Maintain (years 1-4) (per year)	15 AC	\$ 109.50	\$	1,643
	e Maintain (years 5-10) (per year)	15 AC	\$ 54.75	\$	821
4.	Successional Forest	Total Number	Sub Total	\$	240,913
4.1	Highly Modified Successional Woodland/For	70 AC	Sub Total	\$	131,400.00
	a Winter Brush	20 AC	\$ 1,095.00	\$	21,900.00
	b Clustered Plantings	4,500 AC	\$ 21.90	\$	98,550.00
	c Seeding	40 AC	\$ 109.50	\$	4,380.00
	d Maintain (years 1-4) (per year)	40 AC	109.5	\$	4,380.00
	e Maintain (years 5-10) (per year)	40 AC	54.75	\$	2,190.00
4.2	Degraded Savanna	50.00 AC	Sub Total	\$	109,512.50
	a Winter Brush	25 AC	\$ 1,095	\$	27,375.00
	b Clustered Plantings	2,500 plants	\$ 27	\$	68,450.00
	c Seeding	50 AC	109.5	\$	5,475.00
	d Maintain (years 1-4) (per year)	50 AC	109.5	\$	5,475.00
	e Maintain (years 5-10) (per year)	50 AC	54.75	\$	2,737.50

Figure 4.1 (cont.)

Notes:

^Must be forward thinking and science-driven rancher - include research and academia

*Upfront costs for analysis and prospectus. The rest is covered by the contractor. Could possibly even make \$\$\$ rather than spend it. This Stream and Wetland Mitigation Bank Approach is part of Scenario 1 (see page 17 of the Daniel Boone Ecological Report).

**Would involve financial support from township, county, and possible state sources. This MS4 Approach is part of Scenario 2 (see page 17 of the Daniel Boone Ecological Report).

***Could involve state and federal grants (competitive submissions). This approach where the work is not tied to stormwater or mitigation initiatives is part of Scenario 3 (see page 17 of the Daniel Boone Ecological Report).

*Upfront costs for analysis and prospectus. The rest is covered by the contractor. Could possibly even make \$\$\$ rather than spend it. This Stream and Wetland Mitigation Bank Approach is part of Scenario 1 (see page 19 of the Daniel Boone Ecological Report).

**Would involve financial support from township, county, and possible state sources. This MS4 Approach is part of Scenario 2 (see page 19 of the Daniel Boone Ecological Report).

***Could involve state and federal grants (competitive submissions). This approach where the work is not tied to stormwater or mitigation initiatives is part of Scenario 3 (see page 19 of the Daniel Boone Ecological Report).

Recommended Implementation Schedule	
Priority	Action
	Short-term (1-5 years)
1	Historic Core: Install a 2-Mile ADA-Compliant Multiuse Loop Trail - Install a new 10 foot wide, asphalt surface loop trail around the historic core that will provide an all-weather trail surface and safely separate pedestrians and motor vehicles. Construction of this trail has the potential to be funded by DCNR. This trail should seamlessly tie into and compliment the existing features of the historic core.
2	Reverse the Entry Direction - Keep the one-way entry driveway loop but reverse its direction to clockwise which will allow visitors arriving by motor vehicle a direct and impressive view of the Daniel Boone Homestead.
3	Homestead View - Grade the area next to the driveway loop to create the direct sightline and unobstructed view of the Daniel Boone Homestead, as described in the previous recommendation.
4	Educational Space Feasibility Study - Prepare a feasibility study to determine a suitable facility for educational purposes and programming. This study would analyze existing facilities, such as the Craft Shed, for their use as long-term educational spaces based on their size, location, access and amenities. This feasibility study should be tied to the evaluation of the Visitors Center and its options for the long-term.
5	Existing Restrooms Feasibility Study - Prepare a feasibility study to assess remote restroom facilities sitewide to help determine the number, type and location of facilities needed and whether they are / would be year-round or seasonal use facilities.
6	Existing Parking and Access Feasibility Study - Prepare a feasibility study to assess existing parking lots and access routes to site amenities to help determine the need for additional parking facilities and access improvements.
7	Interpretive Signage - Install 4-6 interpretive signs in the natural areas that can focus on habitat restoration, stream headwater protection, site history, wildlife, forest stewardship practices and wildlife management; Install 4-6 interpretive signs in the historic core that focus on historic interpretation and historic education.
8	Site Furnishings - Install benches, trash receptacles, signage, bike racks, habitat boxes and other amenities that create a sense of uniformity in the Homestead's landscape.
9	Interpretive / Visitor Experience Planning - Connect trail projects and ecological restoration / upgrades to the interpretive mission of the Homestead.

Figure 4.2

10	Northern Area: Convert North Site Entrance to Emergency and Special Event Access Only - Currently, visitors park in front of and along the road at this location to access the site after hours when the site entrance gate is closed, but this creates a dangerous condition as speeds along the road are high and the road shoulders where visitors are parking are narrow. Conditions at the north site entrance should be further studied and analyzed. Implementation measures for this road shoulder could then include fencing, bollards, boulders, plantings or other appropriate barriers to deter parking here. New improvements at main entry of the Homestead will safely allow parking and pedestrian access when the gate is closed.
11	Existing Building Assessment: Boone House - Repoint perimeter of southwest doorframe; Repair stucco at interior party wall; Replace failing ceiling boards at cellar; Provide Dutchman repair to stone tread; Refasten chairrail to wall in S. parlor; Spot repoint deteriorated mortar joints
12	Existing Building Assessment: Homestead Barn - Repoint open joints at northwest corner and below north doors; Reset rubble masonry at west ramp wall; Replace split jamb and missing dowel at south window; Reinstall pintle at north doors; Repair crack at north wall interior; Install wire mesh at open eaves
13	Existing Building Assessment: Blacksmith Shop - Replace chink & daub at east wall; Replace barge board on north shed; Epoxy Consolidate one log end
14	Existing Building Assessment: Bertolet House - Replace deteriorated chink & daub; Replace missing or chewed shingles (attic stock); Epoxy consolidate log end
15	Existing Building Assessment: Bertolet Smokehouse - Replace broken roof tiles (attic stock); Repoint base of wall at north wall
16	Existing Building Assessment: Bertolet Sawmill - Replace wood shake roof
17	Existing Building Assessment: Wayside Lodge - Replace deteriorated chink & daub; Epoxy consolidate log ends
18	Existing Building Assessment: Craft Shed - Replace wood shingle roof
19	Existing Building Assessment: Utility Building No. 1 - Replace gable end window; Replace 3 chewed shingles; Replace chewed barge board
20	Existing Building Assessment: Utility Building No. 2 - Replace 3 chewed shingles; Replace deteriorated barge board
21	Existing Building Assessment: DeTurk Springhouse - Replace wood shingle roof

Figure 4.2 (cont.)

	Mid-term (6-10 years)
22	Northern Area: Update Restrooms - Demolish existing restrooms as they are beyond repair. Additionally, the site was recently linked to the areas sewage system so these facilities should be tied to the new system also. As an alternative to tying into the new sewer system, portable toilets can be used.
23	Historic Core: Install a New Pavilion and Restrooms Near Craft Shed for Educational Programming - Installation of a pavilion and restroom will allow more frequent use and educational events in the area of the historic sawmill and pond. This will also serve trail users in this part of the Homestead. This recommendation is dependent on the feasibility studies of the existing restrooms and educational space needs.
24	Meadow Area: Install a New Pavilion and Update Restrooms at the South Picnic Area - Install a new pavilion to compliment the existing two pavilions. Demolish the existing restroom and construct a new restroom that is tied to the new sewer system. This recommendation is dependent on the feasibility study of the existing restrooms.
25	Northern Area: Repair / Replace Pavilions - Replace the existing two pavilions with new rustic structures.
26	Meadow Area: Provide for After Hours Pedestrian / Trail Access / Continue Loop Trail - Create a new parking area just south of the existing maintenance barn with a gate located on the driveway, just north of this parking area. This will allow safe parking for after-hours visitors while keeping the site secure from after-hours motor vehicles. Continue the installation of the proposed 2-mile loop trail south past this new parking area.
27	Northern Area: Plan Structured Overflow / Event Parking - Add an overflow lot at the northern picnic area and stabilized turf parking spaces immediately adjacent to the drive aisle. Add a large area of stabilized turf to accommodate up to 100 cars to the large meadow area north and east of the Visitors Center, in the area contained by the loop driveway.
28	Woodland Area: Install Multiuse Accessible Trail / Hiking Trails - Install a new multiuse ADA accessible trail in the Woodland Area that will permit access from the west (and Pineland Park) to the Homestead.
29	Proposed Trails Plan: Meadow Area - Install new multi-use trails in the vicinity of Boone Lake that will connect to existing trails and the Historic Core loop trail.
30	Proposed Trails Plan: Woodland Area - Install earthen surface and multi-use hiking trails in the Woodland Area. These other hiking trails will provide a variety of hiking experiences in an area of the site with significant topographical variations.

Figure 4.2 (cont.)

31	Woodland Area: Create a Disc Golf Course - Add a nine hole disc golf course. This is a popular low impact, low cost passive sport activity and will bring a new user group to the Homestead.
32	Explore Possibility of Controlling the Deer Population - Work with the Pennsylvania Game Commission to explore safe and efficient ways to control the population of deer at the Homestead. Successful population control measures at regional preserves and open spaces can be studied as models.
33	Meadow Area: Feasibility Study for a New Maintenance Facility / Accessibility Study for DeTurk Education Center - Work with consultants to prepare a feasibility study for a new maintenance center. The current barn as a maintenance center for the Homestead is a very inefficient building and current maintenance staff are well aware of the shortcomings of this building. The feasibility study would assess and evaluate the conditions of the current facility and determine whether it is necessary and present a plan for a potential new facility (recommended in the study to be located north of and below the existing barn) in order to adequately meet the maintenance needs of the Homestead. In conjunction with this feasibility study, an accessibility study for the DeTurk Education Center should also be prepared to ensure what ADA compliant access upgrades would need to be completed before the building could be utilized for future event space.

Figure 4.2 (cont.)

	Long-term (10+ years)
34	Meadow Area: New Maintenance Facilities - Develop a new facility based on the recommendations of the feasibility study. This facility would house both maintenance staff and the Preservation Field Services Crew.
35	Meadow Area: Convert Existing Maintenance Barn and DeTurk Education Center - If a new maintenance facility is constructed, it is recommended that the barn be converted to a new event space and catering facility and that all three floors of the DeTurk House be rehabilitated for supplemental event space, taking the recommendations of the accessibility study under consideration.
36	Historic Core: Visitors Center Options - Consider three options for the long-term: Construct a new visitors center in the location of the current building; Construct an addition to the existing building; Construct a new building in a new location, slightly to the south and east of the existing building location. This evaluation should be tied to the feasibility study for an education space / facility and a new building should not be constructed unless the existing facility has a new use, such as an educational facility, depending upon the evaluation.
37	Woodland Area: Restore / Create Samuel Boone Homestead Ruins - Recreate or reimagine Samuel Boone's (Daniel Boone's uncle) home and interpreting it for visitors. Interpretive signage and other simple means of telling this story should be explored.
38	Woodland Area: Remove Impaired Trails - Remove and revegetate trail segments primarily in the wet areas of the site, near some small tributaries, that are not sustainable as active use trails.
39	Northern Area: Add Riparian Stream Corridor Planting - Remove invasive plants and replace with native species. This is especially important in the site's riparian corridors as these plants can protect water quality.
40	Northern Area: Convert Hay Areas to Warm Season Grass Meadows - The current meadow areas are "hay" grass which is a monoculture species that has almost no ecological or habitat value. It is recommended that this meadow be converted to native warm season grasses that will add an ecological uplift and create habitat for nesting birds.
41	Woodland Area: Restore Woodland Habitat in Former Nursery Stock Area - Reforest this area as per the ecological uplift report recommendations.

Figure 4.2 (cont.)

42	Ecological Assessment: MU2 North Homestead - This section of the site is quite complex, with a series of Homestead buildings, springs, wet meadows, headwater streams and seepage wetlands, upland hardwood forest, conifer plantation, and a manmade lake. Select recommendations include: adding apple tree varieties around the Boone House that may be period appropriate; designing, permitting and installing a functional stream and wetland restoration project from the upper reaches through to the exit from the site in the southeast; plugging ditches to flood meadows more regularly; controlling/removing invasives especially in the flatter low lying areas between the hillslope and the trail by the lake; and planting clusters of native trees in deer-protected fencing where trees are removed.
43	Ecological Assessment: MU1 Central Campus - This portion of the site includes the existing maintenance building, the historic pasture, and the old oak savanna farther to the west. Select recommendations include: eradicating invasive species; stopping the frequent mowing of the fields; sowing native savanna habitat species; converting most of the mowed lawn areas to native meadows/prairie plants; removing non-native trees (apart from specimen trees or culturally significant ones) to open canopy; and planting native trees and shrubs in deer-protected clusters where large trees are removed.
44	Ecological Assessment: MU4 Successional Forest - This area constitutes the western woods at the Boone Homestead. Select recommendations include: controlling known invasive plant thickets with physical and chemical interventions; flagging all mature native trees; being tolerant of exotic or oddly placed specimens if not behaving invasively or known to be toxic; and sowing seed and planting woody material consistent with plantings in other management units.
45	Ecological Assessment MU3 Molasses Creek Riparian Zone - This MU spans the southernmost sections of the site and basically runs along the Molasses Creek tributaries and primary run. Select recommendations include: studying, designing, permitting and constructing a functional stream restoration plan for the drainageway; cleaning the area around the Samuel Boone Homestead ruin and enacting ecological restoration; selectively removing invasives and select trees; and monitoring and maintaining to support the ecology of a forest/savanna dynamic.

Figure 4.2 (cont.)

Potential Funding Sources

The following is a summary of grants, programs, funds, and other sources that can assist with the funding of Homestead improvements. Various sources can be pursued during various development phases, based on availability of funds and priorities for each year.

- Agencies that have grant programs that will be most applicable to the Homestead includes:
- Department of Conservation and Natural Resources (DCNR) – including the Land and Water Conservation Fund (LWCF)
- Department of Community and Economic Development (DCED) through their Greenways, Trails & Recreation Program (GTRP)
- Pennsylvania Infrastructure Investment Authority (PennVEST)
- Pennsylvania Department of Environmental Protection (DEP)

Pennsylvania Department of Conservation & Natural Resources (Pa DCNR)

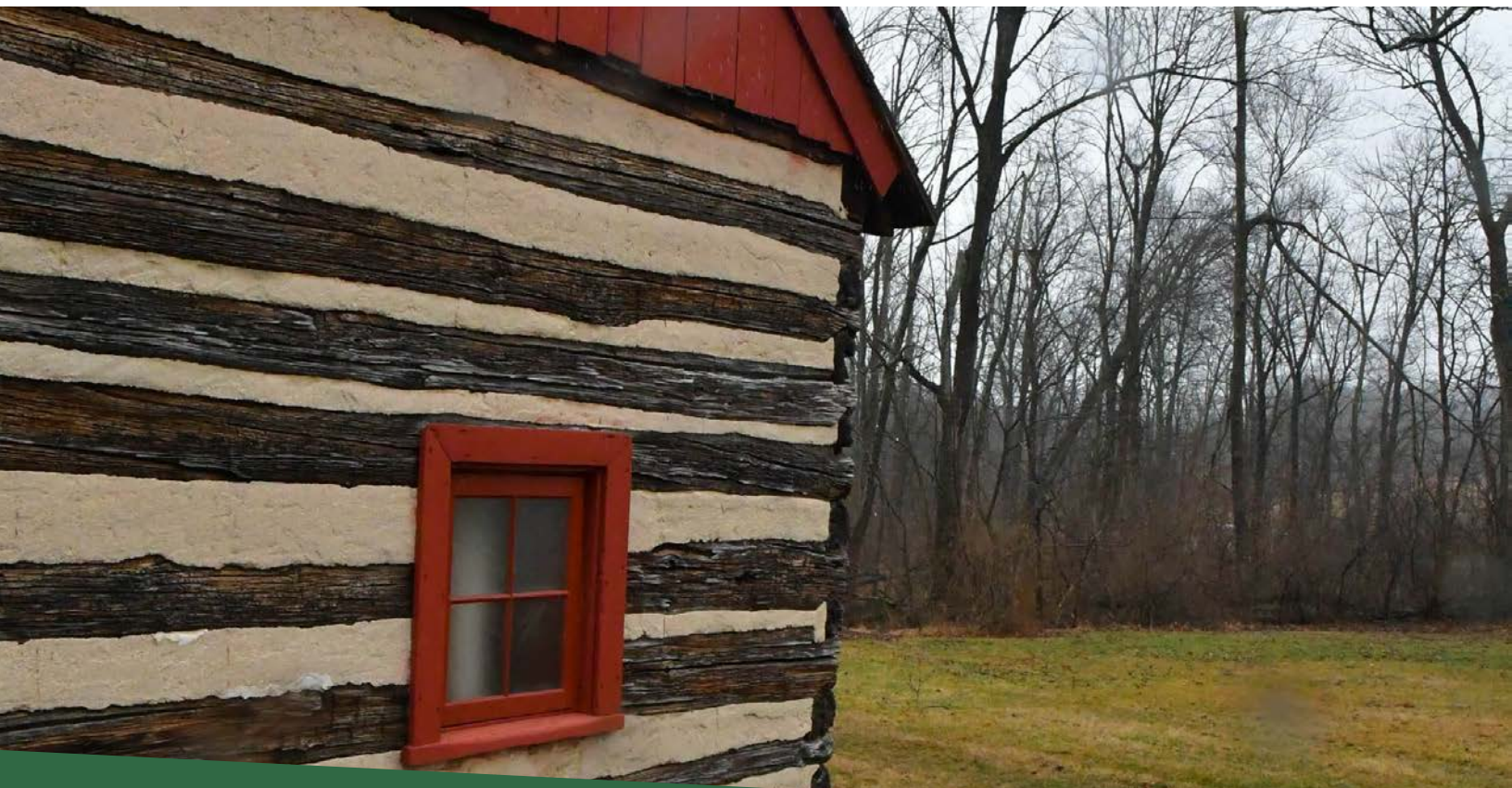
Community Conservation Partnership Program (C2P2)

The Community Recreation and Conservation Program through the PA DCNR Community Conservation Partnership Program (C2P2) provides funding to municipalities and authorized

nonprofit organizations 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 construction and rehabilitation of parks, trails, and recreation facilities. Most of these projects require a 50% match, which can include a combination of cash and/or non-cash values. Following completion of a park master plan, an implementation or construction grant is the next stage grant from DCNR. Grant applications for the C2P2 program are accepted annually—usually in April.

DCNR also administers funding from the federally funded Land and Water Conservation Fund (LWCF). The federal government recently permanently approved this fund. Since administrative requirements are more stringent for this funding, minimum grant amounts are \$500,000.00 and it is not unusual for grants to be as much as \$1million. As with C2P2 funds, a 50% match is required.

More information can be found at: <http://www.dcnr.state.pa.us/brc/grants/grantpolicies/index.htm>



DCNR Forest Buffer Program

The Riparian Forest Buffer Program through PA DCNR provides funding for organizations implementing a variety of forest buffers including conventional riparian forest buffers and multi-functional buffers. The state of Pennsylvania has a goal of planting 95,000 acres of riparian buffers by 2025 to improve state waterways and the Chesapeake Bay. There is no match required to be eligible for this grant.

Grant applications are usually accepted October to late December. More information is available on the PA DCNR website: <https://www.dcnr.pa.gov/Conservation/Water/RiparianBuffers/Pages/default.aspx>

DCNR has provided funding to County Conservation Offices. Grants awards are made by the local conservation office for the planting of multifunctional buffers. These grants do not require match.

Pennsylvania Department of Environmental Protection (PADEP)

DEP Growing Greener Watershed Protection Program

Funded through the state Growing Greener Environment Stewardship Funds applications should be targeted towards clean-up of non-point source pollution. The grant will fund local watershed-based conservation projects with the average award is \$150,000 and requires a 15% match from a non-DEP fund source. Application are typically due in January.

More information on this program can be found at the DEP website: <http://www.dep.pa.gov/Citizens/GrantsLoansRebates/Growing-Greener/Pages/default.aspx>

Non-Point Source Implementation Programs Grant

Provides funding assistance for projects aimed at implementing Pennsylvania's Non-point Source Management Program. Targeted projects include control of urban runoff, and natural channel design/ stream bank stabilization projects. The grant will fund local projects with the average award being \$200,000. The application period is typically in July.

More information on this program can be found at the DEP website: <http://www.dep.pa.gov/Business/Water/PlanningConservation/NonpointSource/Pages/default.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 grants cannot exceed \$250,000. The application period is typically in late May. More information can be found at: <https://dced.pa.gov/programs/greenways-trails-and-recreation-program-gtrp/>

Watershed Restoration and Protection Program (WRPP)

DCED Watershed Restoration and Protection Program is a funding program to restore, and maintain restored stream reaches impaired by the uncontrolled discharge of nonpoint source polluted runoff. Funds may be used for construction, improvement, expansion, repair, maintenance, or rehabilitation of new or existing watershed protection BMPs; stream bank bioengineering; and design services. Grant applications cannot exceed \$300,000 and require a 15% matching funds. Applications are typically due in June for consideration in September. More information can be found at: <https://dced.pa.gov/programs/watershed-restoration-protection-program-wrpp/>

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: <https://www.pennvest.pa.gov/Information/Funding-Programs/Pages/default.aspx>

National Fish and Wildlife Foundation (NFWF)

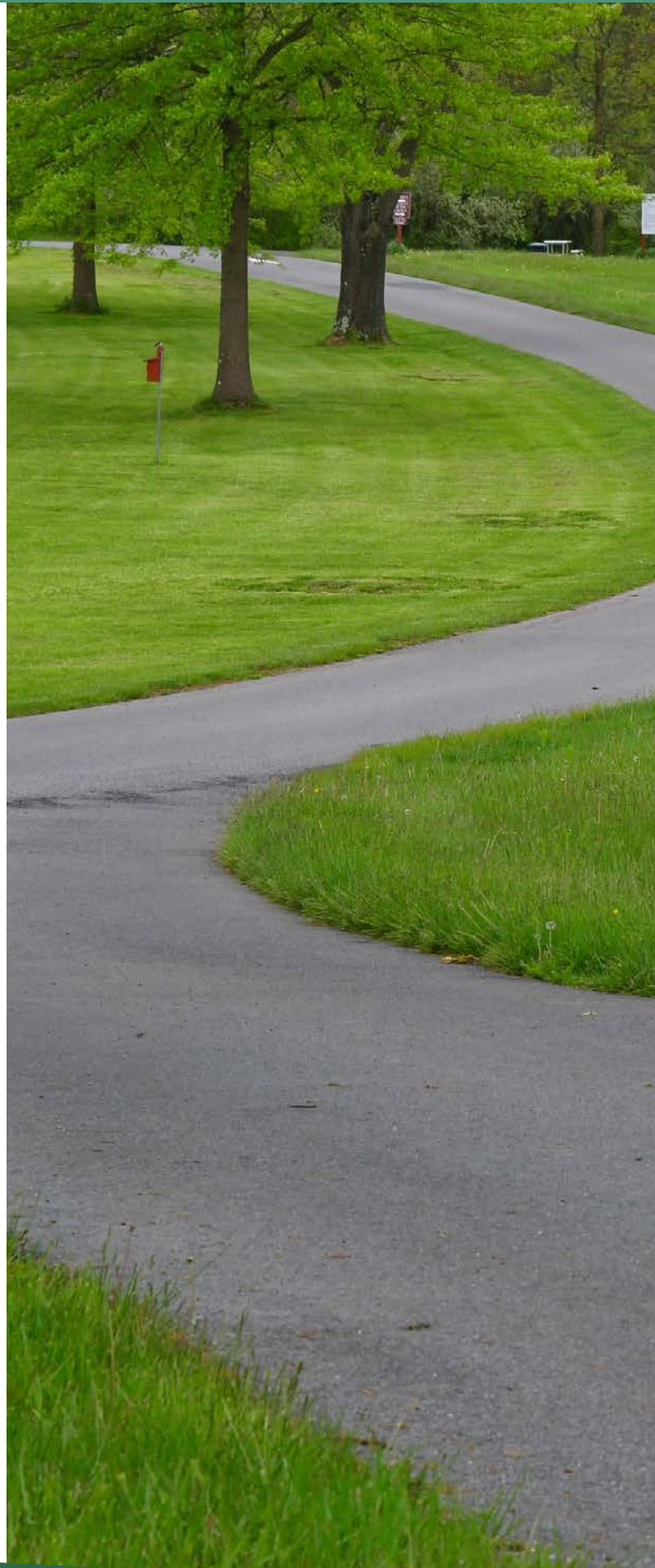
The National Fish and Wildlife Foundation (NFWF) has been a core partner since NFWF's founding by Congress in 1984. The partnership between U.S. Fish and Wildlife Service (FWS) and NFWF benefits a wide range of landscapes from the Delaware River to the Great Lakes and the Klamath Basin. The partnership benefits a wide range of species from mule deer and pronghorn to turtles, shorebirds, bats and native fish. FWS funding serves as the critical base to a broad range of NFWF conservation programs. The partnership allows NFWF to raise private-sector funds to amplify and complement the federal agency's conservation efforts across the nation, on both public and private lands.

Delaware Watershed Conservation Fund

The Delaware Watershed Conservation Fund was launched in 2018 to conserve and restore natural areas, corridors and waterways on public and private lands that support native fish, wildlife and plants, and to contribute to the vitality of the communities in the Delaware River watershed. Priority strategies for on-the-ground implementation include sustaining and enhancing fish and wildlife habitat; improving and maintaining water quality for fish, wildlife, and people; sustaining and enhancing water management to benefit fish and wildlife; and improving outdoor recreational opportunities within the Delaware River watershed.

Delaware River Restoration Fund

The Delaware River Restoration Fund was launched in late 2013 to help community-based nonprofits and government agencies work together to clean up and restore polluted waters and improve habitat for target species, including eastern brook trout and river herring. The Fund awards at least \$2 million per year in competitive grants, geographically focused on three priority strategies: (1) stewardship of working lands; (2) restoration of wetlands, floodplains and stream corridors; and (3) promoting the adoption of green infrastructure in urban/suburban landscapes. Since 2014, the Delaware River Restoration Fund has awarded 90 grants totaling roughly \$14.7 million. These investments leveraged more than \$23.36 million in grantee matching funds to fund agriculture conservation, green





stormwater infrastructure and innovative projects to improve the water quality of the Delaware River. To date, the fund has implemented more than 23,500 acres of best management practices to improve water quality and restored more than 190 acres of wetlands and 60 miles of riparian habitat. The Delaware River Restoration Fund is administered by NFWF in cooperation with the Delaware River Watershed Initiative, with major funding from the William Penn Foundation.

More info at: <https://www.nfwf.org/programs/delaware-river-program>

The Five Star and Urban Waters Restoration Program

The Five Star and Urban Waters Restoration Program focuses on the stewardship and restoration of coastal, wetland and riparian ecosystems across the country. Its goal is to meet the conservation needs of important species and habitats, providing measurable and meaningful conservation and educational outcomes. The program requires the establishment and/or enhancement of diverse partnerships and an education/outreach component that will help shape and sustain behavior to achieve conservation goals. More than \$18 million in grants has leveraged more than \$67 million in other funds or donated services.

More info at: <https://www.nfwf.org/programs/five-star-and-urban-watersrestoration-grant-program>

The Delaware River Watershed Initiative

The William Penn Foundation launched the Delaware River Watershed Initiative (DRWI) in 2014 to address four primary threats to clean water in the riverbasin: stormwater, runoff from agricultural fields, forest loss, and groundwater depletion. The DRWI coordinates and aligns the work of over 50 organizations funded by the William Penn Foundation, with a goal of creating a critical mass of land preservation and restoration work in targeted sub-watersheds where they can demonstrate significant, durable water quality improvements. Through a combination of high-level coordination and on-the-ground work, the DRWI mitigates threats to water quality through strategic, science-informed land protection and restoration. More info at <https://4states1source.org/>



Pennsylvania Game Commission

Cooperative Hunting Agreement

In order to manage the over-population of deer at the site, the Homestead can enter into a Cooperative Agreement with the Pennsylvania Game Commission (PGC) to allow for limited hunting. PHMC can utilize a model used by the Lancaster Conservancy. First, a baseline documentation report that describes the existing natural conditions that should be left untouched is developed. A management plan is then created which determines the “highest and best use” for land management. Finally, PHMC would consider the site for a Cooperative Agreement under the limited hunting options of mixed use, archery only or restricted use.

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.

More information can be found at: <http://www.dep.pa.gov/citizens/environmentaleducation/grants/pages/default.aspx>

Legislative Funding

State and federal elected officials can sometimes include items into legislation for worthy projects in their districts. A conversation between PHMC and municipal officials and state legislators may be a way to begin this process. This type of funding should be targeted toward capital improvement projects.

Private Foundations

There may be regional corporations and foundations that support public works such as projects outlined in the study. Competition for these funds is usually brisk, but opportunities should be researched. Funding is often to non-profit organizations.

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.

Schools and Local Organizations

Local schools and local organizations may also be of assistance in several ways. Local scout groups and are an example. These groups might get involved with fundraising events, and Homestead invasive plant removal days. The school faculty might incorporate the Homestead into various curricula with students helping to develop and volunteer time to maintain the site or do plantings there as part of a classroom assignment or after school club. While the amount of funds raised may be relatively small, this process builds constituents and support that is critical to the long-term success of the Homestead.

Daniel Boone Homestead Associates (DBHA)

The non-profit (501)(C3 DBHA can help raise grass roots funding for the park and be a conduit for tax-deductible donations and foundation funding.

DBHA can apply for many of the programs listed above. Additionally, DBHA can solicit grants from other organizations, and they can also solicit donations from area businesses and individuals.

Donation Opportunities

It is recommended that PHMC or DBHA create a list, with prices, of physical donation opportunities for the Homestead consistent with the study. Rather than having physical markers on the site noting the donation (which can become cumbersome over time) a list of donors might be prominently displayed on the Homestead website or a funder's donation wall at a central location.

Maintenance & Operations

Maintenance is based on site and the maintenance workers have residences at the Homestead. Equipment is housed in the DeTurk Barn. Maintenance staff includes one full-time worker. The long-time maintenance foreman retired in 2021 and PHMC is in the process of adding new staff. The maintenance staff is responsible for outdoor areas, facilities and indoor structure needs and functions at a high-level. Maintenance equipment includes various hand tools, power tools, zero turning radius mowers and a 4-wheel drive.

Additionally, the maintenance staff perform trail work and safety repairs, tree removal, facility repairs, trash removal, rest room care and other functions. The present staff of one worker is inadequate and should be increased beyond the two staff members that were in place for many years to provide for best management practices at the site and to prevent lapses in periodic maintenance. This need will grow as improvements are introduced with an expected increase in site visitation.

In addition to routine maintenance, the site receives supplemental funds for site preservation and funding for major maintenance projects (Keystone Projects). Over the past five years, site preservation supplements have been used for the following expenses:



- Lot repaving
- Split rail fencing
- Wastewater and drinking water testing service, pumping, supplies
- On-call services
- Site lighting
- Upgrades to underground electrical services and boxes
- Tree pruning / storm damage cleanup
- Re-keying doors and padlocks
- Site preservation supplement requests for 2021-22 include services for additional split-rail fencing and supplies, on-call services, asphalt / crack sealing and tree pruning and storm cleanup.

Over the past five years, keystone funds have been used for the following major maintenance items:

- Water system improvements
- Tree removal
- Mill headrace repairs
- DeTurk Maintenance Complex – fuel tanks
- Dam breast fencing and steps – safety issue
- Boone House – repairs to cellar floor
- Entrance and parking lot lighting Visitor Center – installation of domestic grade A/C
- DeTurk House repairs
- Bertolet House – roof repairs
- Hiring of site manager
- DeTurk Maintenance Complex – exterior door replacement
- Repairs / improvements to water systems

Maintenance at the Homestead will continue to be the responsibility of PHMC who can develop a formalized maintenance program based on the recommendations in this study as the improvements are implemented. A new, larger maintenance facility will provide





the space needed for the staff to adequately make repairs and for equipment and tool storage. Proposed meadows maintenance will prevent woody species from establishing and provide for sustainable bird and small animal habitats. Wooded areas will require routine management to identify and remove invasive plant species once maintenance programs are finalized. PHMC can also contract out routine maintenance, like mowing, to landscaping companies. Staff mow 20-30 acres on a bi-weekly basis so if a contractor took over just half of the site mowing, on-site staff would have more time to concentrate on other tasks.

Trails should continue to be regularly maintained and clear of debris and brush growth to provide a safe user environment. The Homestead can work with volunteers from local running groups, equestrians and Scout troops to assist with this responsibility. In addition, Exeter Township maintains Pineland Park and assists PHMC from time to time at the Homestead.

Revenue Generation

A variety of programs and events are held throughout the year at the Homestead. These include the Exeter Township Fall Festival and Hayride and the ChristkindlMart during the holidays. These events help to bring in supplemental revenue to the site that help to offset operations and maintenance costs.

Additional opportunities exist for revenue generating events at the Homestead. The programming can include event and festivals (similar to what the site already offers), educational programs, wellness classes, among others. These programs can then be advertised on the event website for the regional tourism organization, the Berks County Convention & Visitors Bureau, which helps promote area events, activities, dining, lodging, shopping and entertainment. These could be run by the Daniel Boone Homestead Associates. Some program opportunities at the Homestead are as follows.



Craft Markets

Craft markets provide an opportunity for local crafters to show off and sell wares. A typical craft market may draw over 50 vendors and can occur monthly or seasonally. For a typical fee of \$50, the vendors are permitted to reserve their space and sell their wares. These markets usually run for about 3-4 hours.

Farmers Markets

Farmers markets can be part of the craft market or can be a stand-alone event. These are very popular and provide fresh produce and other household items (such as jams, honey, sauces) that people desire. A similar registration system as noted for flea markets is suggested. Typically, fewer vendors are found at farmers markets. A fee of \$25 to \$50 per vendor is typical.

Arts in the Park Markets

Art markets are another opportunity for locals to share their wares. Much like the craft market and farmers market, the program is a revenue generator with little expense incurred by the site to offer the program.

Beer Garden Festivals/Summer Concerts/Food Trucks

Local brew pubs provide the beverages, food trucks provide the food, along with contracted musical groups who can provide a day or evening of entertainment for the community. These festivals are quickly becoming favorites for families. Abundant sponsorship opportunities are available for such events. Two events annually can generate over \$20,000 in revenues. Revenues are derived from ticket sales and sponsorships.

Summer Concerts

Summer concerts typically occur weekly in some parks. Sponsorship opportunities are plentiful for these types of events. It is not uncommon for one agency to sponsor the entire summer concert series (6-8 summer concerts).

Movie Nights

Movies in the park are great family events. Sponsorship opportunities are available for these events as well. Popcorn or snacks can be sold to generate some income.

Holiday Events

The Homestead can build on the success of the Christkindlmarkt and host additional holiday events that are enjoyed by families. They can be funded through sponsorships or nominal fees and can help develop strong community ties to the site.

Group Rentals

As described in Chapter 3 – Recommendations, if a new maintenance facility is constructed, the existing maintenance barn can be repurposed as a venue to host group events such as weddings, birthday parties, business retreats or other large group events. Tents can be erected in the existing paddock for additional event space and the DeTurk House can be utilized as space for small meetings or bridal suites.

For weddings, the Daniel Boone Homestead Associates can lease the space to a private vendor who would organize and run the events. The Associates can enter into a long-term lease agreement with a vendor who would then pay up-front capital costs in order to host events. The Associates and vendor can also look to Landis Valley Village & Farm Museum in Lancaster as a model for holding weddings and large events in a historical setting. Landis Valley has been successful in hosting weddings in their Yellow Barn and Courtyard as well as the Firehouse and House Hotel.

Recreation Programs / Partnership with Berks Nature

There are additional opportunities to expand recreational programs at the Homestead. Expanded educational classes can be offered by the Daniel Boone Homestead Associates or by contracted service providers. Education programs may include youth programs (science, nature, arts) and each program can generate a modest revenue stream.



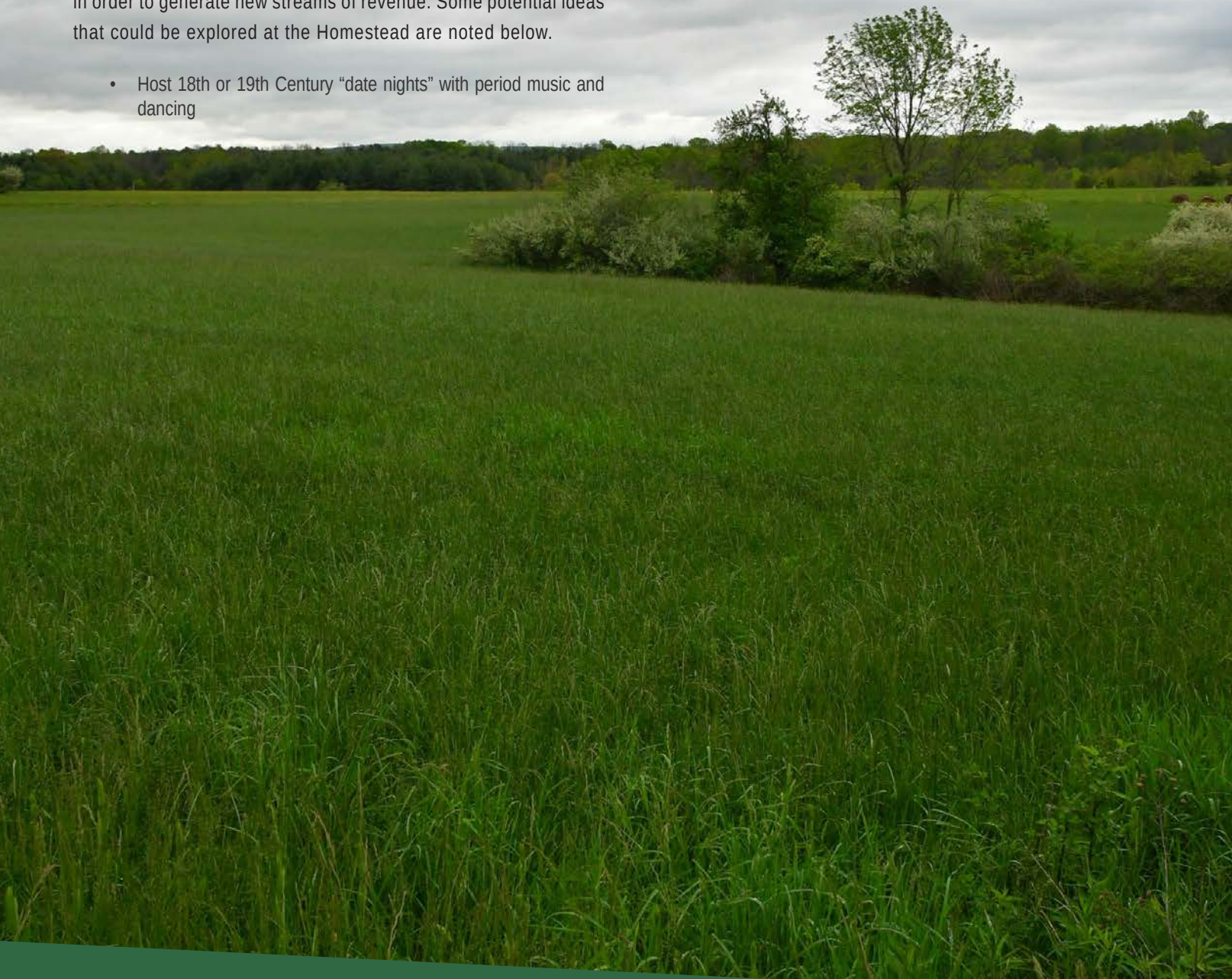
The Homestead can partner with Berks Nature to manage these classes. Berks Nature is a non-profit conservation organization that serves communities in Berks County and specializes in land preservation, water protection, trail management, community gardens and education programs. As specialists in environmental management and programming, they can also assist with the development and improvement of trails, meadows and woodlands.

Additional Revenue Generating Programs

The American Association for State and Local History's publication, 101 Ideas for New Revenue at History Organizations, lists programs and events that historical institutions and organizations can pursue in order to generate new streams of revenue. Some potential ideas that could be explored at the Homestead are noted below.

- Host 18th or 19th Century “date nights” with period music and dancing

- Hold 21-and-up after hours events that combine history, activities, drinks, music and games
- Develop book reading experiences/discussions tied to a book that was released during Daniel Boone's life
- Design historically themed escape rooms where participants work together to solve puzzles
- Have a local artist paint a scene of the Homestead and sell the prints on site
- Partner with a local restaurant or caterer to hold a “taste of history” food tour or farm-to-table events
- Create a yearly wall calendar using photos/paintings of the site









5 Appendix

- *Public Meeting Minutes*
- *Key Person Interviews*
- *Public Opinion Survey Results*
- *Daniel Boone Homestead PNDI*
- *Ecological Report*
- *Existing Building Assessment*