Glen Providence County Park 3

Chapter 3: Glen Providence County Park

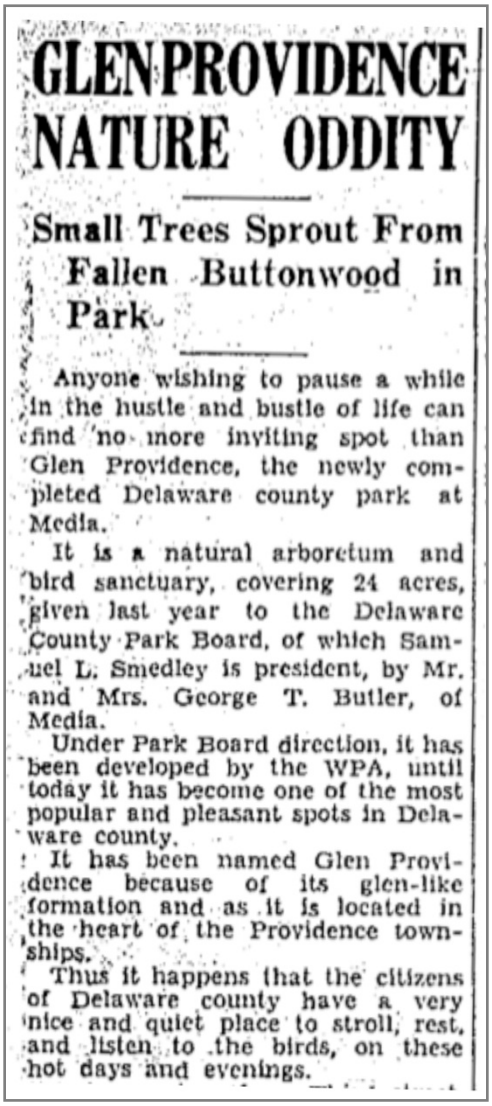
INTRODUCTION

SURROUNDING LAND USE

Glen Providence County Park was established as a Delaware County Park in 1935 as the result of a gift of land from George T. and Eleanor Butler, a family from Media. The land at that time was considered open space and was hoped by the Butlers to be used as an arboretum and bird sanctuary.

The park was carefully planned under the leadership of Delaware County Park Board President Samuel L. Smedley. Trails were laid out to have minimum impact on the natural environment, while allowing visitors to experience and enjoy the plants and wildlife. Most of the early work on the park was done in the late 1930's by the Works Progress Administration. Its goal was to create jobs for the large number of unemployed.

Since its original park improvements, Delaware County Parks and Recreation have maintained the park for the past 75 years as a passive recreation facility.



GLEN PROVIDENCE NATURE ODDITY

Small Trees Sprout From Fallen Buttonwood in Park

Anyone wishing to pause a while in the hustle and bustle of life can find no more inviting spot than Glen Providence, the newly completed Delaware county park at Media.

It is a natural arboretum and bird sanctuary, covering 24 acres, given last year to the Delaware County Park Board, of which Samuel L. Smedley is president, by Mr. and Mrs. George T. Butler, of Media.

Under Park Board direction, it has been developed by the WPA, until today it has become one of the most popular and pleasant spots in Delaware county.

It has been named Glen Providence because of its glen-like formation and as it is located in the heart of the Providence townships.

Thus it happens that the citizens of Delaware county have a very nice and quiet place to stroll, rest, and listen to the birds, on these hot days and evenings.

Figure 3-1: Article from the Chester Times on July 8th, 1936.

CONTEXT WITHIN THE DELAWARE COUNTY PARKS SYSTEM

Glen Providence County Park is a passive recreation facility that offers the park user a scenic experience with its pond, rolling landscape, picnic areas, trails and mature forest. Park users are usually impressed with the amount of flora and fauna that can be seen in the park. The park is easily accessible from both the pedestrian network of the Media area and is also a short walk from the SEPTA trolley.

In the context of the overall Delaware County Park System, Glen Providence County Park is middle of the road in size at 32.3 acres and fits nicely into the County park system with its natural beauty, accessibility and its extremely active friends group.

CURRENT SERVICE AREA

Glen Providence County Park is a community park that has a devoted user base within the surrounding neighborhoods. These park users tend to be regular walkers that come to use the trail system and to take in the natural features the park has to offer.

The current service area of Glen Providence County Park supports the municipalities of Media Borough, Upper Providence Township, Marple Township, Springfield Township, Nether Providence Township, Rose Valley Borough, Edgmont Township, Swarthmore Borough and Middletown Township.

Glen Providence County Park's current service area also includes many other similar open space resources and user constituencies that benefit the park. These resources include: Ridley Creek State Park, Penn State University Brandywine, Tyler Arboretum, Springton Lake Reservoir, Smedley County Park, Rose Tree County Park, Martin County Park, Saul Wildlife Sanctuary, Scott Arboretum, Swarthmore College, Hildacy Farms, Springfield Memorial Park, Spring Valley Park, Kent Park, and Jane Lownes Park.

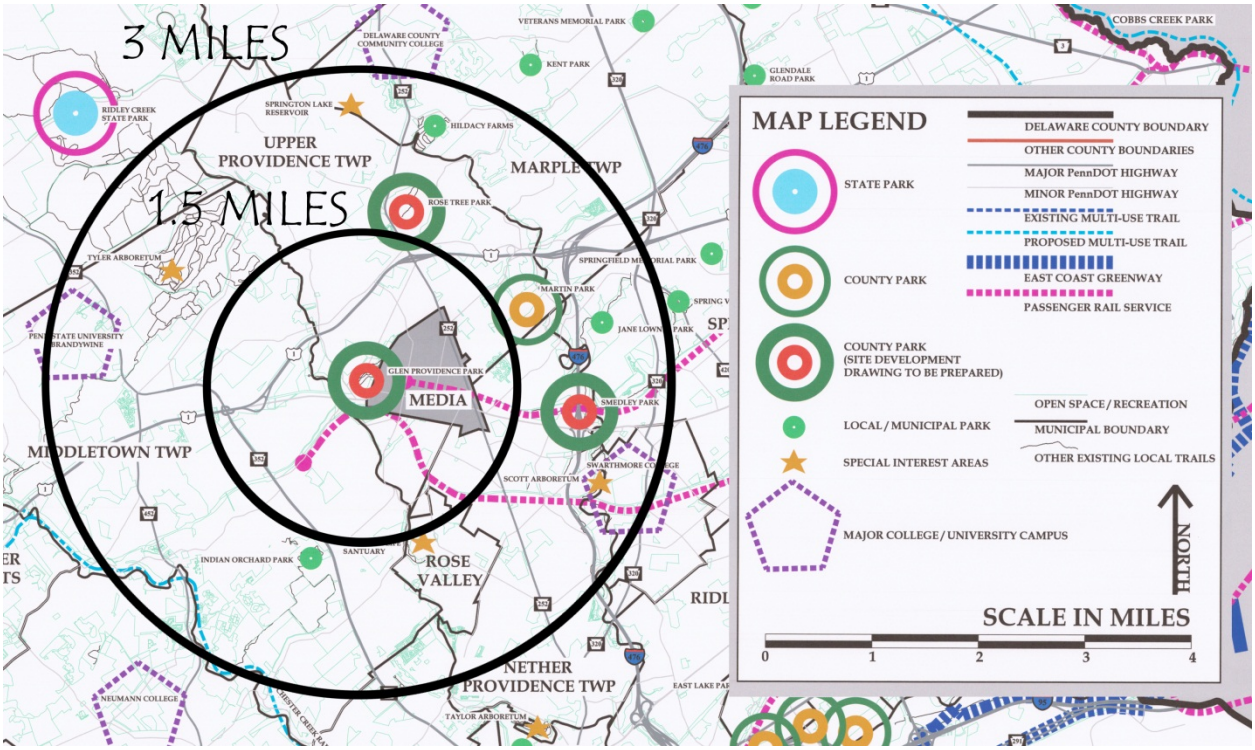


Figure 3-2: Glen Providence County Park Service Area

EXISTING CONDITIONS AND INVENTORY

SURROUNDING LAND USE

Glen Providence County Park is located partially in Media Borough and partially in Upper Providence Township. Glen Providence County Park is a wonderful and cherished piece of green space in a residentially developed area directly west of the town center of Media. Some commercial / industrial use exists mostly along the Baltimore Pike corridor through the south end of Media. The park also has the benefit of being connected to another adjacent green space in Broomall's Lake Country Club. The Ridley Creek corridor is only about a quarter of a mile southwest of Glen Providence County Park.

LEGEND

- RESIDENTIAL LAND USE
- OPEN SPACE / INSTITUTIONAL LAND USE
- COMMERCIAL LAND USE
- PARCEL LINE (COUNTY GIS)
- PARK BOUNDARY
- 10 FT. LIDAR CONTOURS
- EXISTING WATER COURSE
- EXISTING WOODLINE
- EXISTING TREE
- EXISTING PARK ACCESS POINT

HIGHLAND AVE.

BROOMALL'S LAKE COUNTRY CLUB

N. LEMON ST.

W. 5TH ST.

W. 3RD ST.

PARK TRAILS

WOODED AREA

32.30 ACRES

BROOMALL'S POND

WOODED AREA

KIRK LANE

N. RIDLEY CREEK RD.

BROOMALL'S RUN

PAVILION

OPEN LAWN

OVERLOOK

WOODED AREA

PARK TRAILS

UPPER PROVIDENCE TWP.

MEDIA BOROUGH

WEST ST.

W. FRONT ST.

MEDIA

E. STATE ST.

W. STATE ST.

PARKING

E. BALTIMORE PIKE

S. LEMON ST.

BROOKE ST.

E. BALTIMORE PIKE

RIDLEY CREEK

LOCATION MAP

UPPER PROVIDENCE TOWNSHIP

PARK SITE

ROUTE 1

E. BALTIMORE PIKE

N. ORANGE ST.

MEDIA

E. BALTIMORE PIKE

MIDDLETOWN TOWNSHIP

REVISION | NO | BY | DATE

SEAL

PROJECT MANAGER: TIMOTHY PAUL WILSON, RLA, LEED AP

DESIGN BY: | CHECKED BY:

DRAWN BY: TPW | CHECKED BY:

CLIENT
DELAWARE COUNTY PLANNING DEPARTMENT
TOAL BUILDING, 2ND 4 ORANGE STREETS
MEDIA, PA. 19063
PH: 610-891-5200 FAX 610-891-5303

SCALE IN FEET 0 50 100 200

PROJECT TITLE
SITE DEVELOPMENT DRAWINGS
GLEN PROVIDENCE PARK
MEDIA BOROUGH & UPPER PROVIDENCE TOWNSHIP DELAWARE COUNTY, PA.

SHEET TITLE
EXISTING CONDITIONS DRAWING

SUB-CONSULTANTS
CT &C
Toole Recreation Planning

TPW DESIGN STUDIOS
LANDSCAPE ARCHITECTURE + PLANNING
310 ELMWOOD BLVD.
YORK, PA. 17403
STUDIO PHONE: 717-843-1897
WWW.TPWDESIGNSTUDIOS.COM

DESIGN STUDIOS

DATE: FEBRUARY 23, 2012

PROJECT NO.: 13.1 - DELCO

SHEET NO.: 1 OF 1

NATURAL RESOURCES

Vegetation

Dense mature mixed deciduous woodlands cover about 90% of Glen Providence County Park's 32.3 acres.

There is a great variety of large specimen trees throughout the park. Found were, Oak, Beech, Hickory, Tulip Poplar, Red Oak, Sassafras, Ash and Sycamore. The large trees form a canopy high above the dense understory plantings that includes a good variety of native (and invasive) deciduous and evergreens.

Figure 3-3: Wooded area in Glen Providence County Park

Glen Providence County Park is in the stream valley of Broomall's Run (a tributary to Ridley Creek). Broomall's Run flows straight through the park. The stream valley is mostly wooded and occupied by the Run and Broomall's Pond. There are some small cleared areas for picnic tables. These cleared areas are dominated by lesser celandine (Ficaria verna). This plant is listed as an exotic invasive plant by the Pennsylvania Department Conservation and Natural Resources (DCNR). The wooded area is a forested floodplain that is a mix of native and exotic invasive vegetation. The valley downstream of the pond contains a high density of multifloral rose (DCNR invasive). The valley upstream contains a more diverse understory.

Wildlife and Pennsylvania Natural Diversity Inventory

Wildlife

Glen Providence County Park is abundant with wildlife and acts as a migration corridor as it is directly fed by the Ridley Creek corridor, and the Broomall's Lake County Club. The dense woodland provides fauna refuge and habitat. Numerous species of birds, rodents, amphibians, insects and reptiles were seen all over the park. The park really seems to be a sanctuary for wildlife in a well-populated area of Delaware County.

Figure 3-4: Turtle in the pond at Glen Providence County Park

Broomall's Pond is teeming with life. Several species of turtles, frogs and fish were observed within the pond. The turtle population was so dense that territorial behavior was observed between species. No turtle surveys were performed, but it did appear that the red belly slider and snapping turtle are among the species present. Minimal basking habitat exists within the pond. The turtles preferred the shallow upper portion of the pond. The lower portion of the pond was teeming with algae blooms. These blooms

are the result of excess nutrients, likely a result of a mix between animal waste and stormwater runoff. As this algae dies off and begins to decay, dissolved oxygen is consumed. This results in hypoxic or depleted oxygen conditions. Aquatic plants and animals cannot survive without sufficient oxygen. Hypoxic conditions are a greater threat during the warmer months of late summer during the peak algae bloom period.

Preliminary Environmental Review

The Pennsylvania Natural Diversity Inventory (PNDI) records for Glen Providence County Park indicate that there are potential impacts to threatened and endangered species and/or special concern species and resources within the Park boundary.

Further coordination with PA Department of Conservation and Natural Resources and the U.S. Fish and Wildlife Service would be necessitated at the time of any construction activities and/or plan implementation. (See Appendix G-2 for details of the review and limits).

Figure 3-5: Broomall's Pond in Glen Providence County Park

The agencies typically needing coordination in regards to a PNDI are: PA Game Commission; PA Department of Conservation and Natural Resources; PA Fish and Boat Commission; and the U.S. Fish and Wildlife Service.

Soils and Topography

Soils

According to the United States Department of Agriculture (USDA) Soils Survey, the soils present within Glen Providence County Park are as follows:

GeB2 - Glenelg channery silt loam, 3 to 8 percent slopes, moderately eroded
GeC – Glenelg channery silt loam, 8 to 15 percent slopes
GeD – Glenelg channery silt loam, 15 to 25 percent slopes
GeE - Glenelg channery silt loam, 25 to 35 percent slopes
GnB2 – Glenville channery silt loam, 3 to 8 percent slopes, moderately eroded (Hydric Soil)
Me – Made land, schist and gneiss material (Hydric Soil)
MgC2 – Manor loam, 8 to 15 percent slopes, moderately eroded
MkF – Manor soils, 35 to 60 percent slopes
We – Wehadkee silt loam

Hydric Soils are those soils that are sufficiently wet in the upper part to develop anaerobic conditions during the growing season. Hydric soils are generally associated with wetland conditions, but do not necessarily mean there are wetlands present within an area of hydric soil. The soils along the stream valley are mapped as Wehadkee Silt Loam. This soil series is classified as poorly draining and, as a result, many wetland pockets are established along the floodplain. The stream appeared stable except for the artificial channel diverted around the pond.

No wetlands were found on National Wetland Inventory (NWI) mapping of the park. No wetlands were delineated or identified by the three parameter approach outlined in the 1987 United States Army Corps of Engineer Wetland Manual and corresponding regional supplement. A detailed wetland investigation was not practical for the level of detail for this survey report and NWI mapping often does not show smaller wetland pockets. Preliminary wetland investigation criteria used for the sake of this report consists of visual identification and rapid test of hydrophytic vegetation, landform and visible signs of hydrology. It is our conclusion that wetlands are most likely present all along the Broomall's Run corridor within the park. Also, a wetland area had been previously identified in the northern part of the park in the past planning efforts for the 3rd street dam. It is recommended that prior to any park improvements including land disturbance that a wetland investigation and updated Pennsylvania Natural Diversity Inventory (PNDI) inquiry be conducted to the presence of or potential habitat belonging to rare, threatened, and/or endangered species. A wetland investigation and, if necessary, wetland delineation may be required to be submitted with PADEP and NPDES permits for disturbances in wetlands and streams. The soils identified above are detailed further in Appendix G-1.

Figure 3-6: National Wetlands Inventory of Glen Providence County Park

Topography

As with any stream valley, Glen Providence County Park slopes steadily down toward Broomall's Run. The highpoints are on the east and west sides of the park (State Street and Kirk Lane respectively) and slope towards the middle of the park.

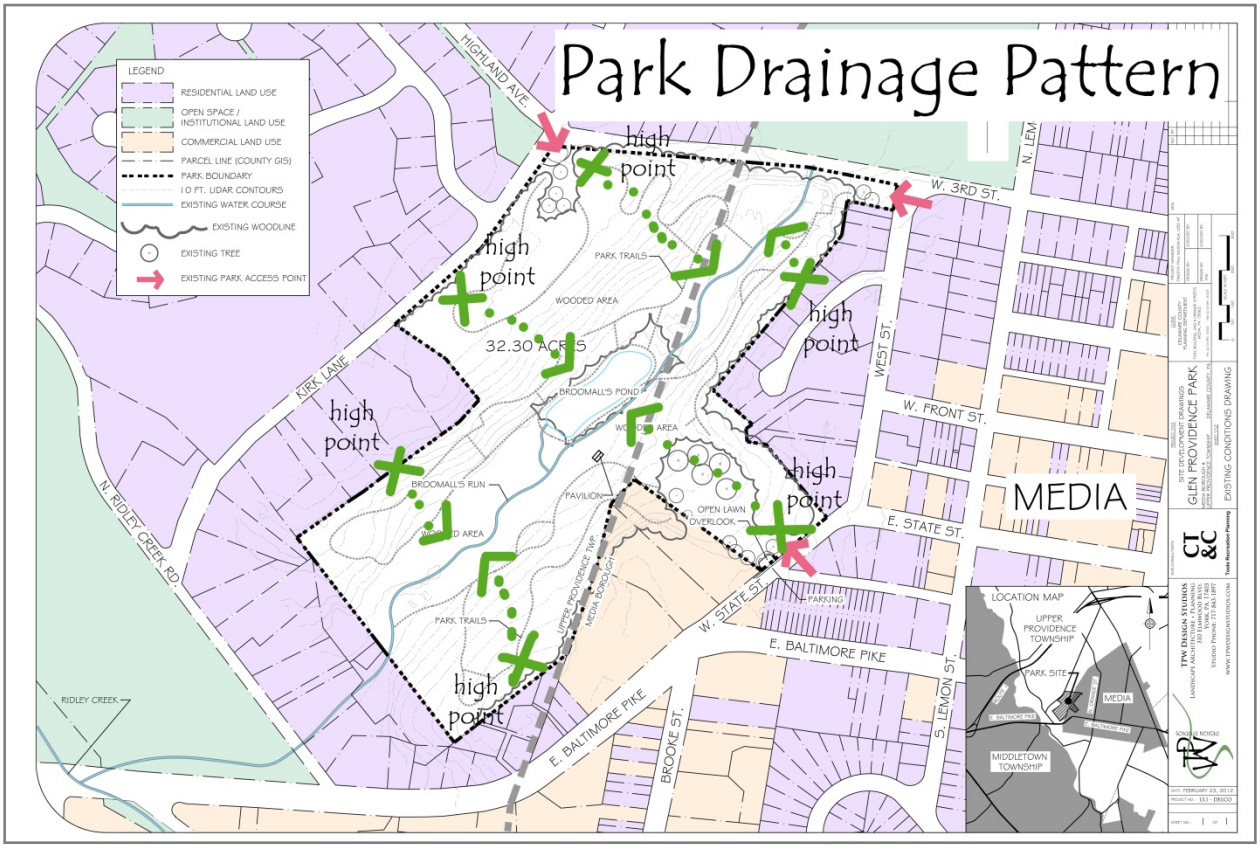


Figure 3-7: Existing drainage pattern at Glen Providence County Park

Hydrology

There are two hydrological features within Glen Providence County Park. They are Broomall's Run and Broomall's Pond.

The riparian buffer of Broomall's Run is well established, but invasive vegetation dominates in some areas. There are some areas of serious erosion along the Run, mainly in the area of Broomall's Pond. At the pond, the Run is channelized around the east side of the pond. This concentrates and accelerates the flow causing major erosion. Also, at the pond's discharge point, there are serious erosion problems (see photos). These issues must be addressed with the development of the park.

Figure 3-8: Stream channel in Glen Providence County Park

There is little in the way of stormwater management on the Glen Providence County Park site. There are some channelized swales that flow during significant rain events. In major rain events, stormwater sheet flows down the open space area of the park adjacent to State Street and creates erosion problems on the slope.

Unnamed Tributaries to Ridley Creek (Broomall's Run) and Chapter 93 Designation

Broomall's Run originates about a mile north of Glen Providence County Park and is dammed at 3rd Street to form Broomall's Lake (Country Club). The dam at 3rd Street on the north end of the park feeds Broomall's Run (and Pond) within the park.

Figure 3-9: Pond discharge in the park

The Chapter 93 Protected Use Designation for the Unnamed Tributaries to Ridley Creek in the area of Glen Providence County Park are:

HQ-TSF – High Quality Trout Stocked Fishery
MF – Migratory Fishes

Broomall's Run flows through the valley toward the southwest. Unnamed Tributaries to Ridley Creek are designated as a High Quality Trout Stocked Fishery (HQ-TSF) by the Pennsylvania Department of Environmental Protection's (PADEP) Chapter 93 Water Quality Standards.

HQ waters have special protections and are defined as "Surface waters having quality which exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water by satisfying § 93.4b(a)" according to PADEP's Chapter 93 guidelines. Designated use of a TSF is defined as "Maintenance of stocked trout from February 15 to July 31 and maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat." Despite the HQ-TSF designation, the aquatic life status has a pending impairment status by PADEP because of urban runoff causing flow variation, siltation, thermal modifications and flow alterations.

EXISTING PARK FACILITIES

Figure 3-10: Overlook structure

Figure 3-11: Dedication plaque

Figure 3-12: Stairs from overlook structure

Figure 3-13: Broomall's Pond

Figure 3-14: Open lawn and picnic groves

Figure 3-15: Performance stage

Figure 3-16: Pavilion

Figure 3-17: Hiking Trails

HISTORICAL AND CULTURAL RESOURCES

There are two main historical and cultural resources still associated with Glen Providence County Park, The Overlook Structure at the State Street entrance and the Eleanor Reed Butler Waterfall.

Overlook Structure

The "Glen Providence Plaza" was one of the original structures built for the park and still stands as a beacon watching over Glen Providence Park.

Figure 3-18: Overlook structure (date unknown)

Eleanor Reed Butler Waterfall

On the northwest side of Broomall's Pond (lake), near the pond "island", is the now-dry Eleanor Reed Butler Waterfall. The stones where water once flowed are now covered with vegetation, and the pool of water that was at the base of the waterfall is dry. The waterfall was one of the first features installed in the park in 1936. It was fed through a pipe leading from the drinking spring 500' upstream near the 3rd Street dam, which is marked on the 1945 Plan of Glen Providence Park (shown on the left).

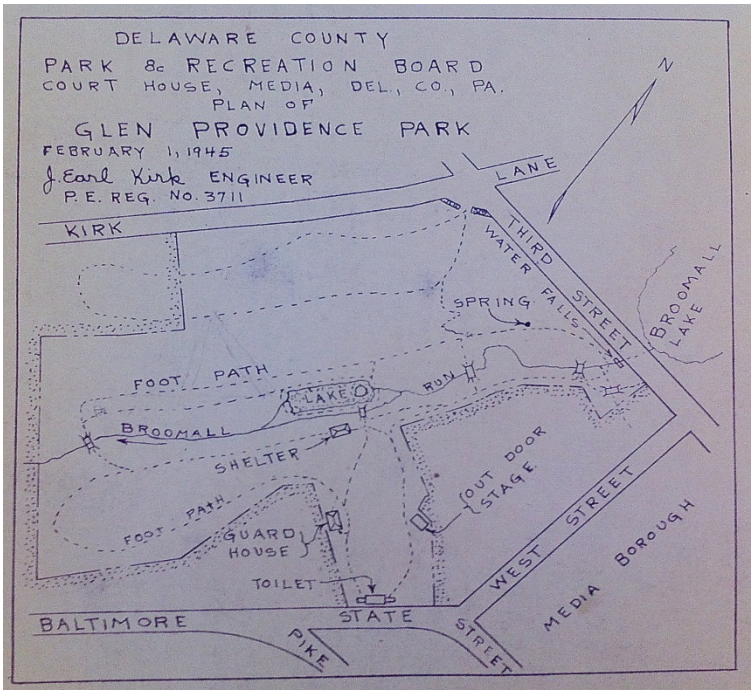


Figure 3-19: Park survey (February 1945)

STRUCTURES

Entry Overlook Structure

Figure 3-20: Overlook structure entrance

Stone Masonry and concrete construction. The structure is not in use and currently all openings are sealed with masonry. The interior space is inaccessible. Presently it is impossible to assess the condition of the interior and the structure, but based on the condition of the roof terrace surface, it seems safe to conclude there is likely significant damage to the interior due to water intrusion. The original roof terrace surface, probably slate or flag stone, is covered with a bituminous coating that has cracked over the years and allows water to penetrate into the construction. The stone masonry forming the walls and the flanking stairs appears to be in relatively good condition. It's been reported the structure once housed restroom facilities. It's appropriate to reconsider using the structure to provide these facilities again and possibly add concession sales to support activities at the park. Based on assumptions about the condition of the interior, this would likely be a costly reconstruction. Even assuming the interior construction is structurally sound and that what remains of the original interior is damaged beyond restoration, the primary issue is restoring a serviceable roof terrace construction. In order to do this the best approach is to strip the terrace of all existing finishes to the structural roof deck and develop a new roofing/terrace construction system that provides suitable protection of the interior, drains well and creates an appropriate and attractive terrace surface. Other work would include:

- Cleaning and some repointing of the stone.
- Resetting lose stair treads.
- New windows and doors with security shutters.
- New mechanical and electrical systems including services.
- New fixtures, interior partitions, and finishes.

Pavilion

Figure 3-21: Pavilion

Wood timber construction on stone piers, in general, the pavilion appears to be in fair condition and in need of general maintenance type repairs including painting, new flooring surface and roofing replacement.

PARK ACCESS

Pedestrian

As a neighborhood and community park, many Glen Providence County Park users access the park on foot from the numerous footpaths that lead into the park and the good pedestrian and sidewalk network in Media. Also, there is limited parking on State Street and at the intersection of Kirk Lane and 3rd Street, making walking to the park a much more desirable option for local users. A very active friends group, Friends of Glen Providence Park, is made up of citizens that walk to and use the park on almost a daily basis.

Trails and Greenways

Internally, Glen Providence County Park has a wonderful network of scenic earthen walking paths that are actively maintained by the Friends of Glen Providence Park and the County Parks Department. This network of trails and ease of access makes it easy to take a step into nature and enjoy the wildlife and passive activities the park has to offer.

Public Transit

Delaware County has an extensive public transit system and Glen Providence County Park is directly on Bus Route 110 – 69th Street Terminal to Granite Run Mall and Penn State University. The bus service frequency during peak park use times of the day are every half hour Monday – Saturday, and every hour on Sundays.

Glen Providence County Park also has the luxury of being at the end of the line of the trolley in Media. The trolley stop is only a short walk from the State Street entrance to the park.

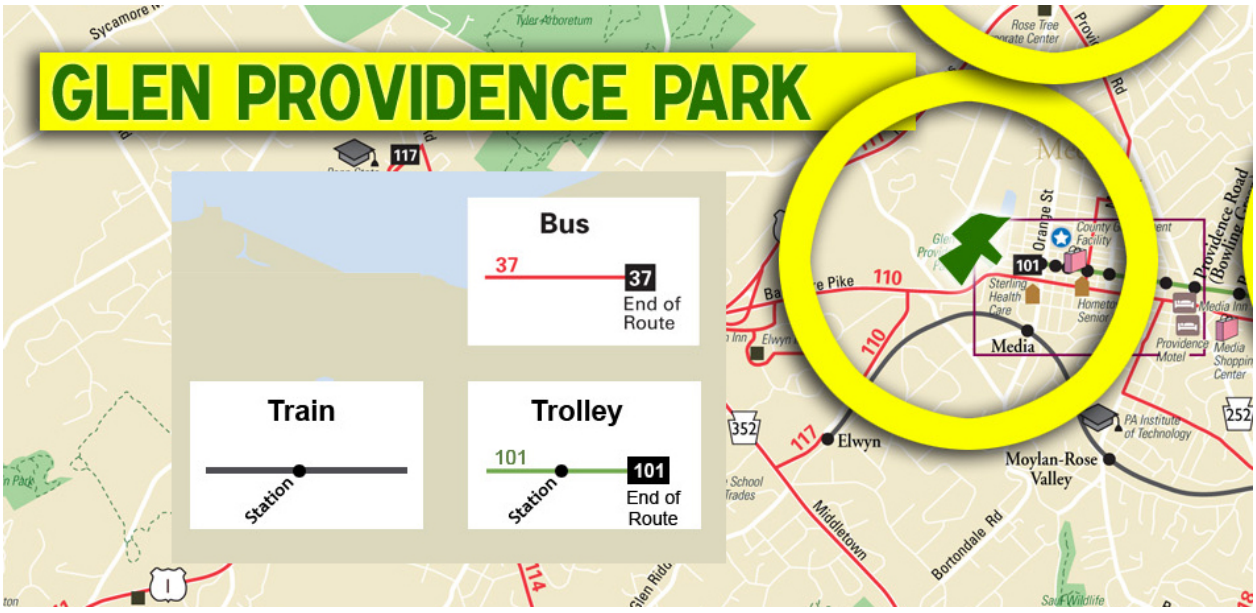


Figure 3-22: Transit connections to Glen Providence County Park
(Base map source: DCPD 2013)

Vehicular

There is neither a vehicular entrance nor an access drive to Glen Providence County Park. There are two small parking areas. One is on State Street on the Media side of the park (as seen to the right in the photo). The other is at the intersection of Kirk Lane and 3rd Street and can park between 3-5 cars at a time.

PARK NEEDS ANALYSIS

PARK USE, PROGRAMS, AND VISITATION IN 2015

As far as what is known, there is currently no documented visitation data for Glen Providence County Park, so no visitation data was acquired or analyzed. Based on information from Delaware County and what has been visually attained from numerous park visits, the following are points and analysis regarding park use, programs and visitation in 2015

1) A majority of everyday use comes from surrounding residential neighborhoods and downtown Media. These park users are typically passive recreating, i.e. walking, dog walking, bird watching, sunbathing, hiking. Many users access the park on foot.

   This use will continue to increase based on marketing, advertisement and facility improvements to Glen Providence County Park.

2) Given the passive recreating that takes place and natural environment of Glen Providence County Park, the park seems to function only during daylight hours (dawn to dusk).

3) With every site visit to the park, three things were always encountered: 1) wildlife for watching; people were hiking or taking in the scenery; and 3) members of the Friends of Glen Providence group were working in the park (planting trees, pointing stonework, or repairing the riparian buffer to Broomall's Run.

   The Friends of Glen Providence are an extremely active friends group and a real asset to Delaware County and the park.

4) Programs:
   Although park programming elements such as ice skating and fireworks are now a thing of the past, current programming of the park is more environmentally centered, with the abundant fauna and flora in the park. Classes and groups visit the park to observe nature and learn natural systems.

   Glen Providence County Park provides a performers forum on its stone stage area and is quite popular. This entertainment is sporadic and should be formally programmed into the park.

   Although sledding is prohibited, Glen Providence County Park possesses what is considered one of the best snow sledding hills around (as seen to the right).

PARK NEEDS

The needs of Glen Providence County Park have been compiled objectively and have been identified based on many variables including numerous consultant site visits and visual observations, public

participation and input, Delaware County Planning and Parks and Recreation needs, and user demographic. Public survey information relating to Glen Providence County Park can be found in Volume IV of the comprehensive Delaware County Open Space Recreation Plan.

The Glen Providence County Park needs are as follows:

1) Better pedestrian access and circulation improvement
2) Trail improvements including crossings of Broomall's Run
3) Signage
4) Build upon existing resources and buildings
5) Build upon existing park programming
6) Promotion of park facilities and programs
7) A more efficient and cost effective maintenance program
8) Improved parking
9) Enhance the user experience / make continuously interesting
10) Enhance gathering areas (picnic groves)
11) Emphasize and promote the SEPTA public transit system as it relates to park use
12) Preserve and steward site woodlands and riparian areas
13) Site stormwater management facilities and erosion improvements
14) Develop relationships between Delaware County and local community oriented and business organizations in the area of Glen Providence County Park (most notably the Friends of Glen Providence Park)
15) Children's play area
16) Enhance and celebrate park historic resources (Eleanor Butler Waterfall)

PARK DEVELOPMENT OPPORTUNITIES

Based on all information gathered and input attained, the following opportunities have been identified as Glen Providence County Park existing features, facilities or connections that should be built upon within the Site Development Plan:

1) Internal trail network
2) Historic resources
3) Broomall's Run and Pond
4) Current park programming
5) Existing effective stormwater management and erosion solutions
6) Parking
7) Structures (pavilion, stone overlook)
8) Tying into the surrounding Media area pedestrian network (sidewalks, crossings, etc.)
9) Delaware County maintenance resources

MANAGEMENT, MAINTENANCE, AND OPERATIONS

Management

Glen Providence County Park is managed by the Delaware County Parks and Recreation Department, located in Rose Tree County Park. This method of park management is sufficient for the size and use of Glen Providence County Park.

No future improvement or development would necessitate offices or the everyday presence of Delaware County Parks and Recreation staff.

Maintenance & Operations

Delaware County crews currently perform weekly maintenance duties that include trash pick-up, mowing, preventative maintenance, and incident maintenance.

As Glen Providence County Park is developed, use will increase, but not to levels that the current maintenance and operations will be insufficient. A detailed maintenance and operation task schedule and frequencies should be implemented in order to effectively manage park upkeep tasks and coordinate with other County Park facility schedules.

PARK SITE DEVELOPMENT PLAN AND RECOMMENDATIONS

THE SITE DEVELOPMENT PLAN "CONCEPT"

The concept of the Glen Providence County Park Site Development Plan is to keep the park natural and passive while making the necessary improvements to sustain functionality and celebrate the natural landscape and history. The concept places emphasis on preserving the passive nature of the park while enhancing the user experience through interpretation and environmental education.

Figure 3-23: Glen Providence County Park Concept Sketch

ADDITIONAL PLAN INFORMATION

PARK ACREAGE - 32.30 ACRES
IN UPPER PROVIDENCE TOWNSHIP AND MEDIA BOROUGH

- PARK BOUNDARY
- EXISTING 10 FOOT CONTOUR
- 100 YEAR FLOODPLAIN
- MUNICIPAL BOUNDARY

VEGETATION

- LAWN
- BIO-RETENTION / RAIN GARDEN
- RIPARIAN CONSERVATION
- FOREST / WOODED AREA

FEATURES & AMENITIES

- POTENTIAL TRAIL / PED. CONNECTION
- BENCHES
- INTERPRETIVE SIGNAGE
- PARK KIOSK
- SMALL PARK KIOSK
- PARKING
- NEW PEDESTRIAN CROSSING

KIRK LANE
DIEMER DR.
COUNTY PARK SIGN
GROVE
EARTHEN PATH
UPPER PROVIDENCE TOWNSHIP
WOODED AREA
STEPS
RE-ESTABLISH ELENOR BUTLER WATERFALL & MEMORIAL
IMPROVE PIPE & POND FEED FROM RUN
BROMALL'S LAKE & COUNTRY CLUB
3RD STREET DAM
ELEVATED BOARDWALK
BROOMALL'S RUN
RIPARIAN
DAM W/ WALKWAY
BROMALL'S POND (1)
PAVILION
BRIDGES
"NATURAL" PLAY AREA (3)
SWALE
6' CRUSHED STONE PATH
RAIN GARDEN
OPEN LAWN
PICNIC GROVE
STAGE & SEATING TERRACE
TERRACED LAWN (2)
SITE COMPOST AREA
6' CONCRETE PATH
TO RIDLEY CREEK CORRIDOR
BALTIMORE PIKE
STATE STREET
COUNTY PARK SIGN
CONNECTION TO DOWNTOWN MEDIA AND TROLLEY LINE
3RD STREET
PARKS EDGE LANE
MEDIA BOROUGH
WEST STREET
BAKER STREET

NOTE: THIS SITE PLAN MAY NEED TO BE REVISED NEAR THE 3RD STREET DAM PENDING FINAL DESIGN OF THE DAM RECONSTRUCTION PROJECT

NOTE: ITALIC LABELS REPRESENT EXISTING SITE INFORMATION

SCALE IN FEET
0' 30' 60' 120' 180'

1. BUFFER POND WITH NATIVE PLANTINGS; STABILIZE BROOMALLS'S RUN STREAMBANKS ADJACENT TO THE POND BY RE-GRADING AND NATIVE PLANT MATERIAL
2. REFURBISH STRUCTURE TO PROVIDE PARK RESTROOMS; ADA ACCESSIBLE WALKWAY AND OVERLOOK TERRACE; TERRACE LAWN AREA WITH RETAINING WALLS; IMPROVE PARKING TO INCLUDE ADA ACCESSIBLE SPACES
3. REFURBISH PAVILION AND DIRECTLY CONNECT TO "NATURAL" PLAY AREA
4. IMPROVE PARKING AT KIRK LANE PARK ENTRANCE (PROVIDING ADA ACCESSIBLE SPACES)

GLEN PROVIDENCE COUNTY PARK

SITE DEVELOPMENT PLAN

JANUARY 2015

DOWNTOWN MEDIA

TPW DESIGN STUDIOS
LANDSCAPE ARCHITECTURE & PLANNING
310 ELMWOOD BOULEVARD YORK, PA.
STUDIO PHONE: 717.843.1897

TOOLE RECREATION PLANNING

CT+&C

RECOMMENDATIONS

All recommendations suggested in this narrative are the result of an extensive analysis of existing park and Delaware County resources, public involvement (and surveys), and potential park user demand.

Facilities & Park Site Development

The following Glen Providence County Park recommendations are in no particular order based on needs or priority. Phasing and implementation priority will be discussed further along in this park narrative.

Recommended Glen Providence County Park improvements are as follows:

1) Improve Glen Providence County Park (and overall County Park) signage as part of a standardized system that is identifiable and recognizable as such. Including interpretive signage.
2) Install new "natural" play area
3) Install Dam at Broomall's Pond and rehabilitate Broomall's Run in the area of the pond.
4) Improve and develop the park pedestrian circulation network, including trails, sidewalk improvements and crosswalk improvements to better access adjacent neighborhoods and downtown Media
5) Implement boardwalks over Broomall's Run to connect park trail network
6) Establish a 50' riparian buffer and floodplain restoration along Broomall's Run
7) Improve pedestrian access to the park
8) Terrace open lawn area
9) Install park / county park system kiosks (Signage), benches and seating areas (including picnic groves).
10) Refurbish pavilion and stage terrace
11) Define open spaces and lawn areas with native plant material and meadows. This will provide the opportunity to naturalize previously regularly maintained areas and reduce maintenance expenditures.
12) Refurbish stone overlook building
13) Re-establish the Eleanor Butler Waterfall
14) Advocate for park "friends" groups and foster partnerships with local business and recreation organizations that could be park stewards and potentially work with Delaware County on park upkeep, maintenance and/or security, i.e., the Friends of Glen Providence Park
15) Redesign / improvement of existing parking facilities
16) Install an on-site compost and recycling area is recommended for Glen Providence County Park.
17) Implement stormwater management and erosion control facilities
18) Re-establish the pond with bank plantings
19) Improve water source to pond for aeration purposes

The Site Development Plan

The site development plan is an illustrative rendering of Glen Providence County Park that reflects the recommended improvements at full park "build out." The plan incorporates all phases of development including "long-range" concepts.

Many factors play a role in the development and timeframe of park improvements: available funds and funding sources, County needs, park use demands and the like. It is recognized that priorities change

over time. That being said, a recommended phasing plan for the Glen Providence County Park development has been laid out further along in this section of the park narrative.

Trail & Greenway Connections

Glen Providence County Park has a wonderful system of earthen path walking trail that link to all sides of the park, neighboring communities, and the Media pedestrian sidewalk system. These connections directly tie the park to the regional network of open space by having access to the Trolley in Media and the Ridley Creek corridor.

It is recommended that the Ridley Creek corridor be studied as a greenway that connects Media to Ridley Creek State Park.

It is also recommended that a maintenance and management program be established for the upkeep and preservation of Glen Providence trails.

Park Programming

Glen Providence County Park already has a well-established identity within the Delaware County Park System and programming that fits the passive recreation nature of the park. Based on the recommended park improvements and park character, there is little room for additional programming elements.

Some general park programming elements as it relates to the Glen Providence County Park Site Development Plan are as follows:

1) Terrace Stage Performances
2) Pavilion events
3) Using the site natural resources and abundant wildlife associated with Glen Providence County Park as learning tools / education – school trips

Management

It is recommended that Glen Providence County Park, even at full build out, continue to be managed remotely from the Delaware County Park and Recreation at their nearby offices at Rose Tree County Park.

Maintenance and Operations

The mission of an operation and maintenance program for Glen Providence County Park is to create a regularly scheduled routine, reactive and preventative maintenance system that guides the stewardship of the park in a way that provides a safe, sustainable, and aesthetically pleasing County and community asset that is operational for public use.

Maintenance and Operations Tasks

Glen Providence County Park maintenance tasks and schedule typically involves mowing, keeping the grounds free of trash and debris, removal of downed limbs or dead trees, snow removal, inspection and repair of permanent structures, fencing, park amenities and parking areas on a per year basis.

Grass & Turf Care
Cut once every 10 working days. A grass clipping deposit area should be designated on site for composting located away from park waterbodies. Aeration of grass area is not necessary unless grass quality indicates a need or an application of fertilizer is anticipated. Reseed and sod only when major bare spots are present. Weeding shall ensue when grass is 50% weed infested or grass quality is low in 15% or more of the surface.

Fertilizer
Apply only when grass vigor seems low. Low level applications can be administered on a once per year basis.

Irrigation
No irrigation should be anticipated.

Planting Beds
Landscape bed areas should be kept in a weed, leaf and debris-free condition. Plants should be trimmed to maintain desired shape and to maintain natural growth habit of plant species.

Litter Control
Litter service is needed two times a week or as necessary. In times of warmer weather and increased use, litter control may be more frequent.

Disease and Insect Control
Done only on epidemic or serious complaint basis. Pest, weed and rodent control measures may be put into effect when the health or survival of the plant material is threatened or where public's comfort is concerned.

Snow Removal
Snow removal shall only be necessary after all snowfall events. Snow removal shall be accomplished by the day following the snowfall.

Lighting
Replacement or repair of fixtures when a report is filed or when a malfunction is detected by inspection staff.

Amenity and Permanent Structure Repairs
Should be accomplished immediately when safety or function is at question.

General Inspection
Once per week.

The following routine preventative maintenance program and schedule has been fashioned to reflect the projected amount of park use at full park build out.

Table 3-1: General Maintenance and Operation Frequencies

Operation	Frequency					
	Daily	Weekly	Monthly	Quarterly	Annually	As Needed
Parking Areas						
Inspection		x				
Repair						x
Remove Litter						x
Remove Snow						x
Permanent Structures						
New Bridges and Boardwalks						
Inspection				x		
Repair						x
Stormwater Management Facilities						
Inspection / Clear Obstructions				x		
Repair						x
Landscape Maintenance						
Mowing			2x			
Trimming						x
Leaf Removal					x	
Tree Pruning					x	x
Tree Replacement						x
Seasonal Plantings				x		
Weeding				x		
Mulching					x	
Fertilizing / Treatment					x	x
Watering / Irrigation						x
Cleaning						
Empty Trash Cans		2x				
Restroom Facilities		x				x
Remove Litter		2x				x
Amenity Maintenance						
Lighting						
Inspection			x			
Repair / Replace						x
Signage						
Inspection			x			
Cleaning					x	
Repair / Replace						x

Table 3-1: General Maintenance and Operation Frequencies (cont.)

Operation	Frequency					
	Daily	Weekly	Monthly	Quarterly	Annually	As Needed
Railings / Fencing						
Inspection			x			
Repair / Replace						x
Furnishings						
Inspection			x			
Repair / Replace						x
Bollards / Gates						
Inspection			x			
Repair / Replace						x
Other Services						
Update Park Kiosk Information						x
Security Patrol	x					
Graffiti Removal						x
Riparian Repair & Rehabilitation						x

Tree Care

Tree care is important to sustaining and guiding responsible tree growth within Glen Providence County Park. Trees and other woody plant material respond biologically to pruning in specific and predictable ways. Careful study of these responses has led to pruning practices that can best develop, preserve, and enhance the structural integrity, beauty and functional value of trees. Through pruning, one can: maintain or direct plant form; enhance health and appearance; influence flowering, fruiting, and vigor; regulate growth; control plant size; and invigorate declining plants. Tree pruning should occur annually but may be needed in emergency situations. The following are high and medium to low priorities for emergency pruning:

High Priority

1) Trees or limbs that have fallen and caused accidents or personal injury.
2) Trees or limbs that have fallen and caused damage to the trail, vehicles, or structures.
3) Trees or limbs which are in immediate danger of falling or breaking.
4) Broken hanging limbs adjacent to the trail, structures, roads, or picnic or play areas.
5) Trees or limbs that block roads or access points.

Medium to Low Priority:

1) Trees or limbs that have fallen and are not an immediate hazard.
2) Trees or limbs that have fallen and are not blocking the trail, roads or access points.
3) Hanging tree limbs that may not be in immediate danger of falling.
4) Dead or severely declining trees without a target present.

Timing or tree pruning can vary. Trees deemed as hazardous should be pruned immediately and during any season. Generally, light pruning can be done at any to during the year on most species if the trees are in good health. Most deciduous plants can be pruned during the dormant period between leaf fall and the end of wither. This can minimize the risk of pest problems. Avoid pruning broadleaf trees in early to late spring. Evergreens will be set back the least if they are pruned in the late winter. It is

recommended to evaluate each tree before pruning and avoid large scale pruning efforts during the bird nesting season. There are many types of tree pruning practices to achieve certain desired results. Pruning can be performed for structure, general cleaning, thinning, raising, reducing, and/or restorations.

Figure 3-24: Wooded area in the park

Pruning for Structure

Structural pruning is the removal of live branches and stems to influence structural integrity. It usually follows four procedures: 1) Canopy cleaning by removing dead, broken, diseased and dying branches, 2) development or re-establishment of a dominant leader, 3) establishment of the lowest permanent scaffold limb and 4) establishment of scaffold limbs by removing competing stems or branches.

Pruning to Clean

Cleaning is the selective removal of dead, diseased, detached, rubbing and broken branches. This type of pruning is done to reduce the risk of branch failure and the transmission of decay, insects and diseases.

Pruning to Thin

Thinning is the selective removal of small live branches to reduce crown density. Branches are 0.25 to 1.00 inches in diameter. 10-15 percent of live foliage can be removed at one time. If more pruning is desired, it should not exceed 25 percent in a single year. Excessive removal of small branches on the lower two-thirds of a branch or stem is called lion tailing and may have an adverse effect on the tree – it is not an accepted practice.

Pruning to Raise

Raising is the selective removal of branches to provide vertical clearance. Caution must be taken to not remove too many lower branches. This can cause slow development of trunk taper, cause cracks or decay in the trunk, or transfer too much weight to the top of the tree.

Figure 3-25: Shade trees in Glen Providence County Park

Pruning to Reduce (Drop Crotch)

Reduction is the selective removal of branches and stems to decrease the height and/or spread of a tree. This type of pruning is done to

minimize the risk of failure, to reduce height or spread, for utility clearance, to clear vegetation from buildings or other structures, or to improve tree appearance. Crown reduction shall be accomplished with reduction cuts rather than heading cuts.

Pruning to Restore

Restoration is the selective removal of branches, sprouts, and stubs from trees that have been topped, severely headed, vandalized, lion –tailed, broken during a storm, or otherwise damaged. Full restoration usually requires several pruning events over a number of years.

Pruning Conifers

Conifers are primarily pruned to control the density of branching, the shape of young trees, and the size of older ones. They are intolerant of topping or heading. Conifers typically have an ex-current growth habit, which is usually maintained throughout the lifespan of the tree. Thinning, by the selective removal of small branches, is the most appropriate method when pruning conifers.

Tree Removal and Replacement

Trees should be removed in Glen Providence County Park for the following reasons: the tree is dead or dying; it is diseased; it is damaged or injured to the extent that is likely to die and become a hazard; or is constituted as a hazard. Nuisance trees should be removed when the tree causes or is about to cause impairment to the park.

It is most desirable to replace a tree of the same (native) species in the same place it was removed, but sometimes crowding and other physical constraints make it impossible to replace the tree in the same spot. In this case, finding an alternate location is the best option. Undesirable species (non-native) are not to be replaced. It is a responsible and environmentally friendly idea to plant desirable, sustainable trees within the park.

Recommended Native Plant Material

It is a sustainable practice to design with and use native plant material within Glen Providence County Park whenever possible. Native plant material is hardy and requires less watering and general care because it is naturally acclimated to the seasons and weather cycles of the region. The following is a list of plant material native to Pennsylvania:

Table 3-2: Native Plant Material for Glen Providence County Park

Medium to Large Trees

Common Name	Scientific Name	Bloom Period	Height	Notes
Red Maple	*Acer rubrum*	Mar-Apr	40-60 ft.	Red flowers; adaptable; fall color
Sugar Maple	*acer saccharum*	Apr-May	60-75 ft.	Yellow flowers in spring; fall color; maple syrup
Yellow Birch	*Betula alleghaniensis*	Apr-May	60-80 ft.	Catkins in winter
Black Birch	*Betula lenta*	Apr-May	45-55 ft.	Catkins in winter
River Birch	*Betula nigra*	Apr-May	60-80 ft.	Catkins; striking bark
Eastern White Pine	*Pinus strobus*	N/A	50-80 ft.	N/A
White Oak	*Quercus alba*	Mar-Jun	50-100 ft.	Edible nuts
Chestnut Oak	*Quercus montana*	May-Jun	40-75 ft.	Fall color; nuts attractive to wildlife

Small Trees and Shrubs

Common Name	Scientific Name	Bloom Period	Height	Notes
Smooth Alder	*Alnus serrulata*	Mar-Apr	6-10 ft.	Yellow catkins; multi-stemmed; needs wet soil
Serviceberry	*Amelanchier arborea*	Mar-May	15-25 ft.	White flowers in spring; edible berries; fall color
Alternate-leaved Dogwood	*Cornus alternifolia*	May-Jun	15-25 ft.	White flowers in early summer; blue berries
Flowering Dogwood	*Cornus florida*	Apr-Jun	10-30 ft.	White branchts in spring; red berries
Winterberry	*Ilex verticillata*	May-Jun	6-10 ft.	Showy berries in winter; multi-stemmed
Mountain Laurel	*Kalmia latifolia*	May-Jul	7-15 ft.	White flowers; evergreen; multi-stemmed; PA state flower
Spicebush	*Lindera benzoin*	Mar-May	6-12 ft.	Berries and foliage in fall; multi-stemmed; ferbal uses
Wild Plum	*Prunus americana*	Apr-May	15-25 ft.	White flowers; edible fruit; nulti-stemmed
Elderberry	*Sambucus canadensis*	Jun-Jul	5-15 ft.	White flowers; multi-stemmed; edible berries & flowers
Highbush Blueberry	*Vaccinium corymbosum*	May-Jun	6-12 ft.	White flowers; multi-stemmed; edible berries; fall colors
Arrow-wood	*Viburmun recognitum*	May-Jun	3-15 ft.	White flowers in late spring; multi-stemmed
Virginia Creeper	*Parthenocissus quinquefolia*	July	10-40 ft.	Fall color; berries improtant for wildlife; considered a vine

Grasses (Perennial)

Common Name	Scientific Name	Bloom Period	Height	Notes
Lurid Sedge	*Carex lurida*	Jun-Oct	1-2 ft.	Wetland plant; interseting seeds
Bottlebrush Grass	*Elymus hystix*	Jun-Aug	2-4 ft.	Grass that grows in shade
Virginia Wild-rye	*Elymus virginicus*	Jul-Sep	2-4 ft.	Grass that tolerates a wide range of conditions

Ferns (Perennial)

Common Name	Scientific Name	Bloom Period	Height	Notes
Maidenhair Fern	*Adiantum pedatum*	N/A	1-2 ft.	Grows in clumps; delicate texture; herbal uses
Evergreen Shield Fern	*Dryopteris marginalis*	N/A	1-3 ft.	Evergreen; clump-forming; attractive
Interrupted Fern	*Osmunda claytoniana*	N/A	2-4 ft.	Grows in clumps; distinctive fronds
Christmas Fern	*Polystichum achrostichoides*	N/A	1-2 ft.	Evergreen; grows in clumps

Showy Flowers (Perennial)

Common Name	Scientific Name	Bloom Period	Height	Bloom Color & Notes
Wild Columbine	*Aquilegia canadensis*	Apr-Jun	1-3 ft.	Red & Yellow - Commonly cultivated; spreads by seeds; hummingbirds
Jack-in-the-pulpit	*Arisaema triphyllum*	Apr-Jun	1-3 ft.	Green-purple - Unusual flower; bright red berries
Wild Ginger	*Asarum canadense*	Apr-May	< 1 ft.	Maroon - Edible and herbal uses
Butterfly-weed	*Asclepias tuberosa*	May-Sep	1-3 ft.	Orange - Butterfly plant; tolerates dry conditions; taproot
Turtlehead	*Chelone glabra*	Jul-Sep	1-3 ft.	Whitish - Tolerates wet areas; strong grower; herbal uses; hummingbirds
White snakeroot	*Eupatorium rugosum*	Jul-Oct	2-3 ft.	White - Tough plant; can grow in dry shade; cultivars availible
Wood Geranium	*Geranium maculatum*	Apr-Jul	1-2 ft.	Rose - Adaptable plant; long bloom time spreader; herbal uses
Common Sneezeweed	*Helenium autumnale*	Aug-Oct	2-6 ft.	Yellow - Tolerates wet areas; showy flowers; herbal uses
Sunflowers	*Helianthus sp.*	Jul-Sep	4-6 ft.	Yellow - Perennials; often aggressive; showy flowers; good for birds
Oxeye Sunflower	*Heliopsis helianthoides*	Jul-Sep	1-5 ft.	Yellow - long bloom time; butterfly plant
Alum-root	*Heuchera americana*	May-Aug	1-2 ft.	Greenish - Long bloom time; many culitvars and hybrids
Cardinal Flower	*Lobelia cardinalis*	Jul-Sep	2-5 ft.	Scarlet - Long bloom time; butterfly and hummingbird plant
Great Blue Lobelia	*Lobelia siphilitica*	Jul-Oct	1-3 ft.	Blue - Long bloom time; white cultivars; hummingbirds
Partridge-berry	*Mitchella repens*	Jun-Jul	< 1 ft.	White - Evergreen; ground cover; berry edible and showy
Bee-balm	*Monarda didyma*	Jul-Aug	2-5 ft.	Red - Showy flowers; aromatic; butterfly plant; herbal uses
Phlox	*Phlox divaricata*	May-jun	1-2 ft.	Lilac - Aromatic; butterfly plant
Phlox	*Phlox maculata*	Jul-Sep	1-3 ft.	Purple - Aromatic; showy flowers; butterfly plant
Phlox	*Phlox paniculata*	Jul-Oct	2-5 ft.	Pink - Aromatic; showy flowers; butterly plant
May-apple	*Podophyllum petatum*	May	1-2 ft.	White - Ground cover, edible fruit; mottled foliage
Jacob's Ladder	*Polemonium reptans*	Apr-Jun	1-2 ft.	Blue - Attractive flowers; slow spreader; herbal uses
Solomon's Seal	*Polygonatum pubescens*	Apr-Jun	1-3 ft.	Yellow - Not fussy; blue berries; herbal and edible uses
Black-eyes Susan	*Rudbeckia hirta*	May-Sep	2-3 ft.	Orange - Bright daisy-like flowers; long bloom time; many cultivars
Bloodroot	*Sanguinaria canadensis*	Mar-May	< 1 ft.	White - Red juice; herbal uses
Golden Ragwort	*Senecio aureus*	May-Jul	1-2 ft.	Yellow - Wetland plant; long bloom time; early daisy-like flowers
False Solomon's Seal	*Smilacina racemosa*	May-Jul	1-2 ft.	White - Plume like flower; re berries; herbal uses
Wrinkle-leaf Goldenrod	*Solidago rugosa*	Jul-Nov	2-6 ft.	Yellow - Aggressive; tough plant; butterfly plant
Tall Meadow-rue	*Thalictrum pubescens*	May-Jun	2-8 ft.	White - Wet to moist soil; tall plant; delicate flowers
Foamflower	*Tiarella cordifolia*	Apr-Jun	< 1 ft.	White - Attractive, long-blooming flower; many cultivars
Trillium	*Trillium grandiflorum*	Apr-Jun	1-2 ft.	White - Showy flowers
American Dog Violet	*Viola conspersa*	Apr-May	< 1 ft.	Violet - Delicate plant and flower; edible
Common Blue Violet	*Viola sororia*	Apr-May	< 1 ft.	Violet - Delicate plant and flower; edible
Golden-alexanders	*Zizia aurea*	Apr-Jun	1-2 ft.	Gold - Not fussy; attracts good insects

RECOMMENDED PHASING & COST PROJECTIONS (ESTIMATES)

The following are recommended phasing and estimated cost projections for each phase of development for Glen Providence County Park. The Phases have been broken down into three different phases: Phase I – Short Term (0-5 years); Phase II – Medium Term (5-15 Years); and Phase III – Long Term (15-30 Years).

The following phasing recommendations and estimated costs are based on 2014 dollars, the current park condition, outlook of capital expenditure and funding, and proposed development. Recommendations are fluid and always susceptible to change for any number of reasons: cost increases in materials, priorities change, use and demographic changes, and unexpected funding sources (or lack thereof). Phasing recommendations are always a best guess of how the park will most likely develop over the next 30 or 40 years and the phases will most likely overlap somewhat. All estimated costs assume furnish and install prices.

Phase I – Short Term (0-5 Years)

1) Improve Glen Providence County Park (and overall County Park) signage
2) Re-establish the pond with bank plantings (Native Material)
3) Begin improvement and development of the park pedestrian circulation network
4) Begin installation of park amenities, benches and seating areas (including picnic groves)
5) Define open spaces and lawn areas with native plant material and naturalized meadows
6 Implement on-site compost and recycling area
7) Advocate for park “friends” groups and foster partnerships with local business and recreation organizations (Friends of Glen Providence Park)
8) Implement stormwater management and erosion control facilities
9) Improve water source to pond for aeration purposes
10) Establish a 50’ riparian buffer and floodplain restoration along Broomall’s Run
11) Re-establish the Eleanor Butler Waterfall

Table 3-3: Glen Providence County Park - Phase I: Short Term (0-5 Years) Cost Estimate

Description	Cost Basis	Quantity	Unit Price	Total Cost
1) Glen Providence County Park Signage				
Kiosks	LS	1	$4,800.00	**$4,800.00**
Roadway	LS	1	$1,000.00	**$1,000.00**
Interpretive	LS	1	$7,600.00	**$7,600.00**
Directional, Informational & General Park	LS	1	$4,200.00	**$4,200.00**
2) Pond Bank Plantings				
Install	LS	1	$3,500.00	**$3,500.00**
3) Begin Park Pedestrian Circulation Network				
Concrete Sidewalk	SY	300	$63.00	**$18,900.00**
Road Crossings	Each	3	$1,200.00	**$3,600.00**
Earthen Path	SY	850	$19.00	**$16,150.00**
4) Begin Implementing Park Amenities				
Benches	Each	14	$725.00	**$10,150.00**
Trash Cans	Each	7	$560.00	**$3,920.00**
Picnic Grove & Tables	Each	1	$6,800.00	**$6,800.00**
5) Begin Developing Open Space, Meadows, Lawn Areas				
Landscaping, Planting and Seeding	LS	1	$12,500.00	**$12,500.00**
6) On-site Compost and Recycling Area				
Building On-site Compost and Recycling Area	LS	1	$3,800.00	**$3,800.00**
7) Develop Local Partnerships				
Delaware County Staff Time	LS	1	$8,900.00	**$8,900.00**
8) Stormwater Management and Erosion Control				
Stormwater	LS	1	$16,700.00	**$16,700.00**
Erosion Control	LS	1	$10,200.00	**$10,200.00**
9) Pond Aeration Improvements				
Pipe Install	LS	1	$4,500.00	**$4,500.00**
10) Riparian Buffer & Floodplain Restoration				
Broomall's Run Restoration	LS	1	$29,000.00	**$29,000.00**
11) Eleanor Buler Waterfall				
Re-establishment	LS	1	$3,800.00	**$3,800.00**
Phase I Total				**$170,020.00**

Note: Costs associated with Design and Maintenance have not been built into the costs per phase. Design work needed for any park improvement items would carry a cost of approximately 15% of the estimated construction/installation cost of the improvement.

Phase II – Medium Term (5-15 Years)

1) Continue improvement and development of the park pedestrian circulation network
2) Continue installation of park amenities, benches and seating areas (including picnic groves)
3) Improve pedestrian access to the park and trail system
4) Terrace open lawn area
5) Refurbish pavilion and stage terrace
6) Add new "Natural" Play Area
7) Implement boardwalks over Broomall's Run to connect park trail network
8) Continue developing open spaces and lawn areas with native plant material and naturalized meadows

Table 3-4: Glen Providence County Park - Phase II: Medium Term (5-15 Years) Cost Estimate

Description	Cost Basis	Quantity	Unit Price	Total Cost
1) Continue park pedestrian circulation network				
Concrete Sidewalk	SY	250	$63.00	**$15,750.00**
Road Crossings	Each	2	$1,200.00	**$2,400.00**
Earthen Path	SY	2300	$19.00	**$43,700.00**
2) Continue Implementing Park Amenities				
Benches	Each	8	$725.00	**$5,800.00**
Trash Cans	Each	4	$560.00	**$2,240.00**
Picnic Grove & Tables	Each	1	$6,800.00	**$6,800.00**
3) Improve Pedestrian Access and Trail System				
Improvements	LS	1	$43,000.00	**$43,000.00**
4) Terrace Open Lawn				
Install	LS	1	$24,000.00	**$24,000.00**
5) Refurbish Pavilion and Stage Terrace				
Pavilion	LS	1	$9,100.00	**$9,100.00**
Terrace	LS	1	$10,200.00	**$10,200.00**
6) New Natural Play Area				
Install	LS	1	$7,200.00	**$7,200.00**
7) Boardwalks Over Broomall's Run				
Construct	LS	2	$26,000.00	**$52,000.00**
8) Continue Developing Open Space, Meadows, Lawn Areas				
Landscaping, Planting and Seeding	LS	1	$11,000.00	**$11,000.00**
Phase II Total				**$233,190.00**

Phase III – Long Term (15-30 Years)

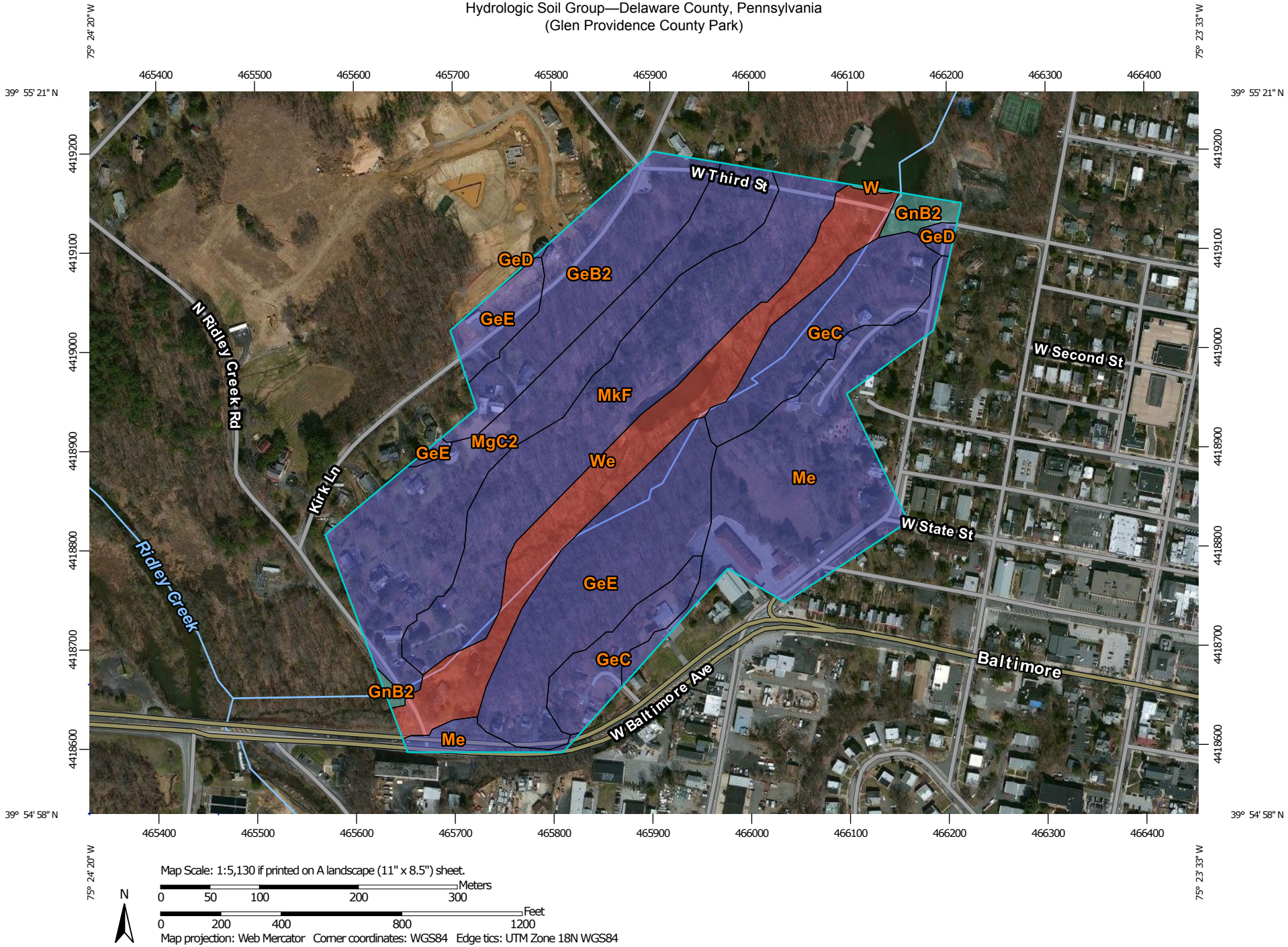
1) Continue improvement and development of the park pedestrian circulation network
2) Continue Installation of park amenities, benches and seating areas
3) Install dam at Broomall's Pond and rehabilitate Broomall's Run in the area of the pond.
4) Refurbish stone overlook building (Restrooms)
5) Redesign / improvement of existing parking facilities
6) Continue developing open spaces and lawn areas with native plant material and naturalized meadows

Table 3-5: Glen Providence County Park - Phase III: Long Term (15-30 Years) Cost Estimate

Description	Cost Basis	Quantity	Unit Price	Total Cost
1) Continue Park Pedestrian Circulation Network				
Concrete Sidewalk	SY	150	$63.00	**$9,450.00**
2) Continue Implementing Park Amenities				
Benches	Each	2	$725.00	**$1,450.00**
Trash Cans	Each	1	$560.00	**$560.00**
3) Install Dam and Run Rehabilitation at Pond				
Dam Install	LS	1	$120,000.00	**$120,000.00**
Run Rehab	LS	1	$38,000.00	**$38,000.00**
4) Refurbish Stone Overlook Structure (Restrooms)				
Refurbish	LS	1	$105,000.00	**$105,000.00**
5) Improve Existing Parking Areas				
Improve Existing Parking Areas	LS	1	$95,000.00	**$95,000.00**
6) Continue Developing Open Space, Meadows, Lawn Areas				
Landscaping, Planting and Seeding	LS	1	$6,000.00	**$6,000.00**
Phase III Total				**$375,460.00**

APPENDIX G-1: GLEN PROVIDENCE COUNTY PARK SOILS

Hydrologic Soil Group—Delaware County, Pennsylvania
(Glen Providence County Park)



MAP LEGEND

Area of Interest (AOI)
- Area of Interest (AOI)

Soils

Soil Rating Polygons
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Lines
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Soil Rating Points
- A
- A/D
- B
- B/D
- C
- C/D
- D
- Not rated or not available

Water Features
- Streams and Canals

Transportation
- Rails
- Interstate Highways
- US Routes
- Major Roads
- Local Roads

Background
- Aerial Photography

MAP INFORMATION

The soil surveys that comprise your AOI were mapped at 1:20,000.

Warning: Soil Map may not be valid at this scale.

Enlargement of maps beyond the scale of mapping can cause misunderstanding of the detail of mapping and accuracy of soil line placement. The maps do not show the small areas of contrasting soils that could have been shown at a more detailed scale.

Please rely on the bar scale on each map sheet for map measurements.

Source of Map: Natural Resources Conservation Service
Web Soil Survey URL: http://websoilsurvey.nrcs.usda.gov
Coordinate System: Web Mercator (EPSG:3857)

Maps from the Web Soil Survey are based on the Web Mercator projection, which preserves direction and shape but distorts distance and area. A projection that preserves area, such as the Albers equal-area conic projection, should be used if more accurate calculations of distance or area are required.

This product is generated from the USDA-NRCS certified data as of the version date(s) listed below.

Soil Survey Area: Delaware County, Pennsylvania
Survey Area Data: Version 7, Dec 14, 2013

Soil map units are labeled (as space allows) for map scales 1:50,000 or larger.

Date(s) aerial images were photographed: Jun 17, 2010—Jul 1, 2011

The orthophoto or other base map on which the soil lines were compiled and digitized probably differs from the background imagery displayed on these maps. As a result, some minor shifting of map unit boundaries may be evident.

Hydrologic Soil Group

Hydrologic Soil Group— Summary by Map Unit — Delaware County, Pennsylvania (PA045)				
Map unit symbol	**Map unit name**	**Rating**	**Acres in AOI**	**Percent of AOI**
GeB2	Glenelg channery silt loam, 3 to 8 percent slopes, moderately eroded	B	5.5	9.7%
GeC	Glenelg channery silt loam, 8 to 15 percent slopes	B	6.4	11.1%
GeD	Glenelg channery silt loam, 15 to 25 percent slopes	B	0.3	0.4%
GeE	Glenelg channery silt loam, 25 to 35 percent slopes	B	8.8	15.4%
GnB2	Glenville silt loam, 3 to 8 percent slopes, moderately eroded	C	0.7	1.2%
Me	Made land, schist and gneiss materials	B	9.7	16.9%
MgC2	Manor loam, 8 to 15 percent slopes, moderately eroded	B	9.3	16.1%
MkF	Manor soils, 35 to 60 percent slopes	B	9.8	17.1%
W	Water		0.0	0.1%
We	Wehadkee silt loam	D	6.9	12.1%
Totals for Area of Interest			**57.5**	**100.0%**

Description

Hydrologic soil groups are based on estimates of runoff potential. Soils are assigned to one of four groups according to the rate of water infiltration when the soils are not protected by vegetation, are thoroughly wet, and receive precipitation from long-duration storms.

The soils in the United States are assigned to four groups (A, B, C, and D) and three dual classes (A/D, B/D, and C/D). The groups are defined as follows:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

If a soil is assigned to a dual hydrologic group (A/D, B/D, or C/D), the first letter is for drained areas and the second is for undrained areas. Only the soils that in their natural condition are in group D are assigned to dual classes.

Rating Options

Aggregation Method: Dominant Condition

Component Percent Cutoff: None Specified

Tie-break Rule: Higher

Physical Soil Properties

This table shows estimates of some physical characteristics and features that affect soil behavior. These estimates are given for the layers of each soil in the survey area. The estimates are based on field observations and on test data for these and similar soils.

Depth to the upper and lower boundaries of each layer is indicated.

Particle size is the effective diameter of a soil particle as measured by sedimentation, sieving, or micrometric methods. Particle sizes are expressed as classes with specific effective diameter class limits. The broad classes are sand, silt, and clay, ranging from the larger to the smaller.

Sand as a soil separate consists of mineral soil particles that are 0.05 millimeter to 2 millimeters in diameter. In this table, the estimated sand content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Silt as a soil separate consists of mineral soil particles that are 0.002 to 0.05 millimeter in diameter. In this table, the estimated silt content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

Clay as a soil separate consists of mineral soil particles that are less than 0.002 millimeter in diameter. In this table, the estimated clay content of each soil layer is given as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter.

The content of sand, silt, and clay affects the physical behavior of a soil. Particle size is important for engineering and agronomic interpretations, for determination of soil hydrologic qualities, and for soil classification.

The amount and kind of clay affect the fertility and physical condition of the soil and the ability of the soil to adsorb cations and to retain moisture. They influence shrink-swell potential, saturated hydraulic conductivity (Ksat), plasticity, the ease of soil dispersion, and other soil properties. The amount and kind of clay in a soil also affect tillage and earthmoving operations.

Moist bulk density is the weight of soil (ovendry) per unit volume. Volume is measured when the soil is at field moisture capacity, that is, the moisture content at 1/3- or 1/10-bar (33kPa or 10kPa) moisture tension. Weight is determined after the soil is dried at 105 degrees C. In the table, the estimated moist bulk density of each soil horizon is expressed in grams per cubic centimeter of soil material that is less than 2 millimeters in diameter. Bulk density data are used to compute linear extensibility, shrink-swell potential, available water capacity, total pore space, and other soil properties. The moist bulk density of a soil indicates the pore space available for water and roots. Depending on soil texture, a bulk density of more than 1.4 can restrict water storage and root penetration. Moist bulk density is influenced by texture, kind of clay, content of organic matter, and soil structure.

Saturated hydraulic conductivity (Ksat) refers to the ease with which pores in a saturated soil transmit water. The estimates in the table are expressed in terms of micrometers per second. They are based on soil characteristics observed in the field, particularly structure, porosity, and texture. Saturated hydraulic conductivity (Ksat) is considered in the design of soil drainage systems and septic tank absorption fields.

Available water capacity refers to the quantity of water that the soil is capable of storing for use by plants. The capacity for water storage is given in inches of water per inch of soil for each soil layer. The capacity varies, depending on soil properties that affect retention of water. The most important properties are the content of organic matter, soil texture, bulk density, and soil structure. Available water capacity is an important factor in the choice of plants or crops to be grown and in the design and management of irrigation systems. Available water capacity is not an estimate of the quantity of water actually available to plants at any given time.

Linear extensibility refers to the change in length of an unconfined clod as moisture content is decreased from a moist to a dry state. It is an expression of the volume change between the water content of the clod at 1/3- or 1/10-bar tension (33kPa or 10kPa tension) and oven dryness. The volume change is reported in the table as percent change for the whole soil. The amount and type of clay minerals in the soil influence volume change.

Linear extensibility is used to determine the shrink-swell potential of soils. The shrink-swell potential is low if the soil has a linear extensibility of less than 3 percent; moderate if 3 to 6 percent; high if 6 to 9 percent; and very high if more than 9 percent. If the linear extensibility is more than 3, shrinking and swelling can cause damage to buildings, roads, and other structures and to plant roots. Special design commonly is needed.

Organic matter is the plant and animal residue in the soil at various stages of decomposition. In this table, the estimated content of organic matter is expressed as a percentage, by weight, of the soil material that is less than 2 millimeters in diameter. The content of organic matter in a soil can be maintained by returning crop residue to the soil.

Organic matter has a positive effect on available water capacity, water infiltration, soil organism activity, and tilth. It is a source of nitrogen and other nutrients for crops and soil organisms.

Erosion factors are shown in the table as the K factor (Kw and Kf) and the T factor. Erosion factor K indicates the susceptibility of a soil to sheet and rill erosion by water. Factor K is one of six factors used in the Universal Soil Loss Equation (USLE) and the Revised Universal Soil Loss Equation (RUSLE) to predict the average annual rate of soil loss by sheet and rill erosion in tons per acre per year. The estimates are based primarily on percentage of silt, sand, and organic matter and on soil structure and Ksat. Values of K range from 0.02 to 0.69. Other factors being equal, the higher the value, the more susceptible the soil is to sheet and rill erosion by water.

Erosion factor Kw indicates the erodibility of the whole soil. The estimates are modified by the presence of rock fragments.

Erosion factor Kf indicates the erodibility of the fine-earth fraction, or the material less than 2 millimeters in size.

Erosion factor T is an estimate of the maximum average annual rate of soil erosion by wind and/or water that can occur without affecting crop productivity over a sustained period. The rate is in tons per acre per year.

Wind erodibility groups are made up of soils that have similar properties affecting their susceptibility to wind erosion in cultivated areas. The soils assigned to group 1 are the most susceptible to wind erosion, and those assigned to group 8 are the least susceptible. The groups are described in the "National Soil Survey Handbook."

Wind erodibility index is a numerical value indicating the susceptibility of soil to wind erosion, or the tons per acre per year that can be expected to be lost to wind erosion. There is a close correlation between wind erosion and the texture of the surface layer, the size and durability of surface clods, rock fragments, organic matter, and a calcareous reaction. Soil moisture and frozen soil layers also influence wind erosion.

Reference:
United States Department of Agriculture, Natural Resources Conservation Service. National soil survey handbook, title 430-VI. (http://soils.usda.gov)

Report—Physical Soil Properties

Physical Soil Properties–Delaware County, Pennsylvania														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
GeB2—Glenelg channery silt loam, 3 to 8 percent slopes, moderately eroded														
Glenelg	0-8	-27-	-54-	15-20- 25	1.10-1.40	4.23-14.11	0.14-0.17	0.0-2.9	1.0-3.0	.32	.64	5	6	48
	8-26	-20-	-54-	20-26- 32	1.20-1.60	4.23-14.11	0.14-0.20	0.0-2.9	0.0-0.5	.43	.64			
	26-60	-46-	-42-	5-13- 20	1.20-1.40	4.23-14.11	0.10-0.20	0.0-2.9	0.0-0.5	.49	.64			
GeC—Glenelg channery silt loam, 8 to 15 percent slopes														
Glenelg	0-8	-27-	-54-	15-20- 25	1.10-1.40	4.23-14.11	0.14-0.17	0.0-2.9	1.0-3.0	.32	.32	5	6	48
	8-29	-20-	-54-	20-26- 32	1.20-1.60	4.23-14.11	0.14-0.20	0.0-2.9	0.0-0.5	.43	.49			
	29-50	-46-	-42-	5-13- 20	1.20-1.40	4.23-14.11	0.10-0.20	0.0-2.9	0.0-0.5	.49	.55			
GeD—Glenelg channery silt loam, 15 to 25 percent slopes														
Glenelg	0-8	-27-	-54-	15-20- 25	1.10-1.40	4.23-14.11	0.14-0.17	0.0-2.9	1.0-3.0	.32	.32	5	6	48
	8-29	-20-	-54-	20-26- 32	1.20-1.60	4.23-14.11	0.14-0.20	0.0-2.9	0.0-0.5	.43	.49			
	29-50	-46-	-42-	5-13- 20	1.20-1.40	4.23-14.11	0.10-0.20	0.0-2.9	0.0-0.5	.49	.55			

Physical Soil Properties–Delaware County, Pennsylvania														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
GeE—Glenelg channery silt loam, 25 to 35 percent slopes														
Glenelg	0-8	-27-	-54-	15-20- 25	1.10-1.40	4.23-14.11	0.14-0.17	0.0-2.9	1.0-3.0	.32	.64	5	6	48
	8-26	-20-	-54-	20-26- 32	1.20-1.60	4.23-14.11	0.14-0.20	0.0-2.9	0.0-0.5	.43	.64			
	26-60	-46-	-42-	5-13- 20	1.20-1.40	4.23-14.11	0.10-0.20	0.0-2.9	0.0-0.5	.49	.64			
GnB2—Glenville silt loam, 3 to 8 percent slopes, moderately eroded														
Glenville	0-10	-30-	-55-	10-15- 20	1.20-1.40	4.23-14.11	0.16-0.20	0.0-2.9	2.0-4.0	.32	.32	3	5	56
	10-16	-19-	-54-	20-27- 35	1.40-1.60	4.23-14.11	0.12-0.16	0.0-2.9	0.0-0.5	.24	.32			
	16-50	-20-	-54-	20-26- 35	1.60-1.80	0.42-4.23	0.08-0.12	0.0-2.9	0.0-0.5	.24	.32			
	50-70	-44-	-41-	5-15- 25	1.40-1.60	1.41-4.23	0.06-0.12	0.0-2.9	0.0-0.5	.24	.64			
Me—Made land, schist and gneiss materials														
Udorthents, schist and gneiss	0-3	-27-	-54-	15-20- 25	1.00-1.45	0.42-4.23	0.14-0.18	0.0-2.9	1.0-2.0	.37	.43	4	5	56
	3-40	-20-	-54-	25-26- 35	1.30-1.60	0.42-1.41	0.14-0.20	3.0-5.9	1.0-2.0	.37	.37			
	40-60	-20-	-54-	25-26- 35	1.30-1.60	0.42-1.41	0.14-0.20	3.0-5.9	1.0-2.0	.37	.37			

Physical Soil Properties–Delaware County, Pennsylvania														
Map symbol and soil name	Depth	Sand	Silt	Clay	Moist bulk density	Saturated hydraulic conductivity	Available water capacity	Linear extensibility	Organic matter	Erosion factors			Wind erodibility group	Wind erodibility index
										Kw	Kf	T		
	In	*Pct*	*Pct*	*Pct*	*g/cc*	*micro m/sec*	*In/In*	*Pct*	*Pct*					
MgC2—Manor loam, 8 to 15 percent slopes, moderately eroded														
Manor	0-7	-43-	-40-	10-18- 25	1.10-1.40	4.23-14.11	0.17-0.21	0.0-2.9	1.0-3.0	.37	.43	4	6	48
	7-21	-43-	-40-	10-18- 25	1.20-1.50	4.23-14.11	0.14-0.20	0.0-2.9	0.0-0.5	.32	.49			
	21-60	-64-	-24-	5-13- 20	1.25-1.50	4.23-42.34	0.10-0.20	0.0-2.9	0.0-0.5	.49	.64			
MkF—Manor soils, 35 to 60 percent slopes														
Manor	0-3	-43-	-40-	10-18- 25	1.20-1.40	4.23-14.11	0.14-0.17	0.0-2.9	1.0-3.0	.37	.37	5	6	48
	3-22	-43-	-40-	10-18- 25	1.20-1.50	4.23-14.11	0.14-0.20	0.0-2.9	0.0-0.5	.32	.37			
	22-60	-64-	-24-	5-13- 20	1.25-1.50	4.23-42.34	0.10-0.20	0.0-2.9	0.0-0.5	.49	.55			
W—Water														
Water	—	—	—	—	—	—	—	—	—					
We—Wehadkee silt loam														
Wehadkee	0-9	-30-	-55-	10-15- 20	1.20-1.40	4.23-14.11	0.16-0.22	0.0-2.9	2.0-4.0	.37	.37	5	5	56
	9-28	-21-	-55-	15-25- 35	1.20-1.40	4.23-14.11	0.16-0.20	0.0-2.9	0.0-0.5	.20	.20			
	28-60	-18-	-55-	10-28- 35	1.20-1.50	4.23-14.11	0.10-0.14	0.0-2.9	0.0-0.5	.20	.20			
	60-64	—	—	5-25- 45	1.10-1.60	14.11-42.34	0.04-0.08	0.0-2.9	0.0-0.5	.20	.20			

Data Source Information

Soil Survey Area: Delaware County, Pennsylvania
Survey Area Data: Version 7, Dec 14, 2013

Engineering Properties

This table gives the engineering classifications and the range of engineering properties for the layers of each soil in the survey area.

Hydrologic group is a group of soils having similar runoff potential under similar storm and cover conditions. Soil properties that influence runoff potential are those that influence the minimum rate of infiltration for a bare soil after prolonged wetting and when not frozen. These properties are depth to a seasonal high water table, saturated hydraulic conductivity after prolonged wetting, and depth to a layer with a very slow water transmission rate. Changes in soil properties caused by land management or climate changes also cause the hydrologic soil group to change. The influence of ground cover is treated independently. There are four hydrologic soil groups, A, B, C, and D, and three dual groups, A/D, B/D, and C/D. In the dual groups, the first letter is for drained areas and the second letter is for undrained areas.

The four hydrologic soil groups are described in the following paragraphs:

Group A. Soils having a high infiltration rate (low runoff potential) when thoroughly wet. These consist mainly of deep, well drained to excessively drained sands or gravelly sands. These soils have a high rate of water transmission.

Group B. Soils having a moderate infiltration rate when thoroughly wet. These consist chiefly of moderately deep or deep, moderately well drained or well drained soils that have moderately fine texture to moderately coarse texture. These soils have a moderate rate of water transmission.

Group C. Soils having a slow infiltration rate when thoroughly wet. These consist chiefly of soils having a layer that impedes the downward movement of water or soils of moderately fine texture or fine texture. These soils have a slow rate of water transmission.

Group D. Soils having a very slow infiltration rate (high runoff potential) when thoroughly wet. These consist chiefly of clays that have a high shrink-swell potential, soils that have a high water table, soils that have a claypan or clay layer at or near the surface, and soils that are shallow over nearly impervious material. These soils have a very slow rate of water transmission.

Depth to the upper and lower boundaries of each layer is indicated.

Texture is given in the standard terms used by the U.S. Department of Agriculture. These terms are defined according to percentages of sand, silt, and clay in the fraction of the soil that is less than 2 millimeters in diameter. "Loam," for example, is soil that is 7 to 27 percent clay, 28 to 50 percent silt, and less than 52 percent sand. If the content of particles coarser than sand is 15 percent or more, an appropriate modifier is added, for example, "gravelly."

Classification of the soils is determined according to the Unified soil classification system (ASTM, 2005) and the system adopted by the American Association of State Highway and Transportation Officials (AASHTO, 2004).

The Unified system classifies soils according to properties that affect their use as construction material. Soils are classified according to particle-size distribution of the fraction less than 3 inches in diameter and according to plasticity index, liquid limit, and organic matter content. Sandy and gravelly soils are identified as GW, GP, GM, GC, SW, SP, SM, and SC; silty and clayey soils as ML, CL, OL, MH, CH, and OH; and highly organic soils as PT. Soils exhibiting engineering properties of two groups can have a dual classification, for example, CL-ML.

The AASHTO system classifies soils according to those properties that affect roadway construction and maintenance. In this system, the fraction of a mineral soil that is less than 3 inches in diameter is classified in one of seven groups from A-1 through A-7 on the basis of particle-size distribution, liquid limit, and plasticity index. Soils in group A-1 are coarse grained and low in content of fines (silt and clay). At the other extreme, soils in group A-7 are fine grained. Highly organic soils are classified in group A-8 on the basis of visual inspection.

If laboratory data are available, the A-1, A-2, and A-7 groups are further classified as A-1-a, A-1-b, A-2-4, A-2-5, A-2-6, A-2-7, A-7-5, or A-7-6. As an additional refinement, the suitability of a soil as subgrade material can be indicated by a group index number. Group index numbers range from 0 for the best subgrade material to 20 or higher for the poorest.

Rock fragments larger than 10 inches in diameter and 3 to 10 inches in diameter are indicated as a percentage of the total soil on a dry-weight basis. The percentages are estimates determined mainly by converting volume percentage in the field to weight percentage.

Percentage (of soil particles) passing designated sieves is the percentage of the soil fraction less than 3 inches in diameter based on an ovendry weight. The sieves, numbers 4, 10, 40, and 200 (USA Standard Series), have openings of 4.76, 2.00, 0.420, and 0.074 millimeters, respectively. Estimates are based on laboratory tests of soils sampled in the survey area and in nearby areas and on estimates made in the field.

Liquid limit and *plasticity index* (Atterberg limits) indicate the plasticity characteristics of a soil. The estimates are based on test data from the survey area or from nearby areas and on field examination.

References:

American Association of State Highway and Transportation Officials (AASHTO). 2004. Standard specifications for transportation materials and methods of sampling and testing. 24th edition.

American Society for Testing and Materials (ASTM). 2005. Standard classification of soils for engineering purposes. ASTM Standard D2487-00.

Report—Engineering Properties

Absence of an entry indicates that the data were not estimated. The asterisk '*' denotes the representative texture; other possible textures follow the dash.

Engineering Properties–Delaware County, Pennsylvania														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*Pct*	*Pct*					*Pct*	
GeB2—Glenelg channery silt loam, 3 to 8 percent slopes, moderately eroded														
Glenelg	85	B	0-8	Channery silt loam	GM, ML, SM	A-2-4, A-2-6, A-4, A-6	0	0-10	60-100	50-75	40-75	30-70	32-40	7-12
			8-26	Channery silt loam, silty clay loam, loam	GM, ML, SM	A-4, A-6, A-7	0	0-10	60-100	50-100	45-100	35-95	34-46	9-15
			26-60	Loam, sandy loam, channery loam	GM, ML, SM	A-2, A-4	0	0-50	60-100	50-100	40-95	25-75	15-40	NP-6
GeC—Glenelg channery silt loam, 8 to 15 percent slopes														
Glenelg	85	B	0-8	Channery silt loam	GM, ML, SM	A-4, A-6, A-2-4, A-2-6	0	0-10	60-100	50-75	40-75	30-70	32-40	7-12
			8-29	Channery silt loam, silty clay loam, loam	ML, SM, GM	A-4, A-6, A-7	0	0-10	60-100	50-100	45-100	35-95	34-46	9-15
			29-50	Loam, sandy loam, very channery loam	GM, ML, SM	A-2, A-4	0	0-50	60-100	50-100	40-95	25-75	0-40	NP-6

Engineering Properties–Delaware County, Pennsylvania														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*Pct*	*Pct*					*Pct*	
GeD—Glenelg channery silt loam, 15 to 25 percent slopes														
Glenelg	85	B	0-8	Channery silt loam	GM, ML, SM	A-2-4, A-2-6, A-4, A-6	0	0-10	60-100	50-75	40-75	30-70	32-40	7-12
			8-29	Channery silt loam, silty clay loam, loam	GM, ML, SM	A-4, A-6, A-7	0	0-10	60-100	50-100	45-100	35-95	34-46	9-15
			29-50	Loam, sandy loam, very channery loam	GM, ML, SM	A-2, A-4	0	0-50	60-100	50-100	40-95	25-75	0-40	NP-6
GeE—Glenelg channery silt loam, 25 to 35 percent slopes														
Glenelg	85	B	0-8	Channery silt loam	GM, ML, SM	A-2-4, A-2-6, A-4, A-6	0	0-10	60-100	50-75	40-75	30-70	32-40	7-12
			8-26	Channery silt loam, silty clay loam, loam	GM, ML, SM	A-4, A-6, A-7	0	0-10	60-100	50-100	45-100	35-95	34-46	9-15
			26-60	Loam, sandy loam, channery loam	GM, ML, SM	A-2, A-4	0	0-50	60-100	50-100	40-95	25-75	15-40	NP-6

Engineering Properties–Delaware County, Pennsylvania														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*Pct*	*Pct*					*Pct*	
GnB2—Glenville silt loam, 3 to 8 percent slopes, moderately eroded														
Glenville	85	C	0-10	Silt loam	ML, SM	A-4	0	0	85-100	85-100	70-95	45-80	25-35	3-10
			10-16	Silt loam, channery loam, channery silty clay loam	ML, CL, CL-ML, GM, SC	A-4, A-6	0	0-10	70-100	60-100	60-95	45-80	25-40	5-13
			16-50	Silt loam, channery loam, silty clay loam	ML, CL, CL-ML, GM, SC	A-4, A-6	0	0-10	65-100	60-100	55-95	45-80	25-40	5-13
			50-70	Channery fine sandy loam, channery loam, very channery sandy loam	CL-ML, GM, ML, SM, GC, SC	A-1, A-2, A-4	0	0-20	45-90	20-75	10-75	5-65	25-35	5-10
Me—Made land, schist and gneiss materials														
Udorthents, schist and gneiss	95	B	0-3	Silt loam	CL, CL-ML, ML	A-4	0	0-5	85-100	80-100	70-95	50-75	25-35	5-10
			3-40	Loam, gravelly silt loam, clay loam	ML	A-6, A-7-6	0	0-5	90-100	80-100	70-100	55-95	35-45	10-15
			40-60	Loam, gravelly silt loam, clay loam	ML	A-6, A-7-6	0	0-5	90-100	80-100	70-100	55-95	35-45	10-15

Engineering Properties–Delaware County, Pennsylvania														
Map unit symbol and soil name	Pct. of map unit	Hydrologic group	Depth	USDA texture	Classification		Fragments		Percentage passing sieve number—				Liquid limit	Plasticity index
					Unified	AASHTO	>10 inches	3-10 inches	4	10	40	200		
			In				*Pct*	*Pct*					*Pct*	
MgC2—Manor loam, 8 to 15 percent slopes, moderately eroded														
Manor	90	B	0-7	Loam	ML	A-4, A-6	0	0	85-100	80-100	70-100	50-90	32-40	6-12
			7-21	Loam, silt loam, channery loam	GM, ML, SM	A-2-4, A-2-6, A-4, A-6	0	0-10	65-100	50-100	40-100	30-90	26-40	4-12
			21-60	Loam, sandy loam, channery sandy loam, very fine sandy loam	CL-ML, ML, SC-SM, SM	A-1, A-2, A-4, A-6	0	0-5	65-100	50-100	30-95	15-75	20-40	2-12
MkF—Manor soils, 35 to 60 percent slopes														
Manor	100	B	0-3	Channery loam	GM, ML, SM	A-2-4, A-2-6, A-4, A-6	0	0-10	65-100	50-75	40-75	30-70	32-40	6-12
			3-22	Loam, silt loam, channery loam	GM, ML, SM	A-2-4, A-2-6, A-4, A-6	0	0-10	65-100	50-100	40-100	30-90	26-40	4-12
			22-60	Loam, very fine sandy loam, channery sandy loam	CL-ML, ML, SC-SM, SM	A-1, A-2, A-4, A-6	0	0-5	65-100	50-100	30-95	15-75	20-40	2-12
We—Wehadkee silt loam														
Wehadkee	90	D	0-9	Silt loam	CL-ML	A-4	0	0	95-100	90-100	70-100	60-90	22-35	2-12
			9-28	Silt loam	CL-ML	A-4	0	0	85-100	80-100	70-95	55-85	22-35	2-12
			28-60	Sandy clay loam, silty clay loam	CL-ML	A-4	0	0	75-100	70-100	60-90	45-60	22-30	2-10
			60-64	Stratified clay	SC-SM	A-2	0	0	50-85	45-80	45-80	15-35	15-32	NP-14

Data Source Information

Soil Survey Area: Delaware County, Pennsylvania
Survey Area Data: Version 7, Dec 14, 2013

APPENDIX G-2: GLEN PROVIDENCE COUNTY PARK ENVIRONMENTAL SURVEY

Delaware County Park Study
Glen Providence Park
Environmental Resource Survey

Glen Providence Park

The Glen Providence Park entrance is located on the west end of Media Borough. The park sits on an approximately 32 acres and is split between Media Borough and Upper Providence Township. The park consists of a steeply sloping partially wooded grassy meadow and a forested stream valley and man-made pond. The surrounding land use is dominated by high density residential housing. Ridley Creek flows through the valley toward the southwest. Ridley Creek is designated as a High Quality Trout Stocked Fishery (HQ-TSF) by the Pennsylvania Department of Environmental Protection's (PADEP) Chapter 93 Water Quality Standards. HQ waters have special protections and are defined as "Surface waters having quality which exceeds levels necessary to support propagation of fish, shellfish, and wildlife and recreation in and on the water by satisfying § 93.4b(a)" according to PADEP's Chapter 93 guidelines. Designated use of a TSF is defined as "Maintenance of stocked trout from February 15 to July 31 and maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat." Despite the HQ-TSF designation, the aquatic life status has a pending impairment status by PADEP because of urban runoff causing flow variation, siltation, thermal modifications and flow alterations.

An environmental survey was conducted to provide a preliminary inventory and assessment of the existing environmental features within the park to assist future planning decisions. The most significant environmental resources within the park consist of the Ridley Creek floodplain valley, the Glen Providence Pond, and the surrounding steep wooded slopes.

A steeply sloping partially wooded turf grass meadow is the first area visitors see upon entrance of the park. There is some erosion occurring at the toe of slope at the transition to the wooded stream valley. This erosion is due to grading and lack of vegetation to disrupt/infiltrate surface flows. Erosion matting and bare soils are exposed.

The stream valley is mostly wooded and occupied by Ridley Creek and Glen Providence Pond. There are some small cleared areas for picnic tables, a stone pavilion and adjacent hiking trails. These cleared areas are dominated by lesser celandine (*Ficaria verna*). This plant is listed as an exotic invasive plant by the Pennsylvania Department Conservation and Natural Resources (DCNR). The wooded area is a forested floodplain that is a mix of native and exotic invasive vegetation. The valley downstream of the pond contains a high density of multifloral rose (DCNR invasive). The upstream contains a more diverse understory. The soil along the stream valley are mapped as Wehadkee Silt Loam. This soil series is classified as poorly draining and, as a result, many wetland pockets are established along the floodplain. The stream appeared stable except for the artificial channel diverted around the pond.

Delaware County Park Study
Glen Providence Park
Environmental Resource Survey

A pipe located along a sharp meander diverts a portion of the creek's flow into the pond. The creek channel has been diverted along the south east edge of the pond and runs at the base of the berm/levee of the pond. Portions of this channel are showing signs of active degradation. The most severe are occurring at the meander around the upstream portion of the pond, at the toe of slope from the meadow at a stormwater outfall, a portion undercutting the pond berm, and at the pond outfall. A vertical bank has eroded along the meander upstream of the pond. The channel appears to have migrated towards the pond. This horizontal channel shift is likely attributable to the multiple flood events that occurred during the month of September 2011. Further downstream there is severe bank erosion occurring at the toe of slope of the wood clearing and subsequent path leading from the meadow to the forested valley floor. (*Note: Emergency repairs were undertaken to the streambank of Broomall's Run adjacent to the Pond in the spring of 2014).* The origins of this degradation are from the surface runoff from the cleared slope and from a stormwater pipe outfall. Riprap was placed along this area for protection. However, it is currently failing. Active undercutting of the pond berm is occurring along the northeast bank approximately 40' downstream of the pedestrian bridge over Ridley Creek. This is a threat to the pond infrastructure. Horizontal and vertical migration of the stream channel was observed downstream of the pond outfall. Woody debris was observed within the pond outfall channel to raise the bed elevation and reduce vertical drop. A headcut is occuring downstream of the woody debris. Braided channels are located below the headcut.

The Glen Providence Pond is the centerpiece of the Glen Providence Park. The pond is teaming with life. Several species of turtles, frogs and fish were observed within the pond. The turtle population was so dense that territorial behavior was observed between species. No turtle surveys were performed, but it did appear that the red belly slider is among the species present. Minimal basking habitat exists within the pond. The turtles preferred the shallow upper portion of the pond. The lower portion of the pond was teaming with algae blooms. These blooms are the result of excess nutrients likely a result from a mix between animal waste and stormwater runoff. As this algae dies off and begins to decay, dissolved oxygen is consumed. This results in hypoxic or depleted oxygen conditions. Aquatic plants and animals cannot survive without sufficient oxygen. Hypoxic conditions are a greater threat during the warmer months of late summer during the peak algae bloom period.

The wooded slope contains primarily hardwood species and had a healthy forest floor and understory that was relatively diverse.

Recommendations:

It is recommended that the channel shift upstream from the pond be addressed by relocating the channel along the previous alignment. This can be done with some toe

slope stabilization and bank grading. Soil bioengineering can be utilized to protect the bank while allowing a naturally aesthetic appearance.

The erosion that is occurring along the toe of the meadow slope can be remedied with relatively little cost. It is recommended that the toe is graded to confine runoff into a drainage swale with check dams or step pools to reduce runoff velocity.

It is recommended that the levee/berm undercutting be resolved utilizing toe slope and bank stabilization methods similar to previous recommendations.

It is recommended that the headcut is stabilized at the pond outfall. This could result in a catastrophic failure of the the pond to retain water. It is recommended that an engineer or a qualified person inspect the pond to determine the level of threat the destabilized areas pose to the pond's stability.

The pond is a unique habitat feature and should be designated as a special habitat area and provided special protections to retain its ecological value. It is recommended that a turtle survey be preformed to identify the presence of red belly turtles and to determine if any rare, threatened, and/or endangered (RTE) species are found within this pond. This pond could qualify as Critical Habitat if any nationally RTE species are found. Red bellied turtles are an introduced species via animal pet trading industry and are extremely aggressive. These turtles are territorial and typically out compete native turtle species. It recommended that these turtles are removed from the area to ensure biodiversity. Signs should be posted to educate citizens on the dangers of releasing pets such as these turtles into the wildlife. A lack of basking habitat was observed. This can be relatively easily remedied by the introduction of large woody debris within the pond. Large fallen trees were observed along the trails near the pond. These trees could be submerged and would provide quality habitat. Large rocks could be randomly placed along the edge of pond bank that would also increase basking habitat. It is recommended that tests be conducted for dissolved oxygen levels within the pond. This test is to determine whether there is sufficient dissolved oxygen that is required and appropriate for the existing aquatic life. If levels too low explore, options should be explored to remedy the solution such as reducing nutrients, adding oxygen, and/or removing algae.

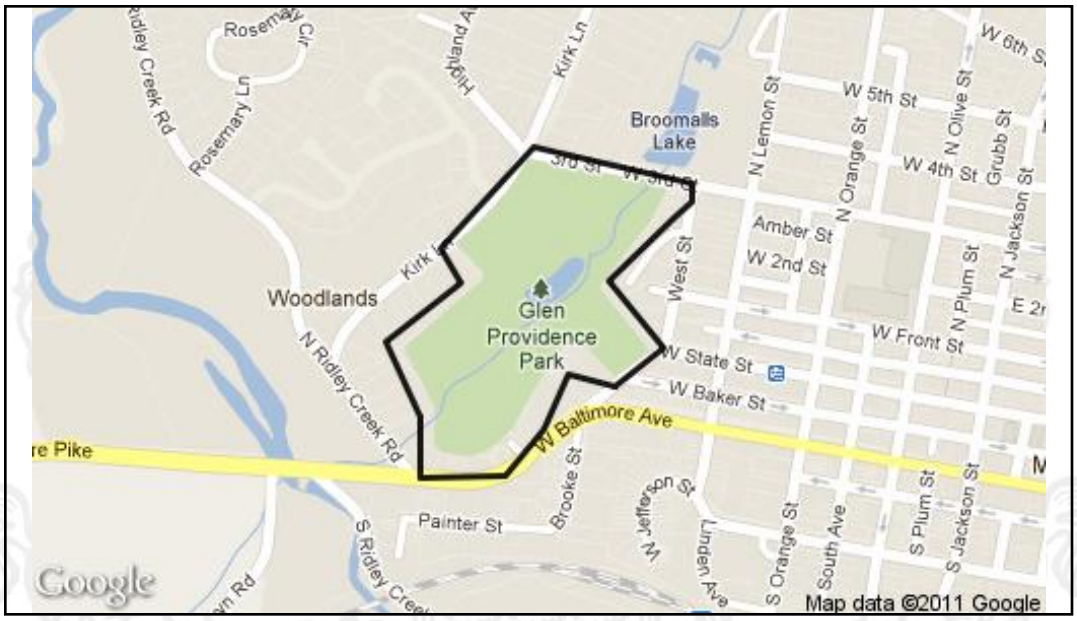
It is recommended that solutions are explored to address the invasive brush layer along the floodplain downstream of the pond. This is a low priority recommendation.

No wetlands were found on National Wetland Inventory (NWI) mapping of the park. No wetlands were delineated or identified by the three parameter approach outlined in the 1987 United States Army Corps of Engineer Wetland Manual and corresponding regional supplement. A detailed wetland investigation was not practical for the level of detail for this survey report and NWI mapping often does not show smaller wetland pockets. Preliminary wetland investigation criteria used for the sake of this report consists of visual identification and rapid test of hydrophytic vegetation, landform and visible signs of hydrology. It is our conclusion that wetlands are most likely present all along the Broomall’s Run corridor within the park. Also, a wetland area had been previously identified in the northern part of the

park in the past planning efforts for the 3rd street dam. It is recommended that prior to any park improvements including land disturbance that a wetland investigation and updated Pennsylvania Natural Diversity Inventory (PNDI) inquiry be conducted to the presence of or potential habitat belonging to rare, threatened, and/or endangered species. A wetland investigation and, if necessary, wetland delineation may be required to be submitted with PADEP and NPDES permits for disturbances in wetlands and streams.

1. PROJECT INFORMATION

Project Name: **Glen Providence Park**
Date of review: **8/16/2011 11:34:47 AM**
Project Category: **Recreation,Other**
Project Area: **45.6** acres
County: **Delaware** Township/Municipality: **Media,Upper Providence**
Quadrangle Name: **MEDIA** ~ ZIP Code: **19063**
Decimal Degrees: **39.919545 N, -75.399770 W**
Degrees Minutes Seconds: **39° 55' 10.4" N, -75° 23' 59.2" W**



2. SEARCH RESULTS

Agency	Results	Response
PA Game Commission	No Known Impact	No Further Review Required
PA Department of Conservation and Natural Resources	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**
PA Fish and Boat Commission	No Known Impact	No Further Review Required
U.S. Fish and Wildlife Service	**Potential Impact**	**FURTHER REVIEW IS REQUIRED, See Agency Response**

As summarized above, Pennsylvania Natural Diversity Inventory (PNDI) records indicate there may be potential impacts to threatened and endangered and/or special concern species and resources within the project area. If the response above indicates "No Further Review Required" no additional communication with the respective agency is required. If the response is "Further Review Required" or "See Agency Response," refer to the appropriate agency comments below. Please see the DEP Information Section of this receipt if a PA Department of Environmental Protection Permit is required.

Note that regardless of PNDI search results, projects requiring a Chapter 105 DEP individual permit or GP 5, 6, 7, 8, 9 or 11 in certain counties (Adams, Berks, Bucks, Carbon, Chester, Cumberland, Delaware, Lancaster, Lebanon, Lehigh, Monroe, Montgomery, Northampton, Schuylkill and York) must comply with the bog turtle habitat screening requirements of the PASPGP.

3. AGENCY COMMENTS

Regardless of whether a DEP permit is necessary for this proposed project, any potential impacts to threatened and endangered species and/or special concern species and resources must be resolved with the appropriate jurisdictional agency. In some cases, a permit or authorization from the jurisdictional agency may be needed if adverse impacts to these species and habitats cannot be avoided.

These agency determinations and responses are **valid for one year** (from the date of the review), and are based on the project information that was provided, including the exact project location; the project type, description, and features; and any responses to questions that were generated during this search. If any of the following change: 1) project location, 2) project size or configuration, 3) project type, or 4) responses to the questions that were asked during the online review, the results of this review are not valid, and the review must be searched again via the PNDI Environmental Review Tool and resubmitted to the jurisdictional agencies. The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer impacts than what is listed on this PNDI receipt. The jursidictional agencies **strongly advise against** conducting surveys for the species listed on the receipt prior to consultation with the agencies.

PA Game Commission

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

PA Department of Conservation and Natural Resources

RESPONSE: Further review of this project is necessary to resolve the potential impacts(s). Please send project information to this agency for review (see WHAT TO SEND).

DCNR Species: (Note: The PNDI tool is a primary screening tool, and a desktop review may reveal more or fewer species than what is listed below. After desktop review, if a botanical survey is required by DCNR, we recommend the DCNR Botanical Survey Protocols, available here: http://www.gis.dcnr.state.pa.us/hgis-er/PNDI_DCNR.aspx.)
Scientific Name: Scleria pauciflora
Common Name: Few Flowered Nutrush
Current Status: Threatened
Proposed Status: Threatened

PA Fish and Boat Commission

RESPONSE: No Impact is anticipated to threatened and endangered species and/or special concern species and resources.

U.S. Fish and Wildlife Service

RESPONSE: Further review of this project is necessary to resolve the potential impacts(s). Please send project information to this agency for review (see WHAT TO SEND).

* Special Concern Species or Resource - Plant or animal species classified as rare, tentatively undetermined or candidate as well as other taxa of conservation concern, significant natural communities, special concern populations (plants or animals) and unique geologic features.
** Sensitive Species - Species identified by the jurisdictinal agency as collectible, having economic value, or being susceptible to decline as a result of visitation.

WHAT TO SEND TO JURISDICTIONAL AGENCIES

If project information was requested by one or more of the agencies above, send the following information to the agency(s) seeking this information (see AGENCY CONTACT INFORMATION).

Check-list of *Minimum* Materials to be submitted:

____**SIGNED** copy of this Project Environmental Review Receipt
____Project narrative with a description of the overall project, the work to be performed, current physical characteristics of the site and acreage to be impacted.
____Project location information (name of USGS Quadrangle, Township/Municipality, and County)
____USGS 7.5-minute Quadrangle with project boundary clearly indicated, and quad name on the map

The inclusion of the following information may expedite the review process.
____A basic site plan(particularly showing the relationship of the project to the physical features such as wetlands, streams, ponds, rock outcrops, etc.)
____Color photos keyed to the basic site plan (i.e. showing on the site plan where and in what direction each photo was taken and the date of the photos)
____Information about the presence and location of wetlands in the project area, and how this was determined (e.g., by a qualified wetlands biologist), if wetlands are present in the project area, provide project plans showing the location of all project features, as well as wetlands and streams
____The DEP permit(s) required for this project

4. DEP INFORMATION

The Pa Department of Environmental Protection (DEP) requires that a signed copy of this receipt, along with any required documentation from jurisdictional agencies concerning resolution of potential impacts, be submitted with applications for permits requiring PNDI review. For cases where a "Potential Impact" to threatened and endangered species has been identified before the application has been submitted to DEP, the application should not be submitted until the impact has been resolved. For cases where "Potential Impact" to special concern species and resources has been identified before the application has been submitted, the application should be submitted to DEP along with the PNDI receipt, a completed PNDI form and a USGS 7.5 minute quadrangle map with the project boundaries delineated on the map. The PNDI Receipt should also be submitted to the appropriate agency according to directions on the PNDI Receipt. DEP and the jurisdictional agency will work together to resolve the potential impact(s). See the DEP PNDI policy at http://www.naturalheritage.state.pa.us.

5. ADDITIONAL INFORMATION

The PNDI environmental review website is a **preliminary** screening tool. There are often delays in updating species status classifications. Because the proposed status represents the best available information regarding the conservation status of the species, state jurisdictional agency staff give the proposed statuses at least the same consideration as the current legal status. If surveys or further information reveal that a threatened and endangered and/or special concern species and resources exist in your project area, contact the appropriate jurisdictional agency/agencies immediately to identify and resolve any impacts.

For a list of species known to occur in the county where your project is located, please see the species lists by county found on the PA Natural Heritage Program (PNHP) home page (www.naturalheritage.state.pa.us). Also note that the PNDI Environmental Review Tool only contains information about species occurrences that have actually been reported to the PNHP.

6. AGENCY CONTACT INFORMATION

PA Department of Conservation and Natural Resources

Bureau of Forestry, Ecological Services Section
400 Market Street, PO Box 8552, Harrisburg, PA. 17105-8552
Fax:(717) 772-0271

U.S. Fish and Wildlife Service

Endangered Species Section
315 South Allen Street, Suite 322, State College, PA. 16801-4851
NO Faxes Please.

PA Fish and Boat Commission

Division of Environmental Services
450 Robinson Lane, Bellefonte, PA. 16823-7437
NO Faxes Please

PA Game Commission

Bureau of Wildlife Habitat Management
Division of Environmental Planning and Habitat Protection
2001 Elmerton Avenue, Harrisburg, PA. 17110-9797
Fax:(717) 787-6957

7. PROJECT CONTACT INFORMATION

Name:_____
Company/Business Name:_____
Address:_____
City, State, Zip:_____
Phone:(_____)_____Fax:(_____)_____
Email:_____

8. CERTIFICATION

I certify that ALL of the project information contained in this receipt (including project location, project size/configuration, project type, answers to questions) is true, accurate and complete. In addition, if the project type, location, size or configuration changes, or if the answers to any questions that were asked during this online review change, I agree to re-do the online environmental review.

_____ _____
applicant/project proponent signature date