Exton Park

Master Site Development Plan

West Whiteland Township, Chester County, PA ***MAY 2017***

Prepared by Urban Research and Development Corporation

ACKNOWLEDGMENTS:

This project was financed in part by a grant from the

Community Conservation and Partnerships Program,

Keystone Recreation Park and Conservation Fund,

under the administration of the

Pennsylvania Department of Conservation and Natural Resources,

Bureau of Recreation and Conservation

EXTON PARK MASTER SITE DEVELOPMENT PLAN

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Adopted May__, 2017

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Preface

Purpose

Exton Park is comprised of 727 acres of parkland, of which 279 acres belongs to West Whiteland Township and the remaining portion belongs to Chester County. Together they form the largest piece of preserved parkland in West Whiteland Township. Whereas many of the public parks located within Exton Park's service area provide primarily active use facilities in the form of sports fields, Exton Park represents a unique opportunity to provide primarily passive recreational opportunities as well as to preserve both ecological and historic assets within West Whiteland Township. The development of Exton Park dates back to 2002, when a master plan was created for both the County and Township-owned portions of the site. This plan proved to be ineffective in meeting the needs and budgetary constraints of the community, and was ultimately never implemented. In preparing this plan, West Whiteland Township determined that an effective master plan for their portion of Exton Park would:

- Provide a guide for future development and preservation of the park,
- Set public policy for the future of the park,
- Create a plan that establishes the park as the Township's premier park,
- Create a plan that is implementable, financially realistic and fundable, and
- Provide the rationale and basis to successfully secure grants and other funding to implement the park plans.

Goals

The goals of the Exton Park Master Plan are:

- Provide a fiscally feasible and financially sustainable plan for the park
- Protect and enhance the natural environment.
- Allow for agricultural uses to continue on the site.
- Create a landscape that reduces flooding and sediment erosion.
- Make the park accessible for all users.
- Connect the park to nearby neighborhoods and trails.
- Provide for a community gathering space.
- Incorporate passive uses, active recreation facilities and support facilities that are needed by the community in a way that protects wildlife habitats and preserves the natural character of the park.

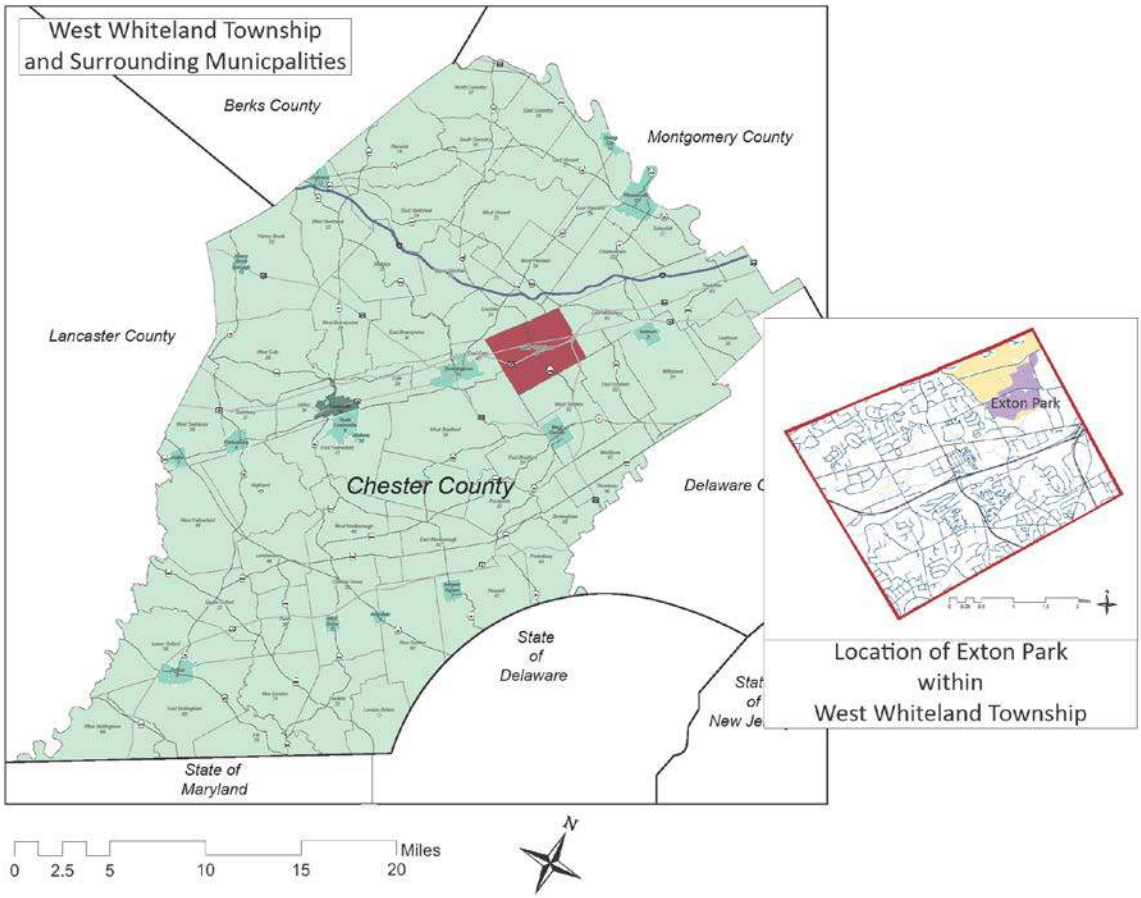
Format

This study is based on and follows the 2016 DCNR scope of work for park planning projects.

A. Background Information and Data

1. Community Introduction

West Whiteland Township is located in Chester County, Pennsylvania. The Township is bordered by the townships of Uwchlan and Charlestown to the north, East Caln and East Bradford to the west, East Whiteland to the east and West Goshen and East Goshen to the south. The Township is served by the West Chester Area School District. The historic Lincoln Highway (Business 30) and US Rt. 30 Bypass passes from east to west within the Township and County. The Lincoln Highway (formerly Lancaster Road), which ran from Times Square in New York City to Lincoln Park in San Francisco, was the Nation's premier transcontinental highway. State Route 100 traverses from north to south through the Township. The commercial center of Exton lies along State Route 100 and Lincoln Highway. The Township's land mass is thirteen square miles and nearly perfectly rectangular. The majority of this area has been developed in the suburban style of development, containing suburban style housing developments (primarily low-density and single family, detached homes), office parks and shopping complexes.



The Exton Park site is located in the northeastern corner of West Whiteland Township. The Township-owned portion of the site is comprised of approximately 279 acres and features significant natural and cultural resources including open field, woodlands, stream, corridors, hillsides, wetlands and agricultural lands. Several unnamed tributaries of Valley Creek flow southwest through Exton Park. These tributaries meet Valley Creek just within the southern edge of the park and before Valley Creek continues west to meet the East Branch of the Brandywine Creek. Ship Road, Old Valley Road, Church Farm Lane and the Chester Valley Trail generally form the exterior boundaries of the combined park property. The combined park property is bisected by Swedesford Road, which runs from east to west.

AERIAL MAP

Demographics, Size and Character

West Whiteland Township is home to 18,274 individuals as of the 2010 United States Census. West Whiteland Township's population increased by 11% from 2000 to 2010, compared to an overall increase of 15% for Chester County. According to the 2010 Census American Community Survey, the community of West Whiteland Township surrounding Exton Park can be described in the following ways:

- The median age was 38.1 years. (Median age refers to the age at which one-half of the population is younger and one-half of the population is older). This age is near the USA countrywide median age of 36.9 years.
- The median household income in 2010 was $93,542. The per capita income was $45,360. Within the Township, 1.9% of families or 2.7% of the population lives below the poverty line.

TABLE 1 - POPULATION BY AGE	
West Whiteland Township	
Age	Population (%)
under 5	6.6
5 to 9 years	6.8
10 to 14 years	6.8
15 to 19 years	6.4
20 to 34 years	18.5
35 to 44 years	16.1
45 to 54 years	15.9
55 to 64 years	11.9
65 to 74 years	6.0
75 years and older	4.8
Source: US Census 2010	

The US Census and local planning commissions forecast that West Whiteland Township and its surrounding townships and communities will have the following population in future years:

Over the next few decades, West Whiteland Township is expected to grow to the following population:

TABLE 2 - POPULATION FORECAST						
Municipality	2010 Population	2030 Forecast Population	2040 Forecast Population	Population Change 2010-2040	Percent Change 2010-2040	Within Service Area
Chester County	498,886		647,330	148,444	29.8	
West Whiteland Township	**18,274**	**21,356**	**22,490**	4,216	**23.1**	**x**
Charlestown Township	5,671	7,705	8,453	2,782	49.1	x
East Bradford Township	9,942	12,528	13,479	3,537	35.6	
East Cain Township	2,855	5,589	5,865	3,010	21.2	
East Goshen Township	18,026	21,221	22,397	4,371	24.2	
East Whiteland Township	10,650	12,657	13,395	2,745	25.8	x
Uwchlan Township	18,088	21,310	22,495	4,407	24.4	x
West Goshen Township	21,866	25,367	26,655	4,789	21.9	
West Pikeland Township	4,020	4,954	5,296	1,276	31.6	x
Source: US Census, Chester County Planning Commision and Delaware Valley Regional Planning Commission (DVRPC)						

- 2020 - 19,400 persons,
- 2030 - 12,700 persons, and
- 2040 - 22,500 persons.

According to the US Census Bureau, the population for West Whiteland Township will increase by 4,200 persons (23.1%) from 2010 to 2040 (see Table 2). This is similar to the growth of adjacent townships of similar total population, with the notable exceptions within the park's projected primary service area of East Whiteland Township which is expected to grow by 2,745, Charlestown Township, which is expected to grow by 2,782, and West Pikeland Township, which is expected to grow by 1,276 in the same time frame.

Housing

In 2010, the Census reported that 73% of occupied housing units were owner-occupied, as opposed to being occupied by renters. The average for Chester County was 75% and based upon sampling completed between 2010 and 2014 by the U.S. Census. The median value of owner-occupied homes in the Township was $326,400 in 2014 dollars (which was close to the median of $323,600 for the County). The median cash rent for rental-occupied units was $1,446 (which was higher than the countywide median of $1,192). In 2010, there were 7,559 housing units in the Township. West Whiteland Township reports that only 54 new single-family housing units and 43 apartment units were built in the Township between 2011 and 2016.

Income

The median household income for 2010 in West Whiteland was $93,542, which was higher than the countywide median income of $84,741 and significantly higher than the nationwide median income of $51,914.

TABLE 3 - HOUSEHOLD INCOME	
West Whiteland Township	
Income	Households (%)
Less than $10,000	3.0
$10,000 to $14,999	1.4
$15,000 to $24,999	4.1
$25,000 to $34,999	4.9
$35,000 to $49,999	7.0
$50,000 to $74,999	17.4
$75,000 to $99,999	16.1
$100,000 to $149,999	25.4
$150,000 to $199,999	10.3
$200,000 or more	10.4
Source: US Census 2010	

The Census estimates that 1.9% of Township families and 2.7% of Township residents live in households with incomes below the poverty level, compared to 7.1 % for the County as a whole.

Racial Background

Based upon sampling completed for 2010 by the U.S. Census, it is estimated that:

- 78.8% of residents were White
- 11.4% of residents are of Asian background (including 8.0% being of Asian Indian background and 1.8% of Chinese background)
- 5.1% of residents are Black/African-American

- 2.0% of residents are of two or more types of racial backgrounds.
- 3.0% of residents are of Latino/Hispanic background.

Place of Birth

The 2010 Census estimates that 2,406 or 13% of Township residents were born outside of the U.S.

TABLE 4 - EDUCATION	
West Whiteland Township Residents	
Education	Population 25 years or older (%)
Did not graduate high school	4.2
Earned high school diploma	18.7
Attended some college (no bachelor degree earned)	21.7
Earned bachelor degree	34.7
Earned a post-bachelor degree	20.8
Source: US Census 2010	

Education

West Whiteland's educational levels are in line with Chester County as a whole. For example, 19.5% of Chester County residents have earned a post-bachelor's degree.

Size

West Whiteland Township is a suburban land area of 13.3 square miles, located in southeastern Pennsylvania, in central Chester County.

Character

West Whiteland Township has changed from a predominately rural locale to a more densely populated suburban residential and commercial one, The historic rural population included farmers and large landowners and many historic buildings still exist in the Township. These historic structures are a strong reminder of the rich history of the Township. Chester County boasts 317 Class 1 National Register of Historic Places. West Whiteland Township is home to 46 of those. Eight buildings and one historic district (the Church Farm Historic District) are located along either Ship Road, Church Farm Lane, Old Valley Road, or Swedesford

Road. The Benjamin Pennypacker House lies along Swedesford Road but is not part of Exton Park. Several Class 2 and Class 3 sites as well as an additional site eligible for the National Register of Historic Places are within the same area.

Exton Park Description

Exton Park was purchased from the Church Farm School in 1995. The School still operates adjacent to Exton Park and Chester County's CVT. The Exton Park property is diverse in terms of its landforms, surface hydrology and vegetative cover. It has the rolling land of agricultural fields, frequently inundated floodplain and wetland areas and a scenic pond. It has views to historic landmark buildings and the picturesque historic agricultural pattern of cultivated fields and woodland areas. It is adjacent to the County parkland that includes sloping woodland areas. When viewed as a panorama, from inside the site, it has all the landscape elements from top of hill to valley floor; views that have otherwise disappeared from the Exton landscape.

Another element of the site is its value as wildlife habitat, particularly for birds, which have found refuge in and have inhabited the site. The park is a popular spot for birding and reportedly has been the location for sighting of roughly 200 different bird species.

The property is partially surrounded and bisected by existing roads. The park is bounded on the south by the popular Chester Valley Trail (CVT) and Chester County portion of the Exton Park, which allows access to the Township-operated trail system.

2. Natural Resources of Exton Park

Forest Cover

According to the Chester County Natural Heritage Inventory Update of 2015, little to none of the original forest cover still exists in Chester County. As in other forested areas of the US, much of the forest on the valley floors was cleared for agriculture and development and the forests that remain have been logged one or more times for fuel and lumber. These factors have changed the extent and species composition of the local forest. These changes are reflected in the extent and species composition of the forested areas of Exton Park. For example, the tulip poplar was considered to be a minor component of this forest region, but has now become co-dominant with the oaks in many places. Species composition in the understory has shifted as well with native spicebush and viburnums becoming more dominant in some areas and exotic species such as Japanese honeysuckle, tree-of-heaven, common privet, introduced bush honeysuckles, autumn olive, winged euonymus, Japanese stilt grass and garlic mustard becoming established in other areas. In many woodlands, these exotics tend to crowd out the native species and reduce the overall biological diversity of the flora. In turn, this reduction in the diversity of the flora also leads to a reduced fauna.

The North Valley Hills Natural Heritage Area (#102)as mapped by the Pennsylvania Natural Heritage Program, considered to have state importance as a Core Habitat, is located north of Old Valley Road. A Core Habitat is an area representing critical habitat that cannot absorb significant levels of activity without substantial negative impacts to elements of concern. The two plant species targeted in the Exton Park PNDI are two plant species of concern to DCNR (Lyonia mariana - Staggerbush and Quercus falcata - Southern Red Oak) and have remnant populations within the upland forest within the North Valley Hills NHA. Reforestation of riparian buffers in the Park have the potential to contribute to repopulation of these and other important forest and buffer species and to make a valuable connection to this Core Habitat as a Supporting Landscape – areas directly connected to Core Habitat that maintain vital ecological processes and/or secondary habitat that may be able to withstand some lower level of activity without substantial negative impacts to elements of concern. Ecologically sound riparian buffer improvements within Exton Park can make Exton Park one of the township's greatest natural assets.

Riparian Buffers

Vegetated riparian buffers and naturally vegetated floodplains along streams and other bodies of water provide vital benefits including protection of water quality, reduced erosion, flood control, and wildlife habitat. Rural and suburban development has historically encroached upon streams in many communities throughout Pennsylvania. West Whiteland Township is no exception.

Elimination of riparian vegetation within the Valley Creek floodplain has removed the capacity to buffer the effects of the surrounding landscape and consequently reduces the water quality in the stream. Two major effects of the loss of riparian buffers are sedimentation and nutrient enrichment. The wetland and stream vegetation in Exton Park are an exceptional resource for West Whiteland Township from structural and hydrological perspective although perform poorly due to sedimentation and nutrient enrichment.

Unique Geology

The Piedmont Lowlands physiographic region is unique. The Exton Park site is located at the base of the northern ridge of a narrow Piedmont Lowlands valley defined by ridges on either side. Typically, the valley bottom is 200 feet beneath the ridges. The reason is related to the type of bedrock geology present. The ridges are comprised of various metamorphic rocks such quartzite, schist, and gneiss which are resistant to erosion. The Valley's geology is mostly comprised of layers of Limestones and Dolomites. These rocks dissolve readily and their erosion has caused a depression, which is the Valley we see today. Due to a robust aquifer and the presence of limestone, the water is often calcium-rich, offering the potential for some unique plant species to be present.

Hydrology

A stream, wetlands and pond are found on the Exton Park site. Valley Creek within Exton Park contributes to the Brandywine Creek East Branch Watershed as a source of groundwater charge and recharge. The headwaters of Valley Creek are nearby within the North Valley NHA. PA DCNR considers Valley Creek impaired and not meeting water quality standards due to high levels of siltation within the stream. Deforestation and past farming practices have contributed to this status. Improvements to the floodplain of Valley Creek and the surrounding hillsides plantings can positively affect local water quality. Damming of the Valley Creek has created a small pond. The pond is surrounded by low brush and tree growth of predominately invasive species.

Flora

Currently, the site is dominated by non-native plants, many of which are extremely invasive and whose presence discourages the presence of native plants and animals in the landscape. Non-native annual plants grown for human benefit also dominate the landscape, primarily corn, soybeans, and hay in the form of reed canary grass. Although degraded and simplified, many habitat types on site still possess the structure and hydrology needed to support diverse native plant assemblages.

The northernmost portion of the property is within the North Valley Hill Natural Heritage Area. The soils here are shallower and have a sandy component due to the abundance of quartzite. Here, two PA-endangered plant species occur. They are southern red oak (Quercus falcata) and staggerbush (Lyonia mariana). A large portion of this site as recognized by the state has been cleared and converted to agricultural land.

3. West Whiteland Township's Park System

Description of Parks System

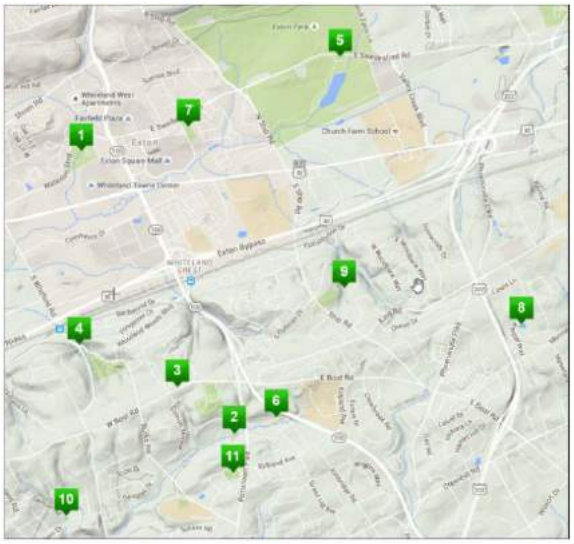
West Whiteland Township maintains a community park system that provides a balance of active and passive recreational areas and facilities for the use and enjoyment of individuals, groups and families of all ages. The Township administers eleven separate recreation/open space facilities, including Exton Park. The total acreage for the Township's developed parks is currently over 110 acres, excluding the 279-acre Exton Park. The following provides a list of West Whiteland Township's current park and open space holdings:

Albert C. Miller Memorial Park - This 20-acre Park offers parking, tot lot play equipment, comfort facilities, grills, benches and parking as well as: three tennis courts, a multi-purpose field, a basketball court, a gazebo, and a 50-person capacity pavilion. Many of the facilities are handicapped-accessible. Friends of the Parks hosts outdoor concerts at the gazebo area during the summer season.

Banbury Park —This 2-acre Park offers playground equipment as well as a basketball court, a multi-use play area and a 40-person capacity pavilion.

Boot Road Park —This 26-acre Park offers large and small playground equipment, a butterfly garden, blue bird nesting boxes, a .58-mile walking path around the perimeter of the park, a 12-person capacity pavilion, a 60-ft baseball/softball field and a 90-ft baseball field. The one-story former home at 110 West Boot Road.

WEST WHITELAND TOWNSHIP PARKS



1. Albert C. Miller Memorial Park
2. Banbury Park
3. Boot Road Park
4. Burke Road Park
5. Exton Park
6. Ivy Glen Park
7. Meadowbrook Manor Park
8. Mill Valley Park
9. Joseph P. Roscioli Park
10. Sunset Grove Park
11. Waltz Park

Source: West Whiteland Township

Burke Road Park —This 23-acre Park offers limited parking, scenic trails, and a 40-person capacity pavilion with picnic tables.

Exton Park — At the time of this plan, Exton Park provides parking, three multi-purpose fields, pet-friendly dispensers, and 4.65 miles of trail, which connect to the Chester Valley Trailhead facility.

Ivy Glen Park —This Park provides no amenities. It is a one-half acre site for passive recreation.

Meadowbrook Manor Park —This is a leased 5-acre Park offering parking, two tennis courts, playground equipment, a softball field, a multiuse play area, picnic tables and two Little League-regulation baseball fields with bleachers.

Mill Valley Park —This 3-acre passive recreation Park offers benches and a picnic table adjacent to a small pond.

Joseph P. Roscioli Park — The Township owns 14-plus acres and leases 13-plus acres as a primary active recreation park. The Park offers restroom facilities, parking, two Little League-regulation baseball fields, a Little League-regulation T-ball field, bleachers, the Exton Little League organization concession stand, a trail, picnic area and playground equipment. The Exton Little League organization contracts with the Township for seasonal use.

Sunset Grove Park — This 1-acre handicapped-accessible Park offers parking, picnic tables, benches, playground equipment, turf areas and a 20-person capacity pavilion.

Waltz Park — This 5-acre Park is a primary active recreation park. The Park offers parking, picnic tables, benches, two Little League-regulation baseball fields with bleachers, a softball field, and the West Side Little League organization concession stand. The West Side Little League organization contracts with the Township for seasonal use.

Other Existing Parks and Open Space Lands in West Whiteland Township

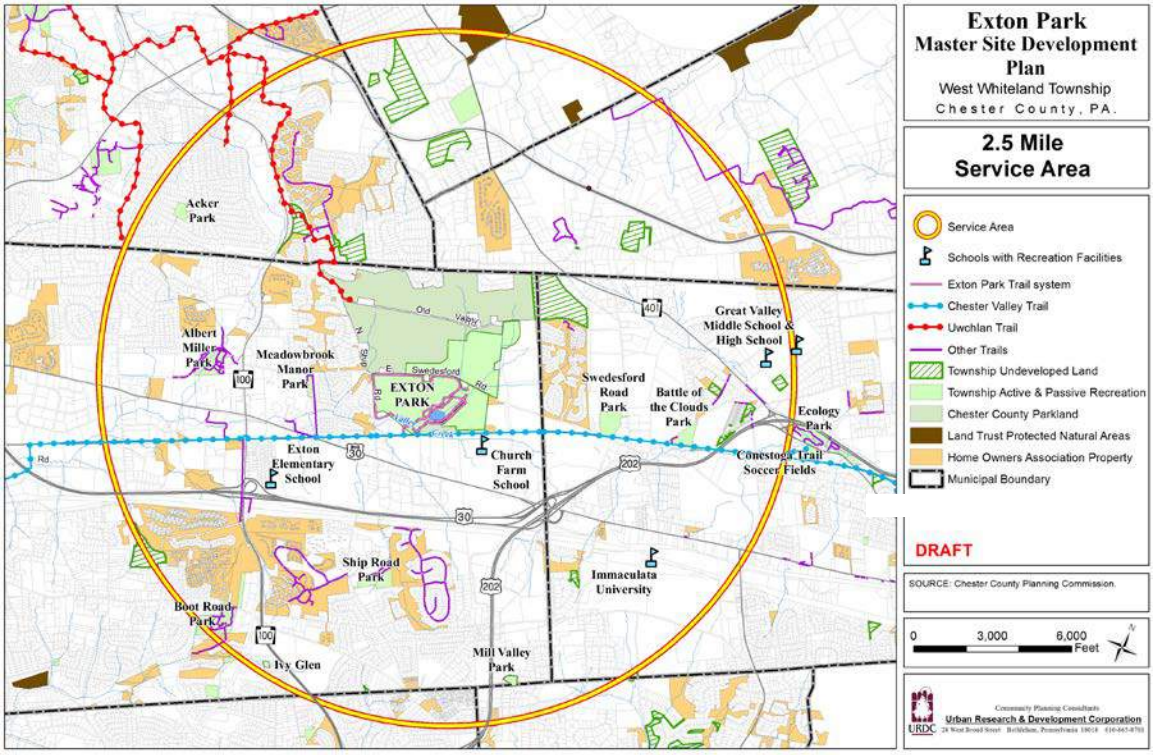
With the rapid growth of residential development, recreational area development has been directed by Township Sub-division and Land Development Ordinances (SALDO). These guidelines and the mandatory requirements for Home Owners Association, (HOA) within these developed residential neighborhoods has resulted in valuable Open Space preservation within and between the numerous sub-divisions within West Whiteland Township. There are 26 HOA-maintained open space properties in West Whiteland Township ranging in size from 1.2 acres to 104.1 acres. The Natural Land Trust maintains a 13.6-acre open space preserve within a residential neighborhood in the southwestern corner of the Township. These parcels constitute a substantial amount of open space, which potentially relieves pressure on Township open space properties but also has the potential to create connections between community facilities, residential areas and Township recreational properties.

Chester County's portion of Exton Park lies north and south of West Whiteland's portion. The County has developed the southern-most parcel as the 'Chester Valley Trail Trailhead at Exton Park'. This improvement consists of parking, bathroom facilities, bicycle repair station, playground equipment, sand volleyball court and connection to the Exton Park Perimeter Trail. Chester County plans on developing the remaining portions of their land holdings at Exton Park based on the original joint master plan, which had been prepared. An entrance into the northern portion off of Swedesford Road would lead to a ranger station with parking, restrooms and interpretive center. Proposed passive recreation amenities would include trails, picnic pavilions and other minor site improvements. The County has no immediate plans to begin construction.

The Exton Elementary School and Mary House Elementary School offer playgrounds and fields for casual recreation during off-school hours.

Recreation Service Area of Exton Park

Exton Park is considered a *Community Park*.* The Chester County Open Space Plan, *Linking Landscapes,* identifies a community park as one whose size is between 20 and 399 acres and serves a maximum population of 25,000. The standards developed for this classification recommend a 2.5-mile Service Radius that is equal to a 5-minute drive or a 30-minute walk. The Service Radius includes dense residential development, several office parks and includes portions of residential neighborhoods within several adjacent townships.



Facilities and improvements proposed at Exton Park will serve as an attractive focal point to the residents within that service radius who reside in the adjacent townships of Charlestown, East Goshen, East Whiteland, Uwchlan, West Goshen and West Pikeland.

*See Appendix A for list of other parks and recreational amenities

4. How Exton Park Fits Into the System of Parks

Exton Park is the largest parcel of public land within West Whiteland Township. In addition to Exton Park, West Whiteland maintains ten parks that represent a mixture of active and passive recreational opportunities. The Township's parks are relatively small (the largest is 26 acres excluding Exton Park) and neighborhood focused, most often containing playground equipment and baseball fields. Six of the parks are smaller than five acres while three others are between twenty and twenty-six acres. The 279-acre Exton Park is a natural, historic and aesthetic jewel in an array of municipal parkland dedicated to active sports and passive recreation.

The Swedesford Road Trailhead provides parking and access to the existing grass and boardwalk trail system, which follows the stream corridor, circles the pond and circumnavigates the leased agriculture fields on the section of the park south of Swedesford Road. The trailhead kiosk posts the trail map and park rules. Dog pickup bags and pickup request signs are posted throughout the trail system. Three grass paths connect the Exton Park Trail system to the Chester Valley Trail and Trailhead.

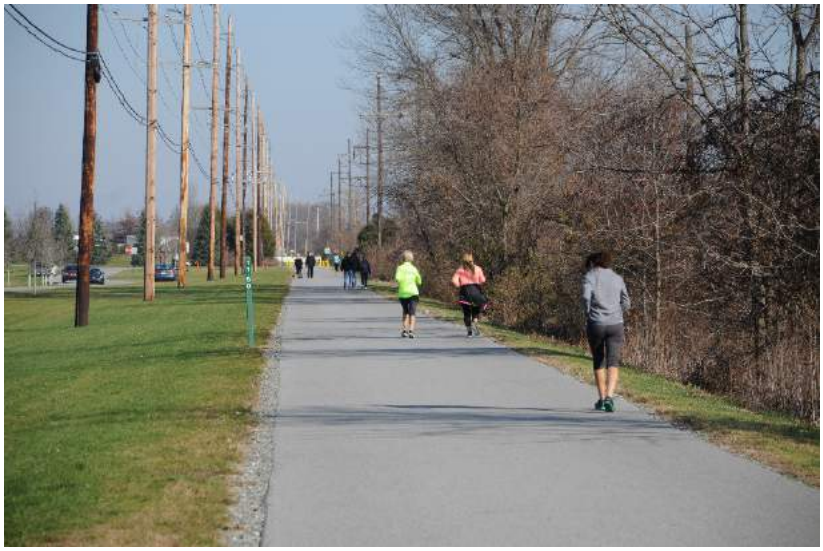
Several West Whiteland Township parks lie within the 2.5-mile service radius of Exton Park: Albert Miller Park, Joseph P. Roscioli Park, Mill Valley Park and Boot Road Park. Each of these parks has its own character, use patterns and amenities. Albert Miller Park, Joseph P. Roscioli Park, and Boot Road Park offer active sport areas, associated amenities such as parking, restrooms, open space and playgrounds. Mill Valley Park is exclusively used as a passive park although it is minute in size (3 acres) compared to Exton Park (nearly 300 acres) and lies near the edge of the 2.5-mile service radius for Exton Park. Many HOA open space areas surround Exton Park. These are available only to neighborhood residents and do not offer the types of amenities presently available at Exton Park such as trails or potential for educational, historic or community gathering opportunities.

Access to this Exton Park is predominately vehicular due to the lack of continuous sidewalk along busy township roads and few improved intersections geared to safe pedestrian crossing. The Chester

TABLE 5 - OTHER PARKS
West Whiteland Township
Exton Park Site (Township Owned)
Albert C. Miller Memorial Park
Banbury Park
Boot Road Park
Burke Road Nature Center
Ivy Glen Park
Meadowbrook Manor
Mill Valley Park
Joseph P. Roscioli Park
Sunset Grove
Waltz Park
East Whiteland Township
Battle of the Clouds Park
Conestoga Trail Soccer Fields
Ecology Park
Spring Mills Farm Park
Swanenburg Property
Uwchlan Township
Acker Park
Chester County
Chester Valley Trail at Exton Park
Exton Park (County-owned)

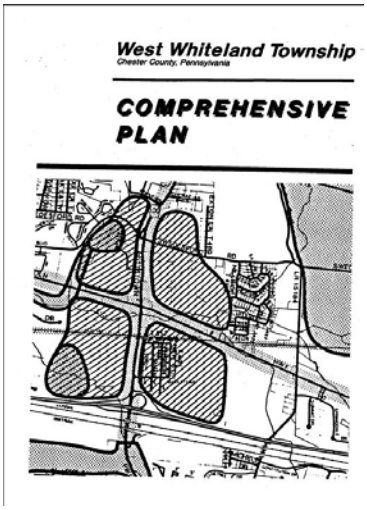
Valley Trail (CVT) traverses Exton Park and West Whiteland Township, is heavily used and is quite popular, although the CVT does not connect to any other park within the West Whiteland Township park system.

Multi-purpose grass athletic fields adjacent to Church Farm Lane and the Chester Valley Trail, used by younger level field sport teams, are the only active recreational use within Exton Park.



5. Existing Community Planning

West Whiteland Comprehensive Plan (updated 2013)



The Comprehensive Plan recommends the following actions:

- Promote the establishment of a permanent open space network though the community and creation of new parklands along the network
- Achieve a safe, efficient and pleasant circulation system that is compatible with the character of the Township and that will best serve both necessary and pleasure trips. This system should incorporate a variety of modes, including private automobile, transit, bicycle, and pedestrian travel.
- Promote goals of the Clean Air Act Amendments by:
    - Development of a network of pedestrian and cycling paths in park, open space, resource conservation and utility corridor areas.
    - Creation of open space linkages from residential neighborhoods to designated open spaces and to the Town Center.
    - Protect groundwater, floodplains, streams, wetlands, mature woodlands and specimen tree, steep slopes, ridgelines, scenic viewsheds and other environmental features of the township.
- Preserve and enhance the significant historical, archaeological, and cultural resources of the township.

The Land Use section of the Comprehensive Plan indicates a web of designated floodplains in the township as a backbone of a permanent open space network extending throughout the community, incorporating existing and prospective parklands, environmental features, utility and transportation corridors, and a golf course. The intent is to ensure that the maximum achievable acreage of open space be retained in the township as it heads toward its full "build-out", that critical natural elements are protected, that sufficient park and recreation opportunities are created, and that the prospect of open space linkages among designated parks, neighborhoods, and the Town Center be encouraged for resident mobility and recreational enjoyment.

The Housing and Open Space section recommends residential clustering, which permits a concentration of a tract's potential development on a small portion of the overall tract and leaving the remaining area available for open space and recreation use in order to help realize the Township open space system.

The Conservation and Open Space Plan

This Plan depicts the future extent of park, permanent open space, and resource protection areas in the Township and emphasizes a knitting together of a series of existing and proposed park, open space, and resource protection elements to form a continuous system of greenways extending throughout the community.

- To conserve areas of environmentally-sensitive and culturally-valuable resources
- To provide appropriate buffers between areas of differing land use,
- To form a continuous path system throughout the township for walking, hiking, and cycling,
- To permit pedestrian and bicycle access to a variety of destinations,
- To maintain and enhance local wildlife habitat,
- To preserve vistas of the North Valley Hills and South Valley Hills ridges of the community.

Many of the suggestions of the original Comprehensive Plan (1994) and the 2015 update have been realized:

- New public parkland acquisition, in particular the Exton Park tract.
- The Chester Valley Trail and Trailhead
- New private open space and conservation areas created in the course of development of properties for new residential uses.

Lincoln Highway and Whitford Road Corridors Plan (2015)

This plan updated the land use plan for these two important development and transportation cooridors and recommended zoning changes to encourage walkable and bicycle-friendly mixed use communities, and coordinate with trail, open space, and public transportation resources along these corridors. Zoning amendments were adopted by the Board of Supervisors in September 2015. The corridors' plan also recommended that the Township consider enacting an ACT 209 transportation impact fee.

Act 209 Capital Improvements Plan (November 2015)

As required by Act 209, the Township completed a lans use assumptions report, and roadway sufficiency analysis and capital improvements plan as support for a transportation impact fee adopted in November of 2015. The lans ude assumptions report estimated the future development of significant office space to the east of Exton Park. To the south, the study assumed and increasing density of housing beginning with 36 single family detached dwellings along the south edge of the CVT, then 72 townhouses before additional office space along Lincoln Highway. These assumptions provide insight into potential development types and densities near Exton Park.

Landscapes 2: Chester County Comprehensive Policy Plan (2009)

The Plan identifies three initiatives for a more sustainable future for Chester County and its municipalities: build working partnerships, create sustainable communities and keep Chester County green. The Natural Resources, Open Space and Greenways, Agriculture and Historic Resources sections of the overall Chester County Comprehensive Plan are appropriate for review for this Exton Park Site Development Master Plan. These sections provide:

- policy recommendations,
- action plan suggestions for the County, municipalities, and
- citizen resource partners.

Chester County Natural Heritage Inventory Update 2015

Prepared for the Chester County Planning Commission by the Pennsylvania Natural Heritage Program noted:

- Human disturbance through agriculture has impacted natural areas in the West Whiteland Township.
- Existing forest patches in West Whiteland Township are between 25 and 250 Acres.
- Successful control of invasive plant and animal species is a time-, labor-, and resource- intensive process, but it is also necessary for native areas within West Whiteland Township to survive.
- Vegetated riparian buffers along stream and pond areas such as those within Exton Park provide vital benefits including protection of water quality, reduced erosion, flood control, and wildlife habitat.

B. PUBLIC PARTICIPATION

Public Participation

The public was engaged throughout the planning process for Exton Park through a well-planned public participation strategy. Public participation created awareness of the planning efforts, solicited the public's ideas and feedback, and gained public support for the project.

The public participation strategy included the following elements:

- Study Committee meetings,
- Two (2) general public meetings,
- Key Person interviews and special interest group interviews,
- Onsite park user surveys, and
- Public Surveys.

A Project Study Committee met with the planning consultant on a regular basis. In addition, two (2) general public meetings were held. Meeting types and number of meetings are listed below.

MEETING TYPE	NUMBER
Study Committee meetings	9
General public meetings	2
Key person interviews & special interest group interviews	20

Further description of the public participation process follows.

Study Committee Meetings

Regularly scheduled Study Committee Meetings were held monthly throughout the planning process. These meetings were publicly advertised and actively attended by members of the public, study committee, and Township administration. The Study Committee Meetings typically took place on the fourth Thursday of each month from January 28, 2016 through October 27, 2016 with the exception of May and September. The topics discussed at each of the Study Committee meetings included long-term visioning, the ecological features of Exton Park, analysis of Exton Park's current conditions, an overview of key interview and public survey results, summaries of both public meetings, an overview of three proposed alternative master site development plans, and an overview of a proposed final master development plan with phasing and cost estimates.

Onsite User Survey

An onsite user survey was conducted at the park. The survey was conducted simultaneously at multiple locations in the park on two days: Thursday, March 24, 2016 and Saturday, March 26 2016. This ensured survey results included a variety of users and experiences on a weekday and weekend day. Both days were warm sunny spring days and the park was well attended by a variety of users. Users were asked to provide input to a specific list of questions regarding the preservation and development of Exton Park. This provided firsthand input from park users during their recreation activities on the site. Users interviewed were able to describe various park issues and needs. URDC staff interviewed and completed 107 surveys. Survey questions collected demographic data, including data on where respondents lived in relation to Exton Park as well as views on the types of potential active, passive and support facilities individuals would like to see developed.

Overall, the survey showed that existing users came from a wide area. Only 20 individuals (18.7%) were West Whiteland residents, while 87 individuals (81.2%) were from outside the Township confirming the regional draw of the park. Bird watching, walking, running, and hiking were the main activities people were engaged in. Major assets identified included the natural open space, variety of habitats, variety of bird species, pond, grass trails, and

access to the CVT. While most users thought the natural open space needed to be preserved, they also identified the need for improvements. Improvements identified included more trails, parking, benches, picnic tables, shade, restrooms and other support facilities.

*See Appendix B for Onsite User Survey Results.

Public Survey

A public survey was created to collect feedback from community members regarding the development of Exton Park. The survey was distributed both as a hardcopy and as a digital version online. The Township received 692 responses. An overwhelming 81% of responses were received from Township residents.

Survey questions collected demographic data, including data on where respondents lived in relation to Exton Park as well as views on the sorts of active, passive and support facilities individuals would like to see developed. Only 18% of respondents were from the area north of the Exton Bypass (US Route 30) and east of Route 100 where the park is located in the Township. This helps confirm most visitors would likely need to drive to the park or have safer pedestrian access across the Exton Bypass (US Route 30) and Route 100. Only 42% of respondents said they would like to walk to the park.

Overall, the survey showed that individuals desired some active recreational opportunities including space for winter sports, soccer fields, passive recreational opportunities including picnic areas and paved trails and support facilities including restrooms, benches and trash receptacles. Walking, hiking, biking, birding and utilizing playground equipment were cited as the most common ways that individuals used Exton Park.

*See Appendix C for Public Survey Results.

Key Person Interviews

Twenty Key Person Interviews and Special Interest Group Interviews were completed between March and April of 2016. The Study Committee and West Whiteland Township chose interviewees that represented the Township, had specific knowledge of the park, possessed an understanding of recreational needs, and/or held a special interest in the park. These included interviews with the following:

- Township Staff
- Township Police Chief
- Township Planning Commission
- Township Historical Commission
- Township Parks and Recreation Commission
- Friends of the Parks (non-profit group)
- Friends of Exton Park
- Weed Warriors (volunteers)
- Chester County Facilities Department
- Church Farm School
- Adjoining Residents
- Valley Creek Corporate Center
- Main Line Health – Paoli Hospital
- A local Eagle Scout
- West Chester United Soccer Club
- Exton Little League
- West Side Little League
- Continental Football Club
- Greater Philadelphia Cricket Club
- SEWA USA

The interviews confirmed general views in support of:

- maintaining and enhancing the natural setting,
- protecting and improving habitats,
- acknowledging the significance of the park as a regional and even national draw for birders,
- telling the story of local history including many historic structures that surround the site,
- providing educational opportunities onsite,
- encouraging healthy living opportunities,
- identifying possibilities for community involvement,
- desiring to maintain some vestige of the agrarian landscape,

- providing connectivity with additional interior walking trails, safe accessible connections to surrounding neighborhoods and trails.
- preventing downstream flooding,
- providing additional parking for existing multiuse fields and future improvements, and
- needing basic support facilities such as shade structures and restrooms.

The interviews with local athletic leagues and clubs show little demand for additional fields at Exton Park, except for a cricket field and a multi-purpose field.

Public Meetings

Two advertised public meetings were held. The first was held on May 19th, 2016 and attended by over 100 individuals, nearly 50% of whom resided in West Whiteland Township. The meeting was conducted as an open house meeting with multiple stations to gain public input and build a consensus on a vision for the park and community needs. At that meeting, individuals responded to questions posed at five stations by placing stickers onto poster-boards that corresponded with their preferred choice.* These five stations represented the following aspects of Exton Park and its development:

- An individual's "favorite memory or experience" at Exton Park
- Environment and ecology
- Educational opportunities
- Connections to and within Exton Park
- Sustainable development practices
- Potential improvements

A second public meeting was held on September 22, 2016, during which the design process, overall draft master plan and cost estimates were presented to the audience. Attendees were asked to provide feedback on which development opportunities within Exton Park should be prioritized by placing dots on poster-boards.

**See Appendix E for graphic voting results*

C. SITE INFORMATION AND ANALYSIS

1. Introduction

Physical Resources

Acreage

The site that comprises the Township-owned portion of Exton Park totals 279 acres. Ship Road forms the exterior boundary to the west, Chester County parkland and Old Valley Road to the north, Church Farm Lane to the east and the Chester Valley Trail to the south. Swedesford Road bisects the combined property into northern and southern portions. While most of the County's land lies to the north, the Township's parkland is divided with approximately 110 acres north of Swedesford Road and 169 acres south of Swedesford Road.

Deed Restrictions and Easements

Various underground pipeline easements cross the Exton Park site: Eastern, Mobil, Transco and Sunoco. Two of these easements are parallel to Old Valley Road while another travels from the northern ridge to the southeast corner. While the east-west easements minimally impact the visual landscape, the north-south easement has resulted in a large gap in a wooded portion of the site. In addition, a 40' pipeline easement exists parallel to and north of Swedesford Road and a sewer easement exists in the northwest corner, traveling along Ship Road.

Surrounding Land Uses

The Exton Park site is bordered on the north by Chester County's Exton Park lands and several single-family detached houses. Valley Creek Corporate Center sits to the east on the opposite side of Church Farm Lane while the Church Farm School sits adjacent to the southeast corner of the site. Along the southern border, the Chester Valley Trail and Trailhead buffer the park from commercial/mixed use along Business 30. To the west, on the opposite side of Ship Road, lies a low-density, suburban-style housing development.

Site Access

The park is accessed by car via Swedesford Road or Church Farm Lane. The Swedesford Road Trailhead provides parking and access to the existing grass and boardwalk trail. The Church Farm Lane access is a driveway, which connects to the County-owned trailhead portion of Exton Park. This access provides parking as well as restrooms, a playground, sand volleyball courts and access to the Chester Valley Trail. Three grass paths connect the Exton Park Trail system to the Chester Valley Trail and Trailhead. Within Exton Park, a grass and boardwalk system of trails follows the stream corridor, circles the

pond and circumnavigates the leased agriculture fields on the section of the park south of Swedesford Road.

Zoning

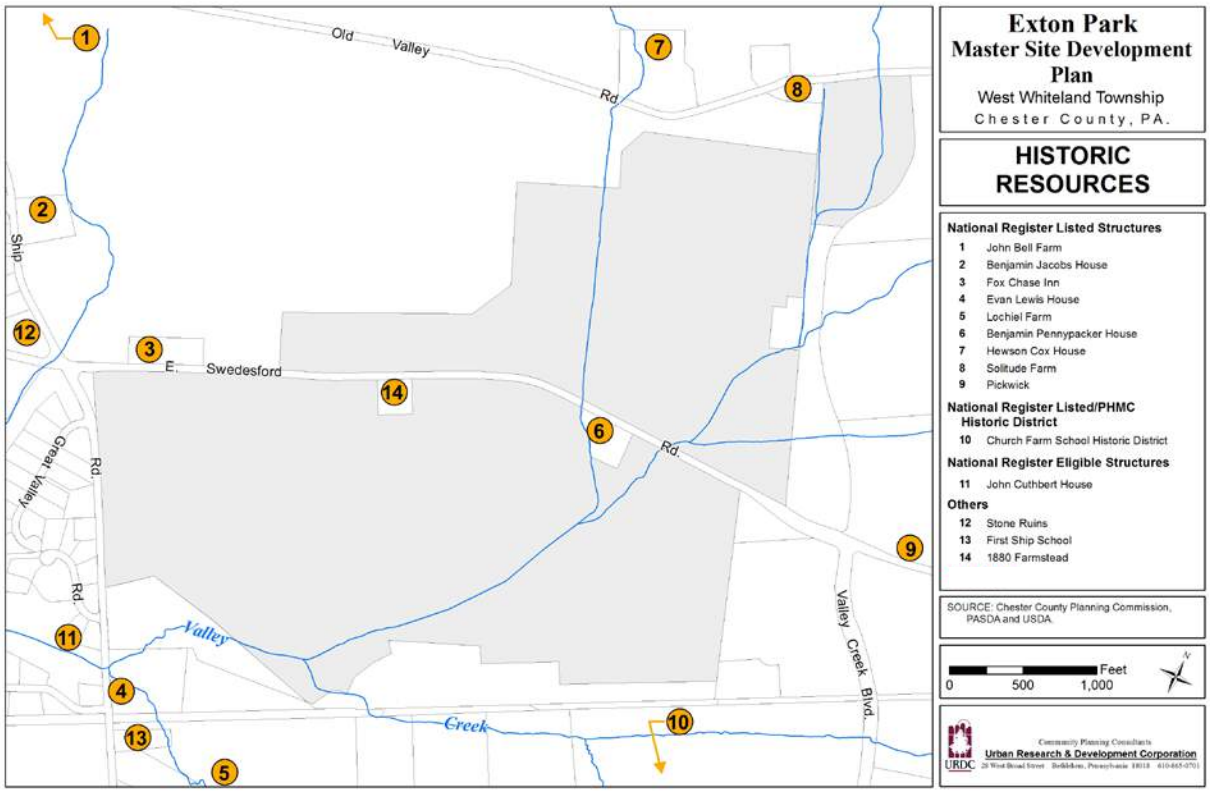
The Exton Park site is zoned R-1 residential and is part of the Unified Overlay District. This district includes Township and County Exton Park sites as well as housing developments to the west and north of the park. Valley Creek Corporate Center is located to the east. The purpose of the Unified Overlay District is to provide flexibility for a planned development that protects the historic and environmental features of the land.

Cultural Resources

There are fourteen historically significant sites within or immediately surrounding the Exton Park site, including nine National Register Listed structures, a National Register eligible structure, a Pennsylvania Historical and Museum Commission (PHMC) Historic District and others. They are listed on the Historic Resources Map and include:

- John Bell Farmhouse
- Benjamin Jacobs House
- Fox Chase Inn
- Evan Lewis House
- Lochiel Farm
- Benjamin Pennypacker House
- Hewson Cox House
- Solitude Farm
- Pickwick
- Church Farm School Historic District
- John Cuthbert House
- Stone Ruins
- First Ship School
- 1880 Farmstead

Three of these properties located along Swedesford Road are adjacent to the Township's parkland, two of which are National Register Listed Structures. The Benjamin Pennypacker House fronts Swedesford Road and is adjacent to the Swedesford Road Trailhead, which provides parking and trail access to Exton Park. The two-and-one-half-story Federal-style home dates back to the 1840's and features stuccoed stone. As one of the initial properties purchased upon the founding of the Church Farm School in 1918, the Pennypacker House served as a residence for the school's farm managers. The Fox Chase Inn fronts Swedesford Road near the intersection of Swedesford and Ship Roads. Originally built in 1765, the structure served as a tavern and inn until 1800 and was placed in the National Register of Historic Places in 1984. The proximity of these historic resources creates the opportunity to provide for interpretive education within and adjacent to the park.



Natural Resources

Floodplains

The 100-year floodplain is located around the water features of the site, which includes the 4-acre pond in the southeast portion of the site, the Valley Creek and constructed wetlands to the southwest of the pond, and an unnamed stream and its intermittent tributaries. One of these tributaries begins on Old Valley Road and flows south into the pond while the other begins on the western portion of the site flowing south parallel to Ship Road.

Species of Special Concern

In preparation of the Atlas of Breeding Birds in Pennsylvania (1992), it was discovered that 79 species of breeding birds were on the site, representing 32 families, including four (4) species of vireos, five (5) species of flycatchers, and nine (9) species of warblers.

The Pennsylvania Natural Diversity Index (PNDI) review receipt noted that PaDCNR found there may be a potential impact to two flora species and that further review is required. These two species are Lyonia mariana (commonly known as Stagger-bush) and Quercus falcate (commonly known as Southern Red Oak).

Topography & Soils

The topography of the site generally ranges from nearly flat to gently sloping. A few small areas of steeper slopes are located around the pond edges, stream banks, Swedesford Road embankments, west of the pipe line just north of Swedesford Road, and the far northeast corner of the site near Solitude Farm.

The Exton Park site is located within the piedmont lowlands, identifiable by its narrow valley with ridges on either side. The valley's geology is comprised of layers of limestones and dolomites, its ridges comprised of various metamorphic rocks including quartzite, schist and gneiss.

The following soils are found on the site:

SOIL TYPES FOUND ONSITE	
Symbol	**Name**
CtA	Conestoga Silt Loam; 0-3% slopes
CtB	Conestoga Silt Loam; 3-8% slopes
CtC	Conestoga Silt Loam; 8-15% slopes
EdB	Edgemont Channery Loam; 3-8% slopes
GIB	Glenville Silt Loam; 3-8% slopes
Ho	Holly Silt Loam
Ln	Lindside Silt Loam
PdA	Penlaw Silt Loam; 0-3% slopes
Th	Thorndale Silt Loam

Vegetation

Currently, non-native plants, many of which are invasive and whose presence discourages the presence of native plants and animals in the landscape, dominate the site. Non-native annual plants grown for human benefits also are part of the landscape, primarily corn, soybeans and hay in the form of reed canary grass. Although degraded and simplified, many habitat types on site still possess the structure and hydrology needed to support diverse native plant assemblages.

The northernmost portion of the property is within the North Valley Hill Natural Heritage Area. The soils here are shallower and exhibit sand-like characteristics due to the abundance of quartz. Here, two Pennsylvania-endangered plant species occur – the Southern Red Oak (Quercus falcata) and Staggerbush (Lyonia mariana). A large portion of this site as recognized by the state has been cleared and converted to agricultural land.

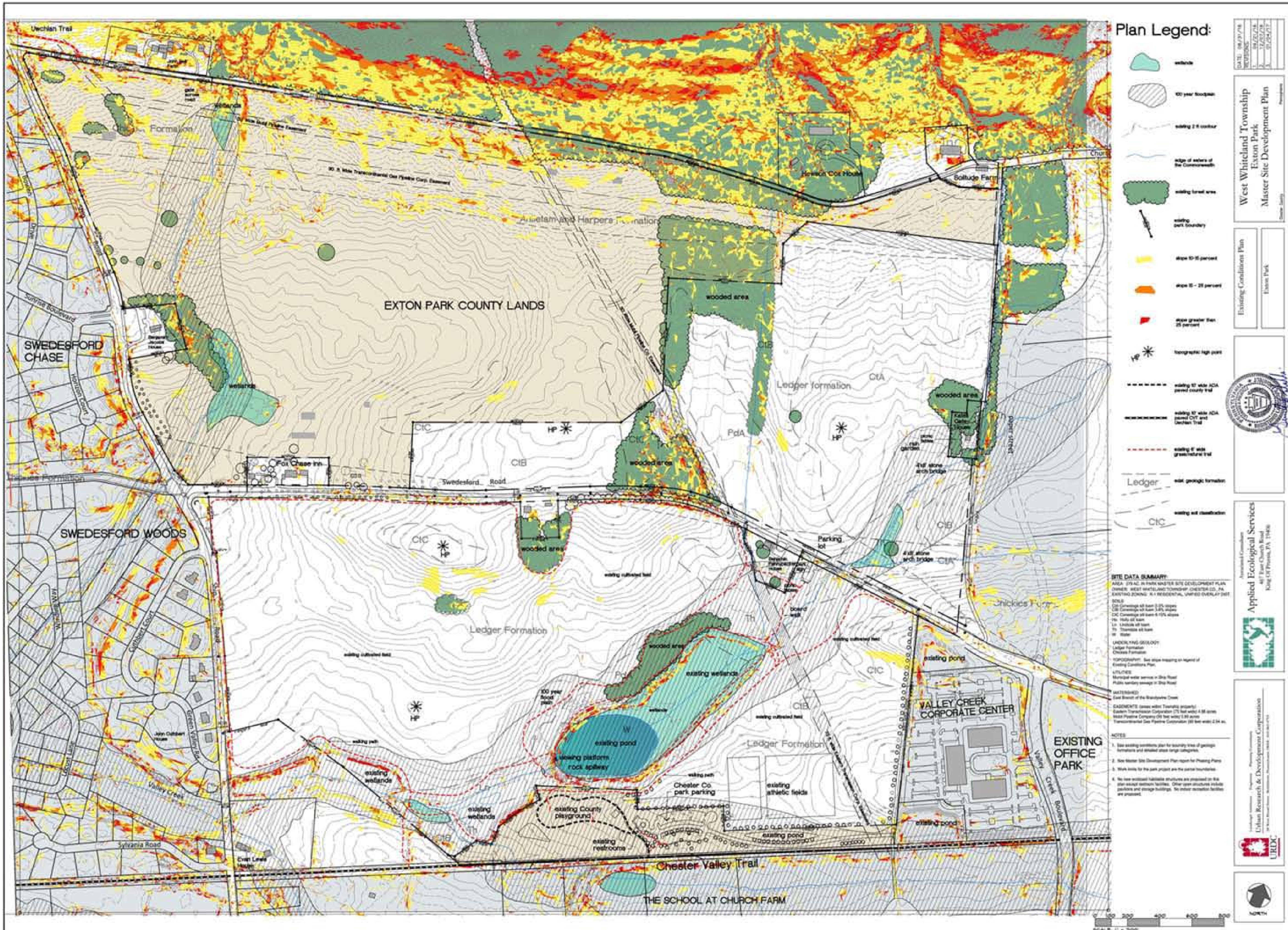
Wetlands

A 4-acre pond is located south of Swedesford Road. The pond is ringed by trees and shrubs of the genus Salix (willows), and exotic invasive shrubs and trees. It also has several small emergent wetland areas around its perimeter.

A constructed wetland area is located southwest of the 4-acre pond. Other wet areas exist naturally throughout the site in the woodlands, transitional vegetation areas, and along stream channels. There are several springs on the site that maintain areas of wet soils.

An unnamed stream begins east of the maintenance building on Old Valley Road and flows south to feed the pond. A thousand-foot section of the stream is channelized into a small ditch as it approaches Church Farm Lane. After flowing under the road, the stream flows to the pond along a fairly narrow and eroded channel through cultivated farm fields. Saplings have been planted recently on this section of stream. The stream then flows through a culvert beneath Swedesford Road. A narrow band of saplings and riparian vegetation has been planted on either side of the stream adjacent to the parking area. These modest new plantings are beginning to form a riparian buffer. The opportunity exists to improve the quality of this water resource by increasing the width of the riparian buffer.

There is a diverse cross section of hydrologic features on the Exton Park site. These wet areas represent some of the site's most sensitive resources. Impacts to these resources should be limited as part of any proposed improvements. While fragile, these areas also represent diverse ecosystems that are valuable for environmental education purposes. Managed properly these resources would provide an abundance of plant and animal life.



Plan Legend:
wetlands
100 year floodplain
existing 2 ft contour
existing forest area
existing park boundary
slope 10-15 percent
slope 15 - 25 percent
slope greater than 25 percent
topographic high point
EXTON PARK COUNTY LANDS
SWEDESFORD CHASE
SWEDESFORD WOODS
Fox Chase Inn
Swedesford Road
Ledger Formation
Antietam and Harpers Formation
wooded area
existing wetlands
existing pond
viewing platform
rock spillway
Chester Co park parking
existing athletic fields
existing County playground
existing restrooms
Chester Valley Trail
THE SCHOOL AT CHURCH FARM
VALLEY CREEK CORPORATE CENTER
EXISTING OFFICE PARK
Parking lot
existing cultivated field
walking path
Solitude Farm
Uwchlan Trail
SITE DATA SUMMARY:
West Whiteland Township
Exton Park
Master Site Development Plan
Existing Conditions Plan
Applied Ecological Services
URDC
NORTH

2. Analysis and Description

a. Advantages of the Site

The site is well suited to a community or regional park for the following reasons:

- The size of the Exton Park site (279 acres) allows for a multitude of development options.
- The site represents the largest piece of preserved parkland in West Whiteland Township. As such, there is great potential to create a place of regional importance with a wide draw of users.
- The Exton site is connected to the Chester Valley Trail (CVT), a regional trail connecting Exton to King of Prussia. The CVT allows for pedestrian access to Exton Park from a wide range of communities and linkage to other natural areas including Battle of the Clouds Park in East Whiteland Township.
- The number and proximity of historic resources creates the opportunity to provide for interpretive cultural education within and adjacent to the park.
- The variety of flora and fauna, especially avian species, provides the opportunity to increase environmental education on the site.
- The availability of land and site hydrology are suited for multiple detention, retention and infiltration systems that would reduce runoff and help alleviate downstream flooding.
- The park is accessible by car via Swedesford Road and Church Farm Lane, and by foot and bicycle via the CVT and the improved crosswalks at the Swedesford Road and Ship Road intersection.

b. Disadvantages of the Site

The following aspects of the site pose challenges to its success:

- Sight distances limit available access points along Swedesford Road.
- The importance of the wetlands as a natural resource limits the amount of available recreational development in that area.
- Swedesford Road divides the site. Pedestrians crossing should be directed to the existing crosswalks at the intersection of Ship Road and Swedesford Road.

c. Environmental Concerns

- The site has invasive, non-native plants that discourage the presence of native plants and impact animals in the landscape. An invasive species management plan is critical to manage the species at the site.
- Existing riparian buffers along wetland resources within the site are limited. Although these wetland resources exhibit exceptional structural and hydrological characteristics, they suffer from siltation and nutrient enrichment. Improvements to the riparian buffers would improve water quality and help to create a functioning ecosystem where the site's mosaic of wetland habitats can support birds, amphibians, reptiles and insects of regional and statewide concern.
- Little of the original forest cover exists in the park. Much of the original forest was cleared long ago for agriculture use. These factors have changed the extent and species composition of the forest. Species composition has shifted toward more invasive and exotic species. These exotics tend to crowd out the native species and reduce the overall biological diversity of the flora. In turn, this reduction in the diversity of the flora also leads to a reduced fauna.

d. High Quality Habitat

The 4-acre pond located in the southeastern portion of the site serves as a habitat for a large variety of birds. Within the birding community, it has been reported that over 200 species of birds have been sighted at Exton Park. During research for the creation of the Atlas of Breeding Birds in Pennsylvania (1992), 79 species of breeding birds were found on the site, representing 32 families or subfamilies. Breeding birds included four species of vireos, five species of flycatchers and nine species of warblers.

e. Zoning

Exton Park and the lands to the west and north of Exton Park are within the R-1 district with a 'Unified Overlay' designation. To the east lies the Office /Laboratory District with a 'Unified Overlay' designation. On the south side of the CVT lies the Office/Residential District with only a portion having the 'Unified Overlay' designation.

Most of the surrounding land is already developed and the parkland is permanently preserved for recreation and open space. Within the R-1 district, only two fairly small parcels to the north near Solitude Farm along Old Valley Road have the potential for further development, but current ownership makes that unlikely in the near future. To the east, the Office/Laboratory is either developed or already planned for office development. To the south a portion of the Office/Residential is undeveloped.

Also, clustering and lot averaging is a 'Use By Right' under Section 325-26 of the West Whiteland Township Zoning Code. Utilizing these zoning tools would be a useful way to designate open space that could be the conduit for paths that interconnect with the Park. The Township should make sure the cluster option is attractive to developers and functions to result in an appropriate border with the Park.

On the parklands, the zoning allows "publicly-owned recreational facilities," with standards in Section 325-22. Those provisions allow a wide range of non-profit and recreation facilities. There is a 15 percent maximum impervious coverage, which can be calculated across contiguous lots. There is also a 100 feet wide setback requirement for buildings, structures, trails or "unnecessary accessways" from all lot lines, except other public recreation lots. The term "structure" may include recreation facilities, support facilities, and fences. Non-profit recreation facilities that are not publicly owned are allowed under similar standards.

f. Pennsylvania Natural Diversity Inventory (PNDI)

The Pennsylvania Natural Diversity Inventory (PNDI) Project review search resulted in a "Potential Impact" find by the Pennsylvania Department of Conservation and Natural Resources (PaDCNR). The agency noted two endangered species may be found on the site. The two species are:

- Lyonia mariana (commonly known as "Stagger-bush"), and
- Quercus falcata (commonly known as "Southern Red Oak")

Both flora species are typically found on steeply sloped areas such as those found to the north in the County-owned parkland. These species are rare in southeastern Pennsylvania because they are at the northern limits of their range. Further agency review w be required prior to development.

The Pennsylvania Game Commission, Pennsylvania Fish and Boat Commission and U.S. Fish and Wildlife Service found "No Known Impacts" and no further review is required by those three agencies.

*See Appendix F for Pennsylvania Natural Diversity Inventory

D. ACTIVITIES AND FACILITIES ANALYSIS

1. Community Needs and Priorities

The Exton Park site is the largest area of preserved open space in municipal ownership and available for public use in West Whiteland Township. Exton Park provides 279 acres of recreation opportunities for Township residents. Exton Park is surrounded by historic homes and is well known as a migratory bird watching location. These unique factors present the Township with a unique opportunity to preserve and showcase ecological and historic assets.

Needs of the Township were defined prior to consultant selection. These included:

- Enhance Exton's quality of place and strengthen community identity,
- Compliment the Chester County owned part of Exton Park including the Chester Valley Trail,
- Respect the history of the land, including 20 years as an undeveloped public park,
- Minimize environmental impact of proposed development and maximize the environmental impact of open space,
- Development plans can be realized with existing or reasonably anticipated funding
- Improvements can be maintained sustainably and cost effectively, and
- The result would be a park the community treasures.

The Township Supervisors provided the Study Committee with a list of approved Guiding Principles, which were to be followed by the Study Committee. These principles stated:

- Development and placement of the active recreation facilities in the park must factor in the unique natural setting of the land. To the extent possible, active recreation facilities should fit "naturally" into the park setting. In other words, do not just "jam" facilities into the park.
- The Master Plan must be fiscally feasible. The Board of Supervisors may want to consider setting budgetary guidelines for the park's development.
- The Committee should study available funding sources for development of the park's facilities. In addition, the Committee should seek public input and opinion whether the residents of West Whiteland Township support increasing property taxes or issuing a bond to pay for the construction and ongoing maintenance of the park's facilities.
- The Committee should consider the operation and maintenance impact, in both time and money, to the Township that would result from the proposed development of the park.
- The Committee should study whether it is appropriate to allow private sports leagues to fund and maintain dedicated facilities in exchange for primary or exclusive rights.

- The Committee should look for a way to incorporate agricultural activities into the scheme of active recreational facilities and activities.
- The Park should include a community gathering area, such as a square, etc., where the Township and the public can hold public activities.
- The Master Plan must take into account the traffic impact of proposed active recreation on the road network surrounding the Park.

Community input was gathered through the Key Person Interviews, Focus Groups, Public Meetings and a community online survey, which received over 700 responses. The following needs predominated the meetings and discussions.

Preservation of Place

- Preserve the pond and the environment that surrounds it, including the natural grass trails.
- Use the park and proposed walking pathways to showcase the historic resources located adjacent to the park.
- Preserve the agrarian character of the land as long as farming is feasible.
- Preserve the feeling of an open space oasis amidst the development of a suburban center.

Environmental Concerns

- Preserve and enhance the watershed, wetlands and riparian buffers.
- Maintain, improve and/or expand the parks native habitat to attract migratory bird species and other wildlife.
- Reduce stormwater runoff, erosion and downstream flooding by planning for the infiltration of stormwater on the site and improvements that minimize impervious surfaces.
- Use the existing topography to dictate the best placement for proposed facilities.
- Enhance the parks character and environment with native landscaping.

Recreation Needs

- Use a small amount of land for active recreation if there is demonstrated need.
- Maintain the multi-use athletic fields at Exton Park as they are now.
- Provide multiple types of pathways and trails throughout the park such as paved, accessible, and also natural grass pathways, similar to those, which presently exist.
- Plan for connections to nearby neighborhoods, the County-owned portions of the park, to the Chester Valley Trail and ultimately to the Uwchlan Trail.
- Provide safe access into the park for pedestrians and cyclists.
- Provide a community gathering place.
- Provide accessible picnic pavilions.
- Create playgrounds that fit in with the natural setting.
- Provide a variety of recreational opportunities for all ages.
- Include a dog park.
- Ensure recreation opportunities for all seasons.

Recreation Support Facilities

- Install signs to provide environmental education, to highlight historical resources, to describe past farming methods and lifestyles, and to explain site geology.
- Provide accessible water fountains and comfort facilities.
- Include additional parking for normal use and overflow parking for special events.
- Provide park entrance signs, wayfinding signs and rules and regulation signs.

2. Uses and Facilities

The West Whiteland Township community strongly supports preservation and protection of the park's environmental assets above the development of active recreational facilities, which require disturbance to the land. The public desires to limit development of the land north of Swedesford Road. The main factors that influenced this decision included:

- Pedestrian safety challenges crossing Swedesford Road,
- High development costs related to improving access along Church Farm Lane, including widening existing road and bridges,
- Costs of constructing additional amenities such as parking, comfort facilities and utilities to service a separate location where they could not be easily shared, and
- The desire to preserve views from this area.

a. Active Facilities

MULTI-PURPOSE ATHLETIC FIELDS

Three existing multi-purpose fields on the site are available for public rental. The fields were recently installed and available for public use in 2015 in response to community needs. One large field is 200' x 380' in size, with the remaining two fields in an area that is 410' x 410'. These last two fields can be rented as one large field, or independently. The fields are used primarily by youth soccer clubs for practices and games. Recently there has been interest in use of the fields from other youth sports organizations. These fields are graded to a 1-2% slope and have a north-south orientation. All three fields would remain in their current configuration.

Parking is currently available in the County parking lot and in a flat grassy area accessed from Church Farm Lane. There are no bleachers or support facilities for these fields.

Two additional multi-purpose fields are proposed for 5.71 acres of the site. The two 330' x 180' fields are proposed in response to public desire for an open lawn area that may be used for unscheduled pick-up games, league use or other activities. This field area is designed so it may be shared by soccer, cricket or other sports leagues. During the planning process, cricket leagues expressed a desire for space in Exton Park. The cricket

leagues do not require exclusive use of the fields or any additional support facilities. A cricket pitch area would be installed as part of these proposed multi-purpose fields. The location would be in the northwest quadrant of the park and accessible from the proposed Swedesford Road parking lot. The fields have a north-south orientation and would require minimal grading to achieve a 1-2% finished grade. The existing grades would allow for a grassed sloped seating area to be formed around half of the field area. Paved access pathways six feet in width would connect the parking lot to the multi-purpose fields.

DESTINATION PLAYGROUND

This proposed playground would encompass roughly 3.5 aces and would be located a short walk from the proposed primary parking lot on Swedesford Road. There would be separate play areas for ages 2-5 and for ages 5-12. The entire area would have a natural theme to reflect the overall feeling of the park. The area for ages 5-12 proposes play installations that include a zip line, a high ropes bridge with climbing towers and a tree house. Fencing would be installed partially surrounding the 2-5 year play area to segregate it from the parking lot. Paved pathways, six feet in width would surround each play area and provide access that meets ADA criteria. Pavilions, benches and native plantings would be installed as amenities. Slides and zip lines would have a north-south orientation.

SLEDDING HILL

The natural terrain just south of the proposed playground lends itself to use as a sledding hill, providing a wintertime recreational opportunity. The hill would be close to 400' in length, about 100' wide, and is sloped between 5 and 15 %. The land, which is currently leased for farming, should be fine graded and seeded. Rolling down the grassy slopes in the summer time may be an added attraction for children of all ages. The hill would be located between the proposed dog park and the playground.

SMALL PLAYGROUND

A small natural themed playground is proposed for a one-half acre area of land north of the existing multi-purpose fields. This playground may benefit parents who bring other children to play soccer. The playground would be designed for children aged 2 -12 years. It would be accessible from the proposed Church Farm Lane parking lot by way of a paved six-foot wide accessible pathway.

DOG PARK

The proposed dog park would be approximately two acres in size. The area would be fenced and would provide separate areas for large and small dogs. Amenities should include a pavilion, benches and shade trees. Agility equipment should be provided to supplement the available canine activities. The selected area is large enough in size that the fencing can be moved, should the existing lawn grasses need relief. A paved six-foot wide pathway would connect the dog park with the Swedesford Road parking lot.

DISC GOLF COURSE

A nine-hole disc golf course is proposed for the area south and east of the playground, dog park, sledding hill and new multi-purpose fields. The course would weave through trees and along the edge of the area that is to initially remain farmland. The course launch pads and holes would be installed on existing grades, with distances between 100 and 300 feet between holes. The course would be for all ages and abilities with no competition events planned. If community interest is high and the course is well used, the number of holes can be increased to 18 holes for a complete course.

EVENT GREEN

A large one-acre grassy gathering area is proposed for the southeast corner of the site, just north of the existing multi-purpose fields. This area is proposed to provide a place to view events such as the Township's fireworks display, which has recently moved from Miller Park to the Exton Park site. The event drew upwards of 4000 visitors in 2016. The event green would be designed to take advantage of the existing slopes at the site to provide a natural grassed amphitheater like setting. The lawn seating is

anticipated to support 1700 visitors. The event green would be accessible from the proposed Church Farm Lane parking lot by way of a six foot paved pathway. Residents would also be able to view the fireworks from most areas in the Park.

b. Passive Recreational Facilities

Township residents are strongly in favor of providing more places to walk, linking neighborhoods to the park and connecting to the region's trail network.

GRASS TRAILS

Existing grass pathways at Exton Park receive frequent use. These pathways range from four to eight feet wide and form loops through the vegetation around the pond and migratory bird area leading out to a parallel course following Ship and Swedesford Roads. These trails are mowed grass where there is less vegetation and more sunlight. Some trails are bare earth where the vegetation is denser and less sunlight hits the ground. Access to the trails is from a gravel parking lot on Swedesford Road. The Exton Park birding group uses this parking lot as their meeting place. The trails are to remain in their current locations. Vegetation maintenance is recommended to keep the trails open and to reduce the potential for tick contact. The existing brushy vegetation should be trimmed to a minimum of four feet from the trail edges and to a height above the paths of fourteen feet. The grass pathways do not meet current ADA criteria for a smooth stable and slip resistant surface.

Only one grass trail is proposed which would connect the natural area around the pond to the paved pathway proposed along Church Farm Lane and to the Church Farm Lane parking lot. This grass path would be installed on the existing grades and maintained as six feet wide. The proposed grass path would not meet ADA criteria, however, a paved pathway is proposed for Exton Park that would lead to the pond and wetland area for handicapped access.

BOARDWALKS AND WETLAND VIEWING PLATFORM

An existing boardwalk leads visitors from the gravel parking lot on Swedesford Road though a wet area to the grass trails that loop around the pond. The boardwalk consists of two boards that lie adjacent and parallel to each other for a total width of four feet. The boardwalk does not meet ADA criteria.

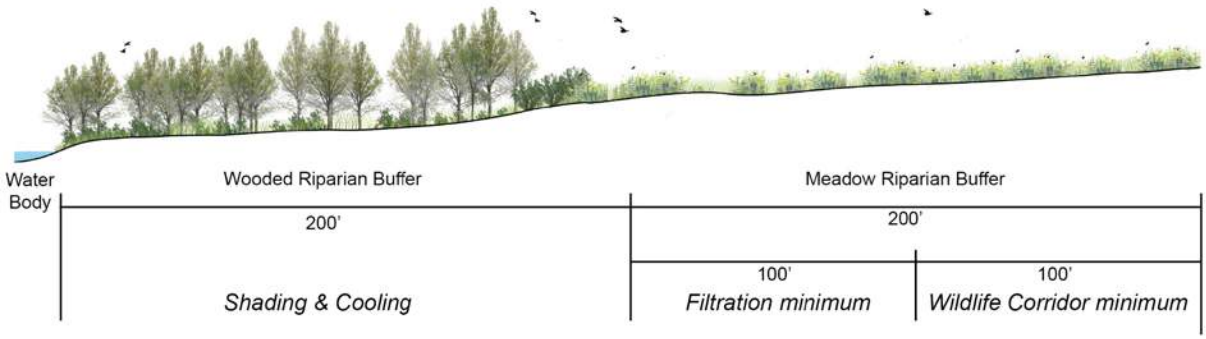
A new six-foot wide ADA compliant boardwalk would lead from an access path to a proposed observation deck overlooking the existing wetland and pond areas. Construction materials would be recycled or sustainably sourced building materials. Seating and enough room for mobility turning radii would be provided on the observation platform. Access to the boardwalk would be via paved access pathways that connect to the proposed Church Farm Lane parking lot. This would provide ADA compliant access for people with disabilities to the wetlands to participate in bird and wildlife observation.

CONNECTOR TRAIL

This proposed ten-foot wide paved-ADA accessible multi-use trail would lead visitors from the intersection of Swedesford and Ship Roads through the northwest quadrant of Exton Park connecting to the paved pathways surrounding the playground in the County owned portion of the park. The County pathways can be followed to connect to the Chester Valley Trail (CVT), a popular walking and cycling venue. Smaller pathways would connect this trail with the proposed destination playground, the dog park and the multi-purpose athletic fields. This connecting trail would cross the stream and wetlands west of the pond, requiring a bridge. The bridge would be 10-feet wide and would be ADA accessible. The connector trail would be approximately 0.7 miles in length.

FACILITY ACCESS PATHS

Multiple six-foot wide paved paths are proposed throughout the park to provide ADA access to all facilities for all visitors. The paths would wind around and between all existing



and proposed facilities connecting visitors to these amenities and to parking, restrooms and pavilions. The access paths would connect facilities to the connector trail. Benches would be installed along the paths for resting and for observing the activities at a park amenity. Low growing fescue grass would be planted on pathway shoulders to reduce the need for mowing. In total, the length of the proposed paved access pathways would be approximately 1.65 miles.

c. Environmental Improvements

WOODED RIPARIAN BUFFER

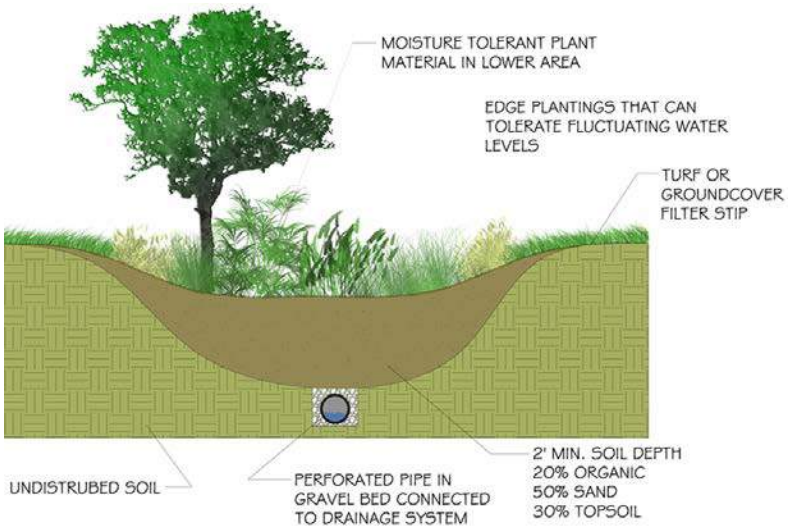
There is an existing buffer around the existing pond. The Township has been working with the PennState Extension Service and the Weed Warriors Volunteer group to remove invasive species from the buffer and install beneficial shrubs and trees. The wooded riparian buffer is proposed to be expanded to its full width of 200 feet from all waterbodies as part of this master plan. This concept was embraced as being very important to West Whiteland Township residents. The expanded riparian buffer would be installed using small trees and bare root shrubs selected to be suitable for a seasonally wet environment. The buffer would provide water quality improvements and would improve wildlife habitat. The wooded buffer would comprise about 44 acres of the site when fully planted. Interpretive signs would provide information to visitors as to the important role and function the buffer plays in improving the environment.

MEADOW RIPARIAN BUFFER

The meadow riparian buffer would be comprised of meadow grasses, perennial flowers and small shrubs, extending an additional 200 feet from the edges of the wooded riparian buffer. The buffer would be installed around existing grass trails. The meadow buffer was also of particular importance to the Township. The meadow would provide additional water quality improvements by removing toxic materials from storm water runoff and would provide additional habitat for wildlife. When fully planted the meadow riparian buffer would be comprised of approximately 55 acres of land. Interpretive signs would explain the benefits and establishment process of the riparian meadow buffer.

RAIN GARDENS

Rain gardens are proposed to infiltrate storm water created when paved surfaces are installed so that no untreated stormwater would enter into the water bodies located throughout Exton Park. The rain gardens would be built to infiltrate the quantity of water being cleansed. They would include a layer of organic soil or compost and rain garden plants and shrubs. Educational signs would be installed at the rain gardens to describe their importance and how they mitigate the negative effects of storm water run-off and flooding. Rain gardens can add an aesthetic element to the park and can provide food and shelter for wildlife.



FARMLAND TO MEADOW

Currently portions of Exton Park are leased to a farmer and are in agricultural use. As development of the Park proceeds or as interest in farming ceases, the areas farmed may be converted to meadow areas. This would reduce Township maintenance, add to the water quality improvement impact of the riparian buffers and provide additional wildlife habitat benefits. The area of farmland that would be converted to meadow is approximately 65 acres in total.

LANDSCAPING

The existing landscape would be enhanced as development of facilities proceeds. Trees and shrubs would be installed along pathways and trails and surrounding facilities. They would provide shade and beauty for visitors, and food and shelter for wildlife. Native species and disease free varieties would be selected when possible to increase the likelihood of survival and to provide the maximum environmental benefit. Lawn grasses would be used for athletic fields, but low maintenance mixes would be selected. Low growing grasses would be used on trail and pathway shoulders as well as on the proposed natural grass trail.

d. Support Facilities

PARKING

Visitors currently use either the County parking lot accessed from Church Farm Lane or the Township's small gravel lot on Swedesford Road. The existing gravel lot holds no more than 20 vehicles and is filled to capacity when the bird watching group has a meeting scheduled.

Two new parking areas are proposed for the park to supplement the existing lots. This would be necessary to accommodate visitors drawn to the new facilities at Swedesford Road and Church Farm Lane.

Swedesford Road Parking Area

A new paved parking lot would be located off of Swedesford Road near the intersection with Ship Road. The lot would accommodate 252 vehicles, including seven ADA compliant spaces and a space designated as handicapped van accessible. The lot would be paved with bituminous pavement, interrupted with planting islands designed to collect and infiltrate stormwater runoff. The islands would be planted with native trees and grasses to minimize maintenance and to provide shade, which reduces heat island effect in the warm months.

In addition to the paved parking, overflow parking for 120 additional vehicles is proposed for both ends of the new Swedesford Road lot. The soil in the overflow lots would be reinforced turf with netting or a cellular system on the ground to allow grasses to grow and thrive when they are driven and parked on for short periods of time.

Church Farm Lane Parking Area

Another paved parking lot is proposed to be located along Church Farm Lane adjacent to the existing mulit-purpose fields. This parking lot would be located for access to the event green, the natural playground, a small viewing platform, an educational pavilion center, and the existing multi-purpose fields. This parking lot would be paved and sized to accommodate 180 vehicles, with 4 dedicated handicap spaces and one van

accessible space. This secondary lot would use depressed planting islands to infiltrate storm water. The islands would be planted with trees and native groundcovers.

ACCESS ROAD

A twenty-four foot wide driveway would be required to access the new parking lot from Swedesford Road. This entrance would be approximately 265 feet in length. The proposed entrance would be directly across from the County's future entrance to their parkland north of Swedesford Road.

LIGHTING

Security lighting may be installed at the parking lots on Swedesford Road and on Church Farm Lane. LED and solar lighting should be considered as away to reduce energy consumption and utilize renewable energy.

PICNIC AREA

An existing picnic area with wooden tables and a fence has been installed across from Valley Creek Corporate Center in the park. This picnic area would not be retained in the final development plan for Exton Park.

PAVILIONS WITH PICNIC TABLES

Four pavilions with picnic tables would be placed at various locations throughout the park. Two would be located near the Swedesford Road parking lot and adjacent to the destination playground. Two pavilions would be located west of the Church Farm Lane parking lot. Pavilions would be constructed of maintenance free materials and would feature easy-clean concrete floors.

The Township would provide tables. One table located at each pavilion would be ADA accessible, including ADA compliant space for maneuverability. Each picnic area would be accessible via ADA compliant paths.

RESTROOMS

Two restrooms would be located within the park. One restroom building would be located between at the Swedesford Road Parking lot and another near the existing multi-purpose fields. The facilities would be ADA accessible and constructed of vandal-resistant, recycled and/or sustainably sourced low-maintenance building materials. The restrooms would feature drinking fountains on outside walls. ADA accessible pathways would lead to the restrooms from the parking lots and other nearby facilities.

UTILITIES

Sewer and water lines would be laid to provide service to the proposed restroom buildings. Existing water and sewer mains are located on Ship Road and within the CVT corridor. The locations and elevations of Restrooms allow for gravity fed sewer

connections to the closest sewer mains. Approximately 1100-linear feet of both water and sewer lines would need to be installed to connect the proposed restroom at the Swedesford Road parking area. Approximately 245-linear feet of water line and 255-linear feet of sewer line would be need to be installed to connect the proposed restroom near the multi-purpose fields along Church Farm Lane.

SMALL VIEWING PLATFORM

This facility is proposed to be located north of the proposed Church Farm Lane parking lot on a grade higher than the proposed event green. This viewing platform is an alternative place for fireworks and other community event observation or just a place to look for wildlife. This platform would be accessible from the Church Farm Lane parking lot by way of a paved accessible pathway. The materials used in construction of the facility would be maintenance free and sourced from recycled materials. The platform would be covered and would provide room for mobility devices to maneuver.

BENCHES AND TRASH RECEPTACLES

Benches and trash receptacles are proposed at key locations in the park. The benches would be four to six-feet-long and would meet ADA criteria. The trash receptacles would co-ordinate with the benches in materials and design and should be vandal resistant, easy to maintain and service. Benches would be located on bench pads so they are accessible and provide legroom for persons sitting to not interfere with pathway or trail traffic. Trash receptacles would be placed close to areas of high visitor turnover and in places where visitors are known to want to be able to dispose of trash.

FLAGPOLE

A flagpole would be included at an appropriate location in the park as determined by West Whiteland Township.

SIGNS

Signs would be located throughout Exton Park at multiple locations to serve multiple purposes. Signs would be manufactured from materials that are sun and vandal resistant.

- Interpretive signs would be installed to help educate park users about local history and historic sites, the natural environment, local flora and fauna and other items of interest. They would be located at strategic locations along trails through the site.
- Park entrance signs are proposed for the parking entrances and at the intersections of Swedesford and Ship Roads as well as the intersection of Swedesford Road and Church Farm Lane. These signs can be simple or detailed, standard-sized or custom-sized.
- Directional and wayfinding signs are proposed to guide visitors to and through the park site. Within the park, they help visitors to locate facilities and event areas.

- Rules signs would be posted throughout the park wherever the need presents itself. General rules such as opening and closing times, or prohibited uses. Rules also apply to pavilion renters, dog walkers, cyclists and playground visitors.
- Funding recognition signs would be needed to recognize multiple sources of funding as the park is developed.

E. DESIGN CONSIDERATIONS

1. Limitations

South of Swedesford Road, the existing stream, pond and wetlands bisect the lower park from northeast to southwest, dividing the land available for facility development. This water system must be crossed to get from one side of the park to the other. North of Swedesford Road, the park is also divide by the same stream and intermittent stream channels into even smaller areas.

This reduction in buildable acres of land might pose some serious limitations if West Whiteland Township needed more athletic fields, courts or built facilities. The needs identified by this study have shown however, that the Township wants to provide a predominately passive recreation experience at Exton Park. That intention makes the natural features on the site an asset instead of a limitation. The Township wants to expand the stream and pond corridor through the site to improve the habitat and environment for wildlife and residents who have come to know this park as a great venue to observe wildlife. The only limitation then is in providing access through the stream, pond and wetland corridor to access both halves of the park.

A second limitation at Exton Park is that the land is divided by Swedesford Road. Swedesford Road is a well-traveled collector and a Township road with few crossings. There is a signalized intersection with crosswalks at Swedesford Road and Ship Road for pedestrians to cross from residential areas west of Ship Road into Exton Park. The County plans to develop the part of Exton Park that it owns to the north of Swedesford Road. The Township will put its entrance into the Township owned part of Exton Park to the south of Swedesford Road in alignment with the potential County park entrance. This will create a potential formalized crossing location for pedestrians and cyclists connecting the parklands. The Uwchlan trail will need to cross Swedesford Road to connect to the Chester Valley Trail. An intersection created by park entrances may present an opportunity to create a well-marked and safe crossing.

The park is a noted birding spot for migratory birds and for less frequently seen wetland species. The process of replacing the invasive plant species with native beneficial plant varieties should be done with consideration to promote biodiversity and maximize the benefits to all wildlife and the environment of the Park.

2. Advantages

The Exton Park site is very well suited to the passive recreation experience the Township wants to provide. The wetland corridor may serve as the backbone of a riparian buffer of woods and meadow that would encompass nearly 100 acres when completely planted to its full depth.

The portions of the site outside of the waterways that are farmed are more easily developed for active recreation and/or community uses than a wooded site would be.

The site topography allows for easy design and installation of walking pathways and facilities that meet ADA criteria.

There is a stream and intermittent streams that flow from the northern half of the site to Valley Creek, south of the pond. These connecting tributaries and streams allow for the creation of a continuous riparian buffer through the southern portion of the park from the northeast to the southwest.

There are many historical resources adjacent or nearby to Exton Park. They provide a unique cultural opportunity for interpretation of the local history. This may include a historical sign program that explains the age and use of the homestead, as well as the livelihood of early settlers to West Whiteland Township.

Environmental features onsite provide an opportunity for educational interpretation. Interpretive signs could educate the public about local habitats and species.

Exton Park has excellent vehicular accessibility from Swedesford Road and Church Farm Lane.

Exton Park is accessible to non-vehicular travelers from the Chester Valley Trail. Cyclists and pedestrians can visit Exton Park from the trail, or Exton Park visitors can access the Chester Valley Trail. Upgrades to the Ship Road and Swedesford Road intersection also provide for safe accessible pedestrian access across the intersection.

There is agreement amongst the majority of Township residents that this park should expand passive recreational opportunities, preserve and enhance the environment and limit development at the park. This community unity of vision will be a great benefit in developing the proposed improvements to the park in the future.

3. Public Health and Safety

The most applicable public health and safety issues at Exton Park concern accessibility and playground safety. All improvements, such as playground equipment and restrooms, will adhere to the Pennsylvania Uniform Construction Code.

4. Americans with Disabilities Act

The Americans with Disabilities Act (ADA) prohibits discrimination based on disability. Disability is defined as a physical or mental impairment that substantially limits a major life activity. The Department of Justice (DOJ) publishes ADA regulations. The DOJ's Titles II and III regulations addresses state and local government facilities, including additional design requirements. Title II provides that those facilities that are constructed or altered by, on behalf of, or for the use of a public entity shall be designed, constructed, or altered to be readily accessible to, and usable by, individuals with disabilities.

All facilities proposed to be developed at Exton Park shall meet the most current ADA criteria. The proposed master plan places proposed facilities in areas of the site that require minimal grading to meet ADA criteria. The following list of proposed improvements will provide accessibility to all aspects of the park for all ages and abilities.

- Accessible routes to all active and a majority of passive facilities
- Accessible routes to parking lots and pavilions
- Accessible playground facilities that are designed to include activities for children of all ages and abilities.
- Support amenities such as benches and drinking fountains that meet ADA criteria
- Parking lots will feature accessible spaces and access aisles meeting ADA criteria
- The connector trail will connect surrounding homes to the park and to the County portion of the park

5. American Society for Testing Materials and the Consumer Product Safety Commission

The U.S. Consumer Product Safety Commission (CPSC) protects the public from unreasonable risks of injury or death associated with the use of the consumer products that fall under the agency's jurisdiction. Playground equipment falls under the jurisdiction of the CPSC. The CPSC and the National Safety Council have developed the following guidelines for safety and age segregation at public playgrounds. These guidelines will be used to develop new play areas at Exton Park.

Proper safety and fall zones will be provided with surfacing that meets the most recent requirements of the CPSC and the American Society for Testing and Materials (ASTM). ASTM International is a globally recognized leader in the development and delivery of international voluntary consensus standards. Today, some 12,000 ASTM standards are used around the world to improve product quality, enhance safety, facilitate market access and trade, and build consumer confidence. Some of the materials proposed for use at Exton Park that shall meet ASTM standards would include the plastics used in

playground equipment play area surfacing, and all epoxy and/or coated metals used for fencing and site furnishings

6. Maintenance and/or Establishment of Riparian Buffers

A primary existing natural resource at Exton Park is Valley Creek, with the associated wetlands, perennial streams and unnamed tributary leading to it. Currently, there is a shallow riparian buffer surrounding this wetland corridor made up of woody and wet meadow plants.

To improve water quality and wildlife habitat, the riparian buffer will be expanded to the recommended width of 400 feet on each side of the corridor. The interior two hundred feet will be wooded riparian buffer with 200 feet beyond that of riparian meadow buffer. The enhanced riparian buffer will help prevent erosion while removing silt and contaminents from entering the pond and creek. The riparian buffer will also help cool the run off and shade the creek while helping to reduce flooding downstream.

As the buffers are expanded and installed, the Township will continue its effort to keep invasive species at bay by inspecting the riparian vegetation for the presence of invasives and eradicating them, as they are located. Surrounding pockets of natural vegetation that are not part of the buffer should be monitored as well to prevent the transfer of seeds into the buffer by wildlife.

The riparian buffer is subject to many threats including herbivory, invasion by exotic species and noxious weeds, competition for nutrients and human disturbance. Proper maintenance is important to ensure the long-term effectiveness and sustainability of a restored and/or newly installed riparian buffer. The most critical period for woody plant establishment is the time during tree canopy closure, typically the first 3 to 5 years. Maintenance and monitoring plans should be prepared for the site and specifically for the type of planting. Maintenance personnel and volunteers need to be advised of the needs of the new planting during the establishment period.

Maintenance measures that should be performed regularly:

Watering

- Plantings need deep regular watering during the first growing season, either natural watering via rainfall, or planned watering,
- Planting in the fall increases the likelihood of sufficient rain during planting establishment, and
- Plants develop stronger root systems in the fall, so even if it is a dry fall, the new plants will still need deep watering until the ground freezes.

Mulching

- Mulch retains moisture at the root zone of plants, regulates soil temperatures, provides weed suppression, and retards evaporation,
- Coarse, organic mulch is slower to decompose. This minimizes the need for repeat applications,
- Apply a 2-4 inch layer, leaving air space around trunks of trees and woody shrubs to prevent fungus growth,
- Use combination of woodchips, leaves, and twigs that have been stockpiled for a minimum of six months to a year, and
- If seed mixes are used to vegetate portions of the buffer, check with the seed manufacturer for instructions regarding mulching. Some native seeds are so small and fragile that mulching will smother them or inhibit their ability to germinate.

Weed control

Competition from noxious vegetation can retard the growth process and affect the survival rate of newly installed plants. The planting should be regularly monitored for the presence of weeds. Weed growth and germination can be controlled by selective herbicides, mowing, and/or weed mats:

- Selective Herbicides: Use of this short-term maintenance technique (2-3 years) that is generally considered to result in a quicker establishment of the buffer. This does require a person to navigate through the planting and apply herbicide to individual undesirable plants. Care must be taken when using herbicides in native seeded plantings, as the herbicide may reduce the likelihood of germination for some native species that lie dormant for two to three years. The PA Department of Agriculture regulates herbicide use. Proper care should be taken to ensure that proximity to water features is considered.
- Mowing: Mowing controls the height of an existing groundcover, whether weed or desirable plant species. Mowing increases the nutrient uptake of grass species, so by not removing weeds the competition for nutrients will persist. In woody material plantings, grasses can be planted to prevent weed growth on the ground until the tree canopy closure begins to shade out whatever is growing as a groundcover.

- Weed Mats: Weed mats are geo-textile fabrics that are installed on the ground to suppress weed growth around newly planted vegetation. Weed mats shade the ground and prevent weed seed germination at the soil level. If a mulch layer is installed over the weed mat, seeds may germinate in the mulch layer, but they are easier to remove. Weed mats, if not biodegradable, should be removed once the trees have developed a canopy that will naturally shade out weeds.

A grid format may be used to layout a large planting area. This type of layout facilitates ease of mowing yet yields an unnaturally spaced plant community. Tree trunk protection is recommended for all new trees to prevent mowing and critter damage. If a slow growing fescue is planted in the woody riparian buffer area, mowing between trees should be necessary only twice per growing season. Meadow grasses will need to be trimmed when the height of the vegetation reaches 18-24 inches. Growth rate of a meadow will depend on weather conditions and variety of grass. New meadow plantings should not be mowed, but hand trimmed to a height of eight inches. Mowing equipment should not be used on a meadow until it is well established, which typically takes a period of up to three years.

7. Protect Environmentally Sensitive Areas

This plan recognizes the importance of protecting environmentally sensitive areas including stream, wetlands, vegetation and natural areas that provide wildlife habitat and protect water quality. Protecting water at the source is the first critical step in a multiple-barrier approach. Exton Park is the site of the Valley Creek, an unnamed tributary to the Valley Creek, a pond and wetlands which are all art of the Valley Creek Watershed. Maintaining and enhancing riparian buffers in Exton Park will help protect the water quality. Park design will avoid disturbance of these sentive areas where possible.

8. Sustainable Site Design and Green Infrastructure

Sustainable Sites Initiative

The core message of the Sustainable Sites Initiative is that any landscape holds the potential to improve and to regenerate the natural benefits and services provided by ecosystems that would exist on the site were it not developed. The Initiative's Guidelines and Performance Benchmarks of 2009, focused on measuring and rewarding projects that protect, restore and regenerate ecosystems. The rating system covers all stages of site development from site selection to landscape maintenance. The 2013 Prerequisites and Credits were referenced when designing the improvements for Exton Park. The following Sustainable Landscape Design Principles were considered when preparing the Exton Park Master Plan include:

- Conserve and protect water resources,
- Protect and enhance riparian buffers and native vegetation,
- Design natural storm-water management systems to infiltrate storm-water on the site,
- Create contiguous areas of native plantings and control invasive plants throughout the park,
- Maximize the use of porous paved surfaces and minimize impervious surfaces,
- Buffer athletic turf fields with areas of low maintenance native grasses to assist in the removal of chemicals used for field maintenance,
- Implement "green" building practices in all proposed structures and renovations to existing structures,
- Utilize local volunteer groups; Master Watershed and Master Gardener program participants, high school students, Friends of Exton Park and scouting groups to implement improvements and spread public awareness, and
- Minimize earth disturbance through sensible facility location planning.

United States Green Building Council & LEED

The LEED green building rating system as developed and administered by the U.S. Green Building Council, is designed to promote design and construction practices that reduce the negative environmental impacts of buildings while improving visitor health and well-being.

The Township does not plan to install any permanent buildings at the park other than pavilions and a restroom building. Building materials will be evaluated so that where possible they will be locally sourced, low maintenance, have recycled content and will have a low VOC rating.

DCNR Green Principles

DCNR's Green Principles are a starting point and continual benchmark for planning the development of Exton Park. The Green Principles most applicable to the future development at the park are:

- Promote groundwater infiltration and manage storm-water naturally,
- Protect and enhance riparian buffers,
- Plant trees, using natives where possible,
- Manage invasive plants and landscape with native plants,
- Use regional and recycled content materials for construction,
- Provide opportunities for passive recreation and interaction with nature,
- Control and protect water resources,
- Use interpretive signs and/or programming to educate the public, and
- Use solar lighting or power when feasible

As West Whiteland Township moves from Master Plan to plan implementation, the Green Principles will remain a guiding force for what takes place at the park.

F. DESIGN PROCESS

1. Preliminary Alternative Concept Drawings

This process of defining the final site design for the park was informed by feedback gathered from six study committee meetings, one public meeting, several key person interviews and focus group meetings. The analysis of the site and subsequent meetings revealed that the Township strongly desired retaining and enhancing the natural ecology of the site, and limiting active recreation facilities.

Three concept site designs and related cost estimates for each were presented to the committee and the public in attendance. All three concepts displayed the following priority elements:

- Retaining the wetlands, pond and streams and expanding the existing vegetated buffer with the recommended 200' woodland and 200' meadow riparian buffers. This greatly reduces the land available for active recreation,
- Retaining the pond in its current size and configuration,
- Retaining the perimeter foot path that runs along Ship and Swedesford Roads,
- Providing a connection between the Uwchlan and Chester Valley Trail through Exton Park,
- Improving access to Exton Park's northwest quadrant (south of Swedesford Road) via a new entrance to be located on Swedesford Road directly across from the entrance proposed by the County to access their land to the north of Swedesford Road, and
- Installing interpretive signs to highlight wildlife, environmental features of significance, and existing historic site that can be viewed from Exton Park.

Concept A

Concept A addressed the priority elements with the following proposed improvements:

Proposed for the lands to the south of Swedesford Road:

A drive through the existing farmed land led to a primary parking lot closer to center within the park. This provides proximity to all facilities for people with disabilities and mobility limitations.

A second parking area was added using the existing entrance road to the CVT parking lot, as a spur lot serving the southeast portion of Exton Park where the soccer fields are now located.

A paved perimeter loop trail circled through the park in the northwest section, with seating nodes located along its route.

Picnic pavilions dotted throughout the transitional woods outside of the 200' wooded riparian buffer. This plan did not provide for the 200' meadow riparian buffer in this area. A large nature themed playground, splash pad and community gathering space was proposed closer to Ship Road within the northwest quadrant of the park.

The system of natural trails around the pond was simplified and the boardwalk portion of the natural area trails extended in length to protect the wetland habitat while providing ADA access.

A boardwalk crossing the dam was proposed to cover the existing dam and allow wildlife and bird viewing.

Natural and paved pathways connected all facilities. A multi-purpose lawn area, a 90' baseball field and a 70' baseball field were proposed, each in a different quadrant of the park.

Proposed for the lands to the north of Swedesford Road:

A third parking lot accessed the land north of Swedesford Road from the proposed Valley Creek Boulevard.

Community gardens and a cricket field were proposed for the northern most land in the park, in the area of level land.

A disc golf course running throughout the park and a Community Center located on the Township property north of Swedesford Road. This facility would be accessed from the proposed County entrance road into the County land north of Swedesford Road.

Concept B

Concept B included the priority elements with the following differences:

Proposed for the lands to the south of Swedesford Road:

A modestly sized primary parking lot located off of Swedesford Road with overflow parking not paved, but stabilized turf.

A paved pathway system linking elements in the northwest quadrant and close to the parking area.

Features located in the northwest quadrant included a pump park, a destination playground with a tree house zip line, and hillside slide. Restrooms, pavilions and a grove of shade trees rounded out the amenities accessible from the parking lot.

The remaining land in the northwest part of the park was converted from farmland to meadow.

A buffer of trees was proposed to border Ship Road to segregate the park from vehicular traffic and noise.

A small parking lot and 70' Little League field were proposed for the southeast part of the park near the existing soccer fields.

Rain gardens were located to infiltrate stormwater from proposed improvements.

The perimeter footpath was connected to the natural pond pathways.

Proposed for the lands to the north of Swedesford Road:

Meadow, wooded and meadow riparian buffers were all the development proposed for the lands north of Swedesford Road.

Concept C

Concept C included the priority elements with the following differences:

Proposed for the lands to the south of Swedesford Road:

A primary parking lot located off of Swedesford Road, with an overflow parking area of stabilized turf.

An entrance roundabout with connections to parking and a large event green.

The event green was to have tiered amphitheater like seating graded and covered in lawn.

Pavilions, a sledding hill, natural playground and dog park rounded out the facilities proposed for the northwest quadrant.

The connector trail serves to connect all the proposed facilities within this section and to the County portion of the park and the amenities there.

About one-third of the land currently farmed was proposed as organically farmed land in this concept.

In the southeast section of the park, where the soccer fields are now, two parking lots were added, accessible from the existing entrance to the Chester Valley Trail parking area and from Swedesford Road.

Also in this area of Exton Park, a 70' baseball field, a small natural playground, restrooms and several pavilions were proposed.

Paved and natural paths connected facilities in this area to parking and to the existing natural grass pathways leading to and surrounding the pond.

Rain gardens were located to infiltrate stormwater from proposed improvement.

Proposed for the lands to the north of Swedesford Road

Additional area of organic farming, wooded and meadow riparian buffers were all the development proposed for the lands north of Swedesford Road.

Evaluation of Preliminary Concept Plans

At the same meeting and after the concepts were presented, the committee was asked to prioritize each of the predominate plan elements as taken from the entire three concept drawings as low, moderate or high priority.

High priority features included: pavilions, rest rooms, an event green, disc golf course, sledding hill, a dog park, parking lots, and a cricket field.

Lower in priority were the following plan elements: organic farming, community gardening, baseball fields, sand volleyball court, pump park, re-use of the Witch's Cap, a splash pad.

The Community Center, proposed in Concept A was a definite "no", as the need did not justify the expense.

Copies of all three-concept plans follow this page.

Plan Legend:
wetlands
100 year floodplain
existing 2 ft contour
200 foot riparian buffer
100 foot meadow filter
slope 10-15 percent
slope 15 - 25 percent
slope greater than 25 percent
topographic high point
existing park boundary
existing forest area
existing pedestrian path
West Whiteland Township
Exton Park
Master Site Development Plan
CONCEPT A
Exton Park
Applied Ecological Services
Urban Research & Development Corporation
URDC
NORTH
SCALE: 1" = 200'
CHESTER COUNTY PARK LAND
SWEDESFORD CHASE
SWEDESFORD WOODS
EXISTING OFFICE PARK
future parking lot
keep field in agriculture until County installs planned improvements
future community center
potential crossing of multi-use trail
pedestrian waiting area near park sign
park sign
community garden
parking lot
meadow
cricket field
paved ADA access turnaround and bench pad
nature play trail
inclusive splash pad
multi-purpose field (soccer size)
pavilions
pond
little league field
baseball field
remove berm to allow wetlands to function properly
bridge stream crossing and interpretive sign
mulch or grass pathway
paved ADA turnaround and bench area
paved pathways
historic house sign
connect to Chester Valley Trail
Chester Valley Trail
use County entrance to create entry to township trail
CONCEPT A

Plan Legend:

- wetlands
- 100 year floodplain
- existing 2 ft contour
- edge of waters of th Commonwealth
- 200 foot riparian buffer
- 100 foot meadow filter
- 100 foot meadow buffer wildlife corridor
- slope 10-15 percent
- slope 15 - 25 percent
- slope greater than 25 percent
- topographic high point
- existing park boundary
- existing forest area
- existing pedestrian path

DATE: 12/7/15
REVISIONS:
1. 03/28/16
2. 05/16/16

West Whiteland Township
Exton Park
Master Site Development Plan
Pennsylvania
Chester County

CONCEPT B

Exton Park

Associated Consultant
Applied Ecological Services
467 East Church Road
King Of Prussia, PA 19406

Landscape Architects - Engineers - Planning Consultants
Urban Research & Development Corporation
28 West Broad Street, Bethlehem, Pennsylvania 18018 - 610.865.0701

NORTH

SCALE: 1" = 200'

CONCEPT B

CHESTER COUNTY PARK LAND

SWEDESFORD CHASE

SWEDESFORD WOODS

EXISTING OFFICE PARK

Chester Valley Trail

CONCEPT C

SCALE: 1" = 200'

Plan Legend:

- wetlands
- 100 year floodplain
- existing 2 ft contour
- edge of waters of th Commonwealth
- 200 foot riparian buffer
- 100 foot meadow filter
- 100 foot meadow buffer wildlife corridor
- slope 10-15 percent
- slope 15 - 25 percent
- slope greater than 25 percent
- topographic high point
- existing park boundary
- existing forest area
- existing pedestrian path

DATE: 12/17/15
REVISIONS:
1. 03/28/16
2. 05/16/16

West Whiteland Township
Exton Park
Master Site Development Plan
Pennsylvania
Chester County

CONCEPT C

Exton Park

Associated Consultant
Applied Ecological Services
467 East Church Road
King Of Prussia, PA 19406

Landscape Architecture · Engineering · Planning Consultants
Urban Research & Development Corporation
26 West Broad Street · Bethlehem, Pennsylvania 18018 · 610.865.0701

NORTH

2. Final Draft Master Site Development Drawing

The final site design drawing was revised and presented to the committee for review and comment with a cost estimate broken out into potential phases. The total estimated costs were based on the anticipated Township municipal budget matched with grant funding.

The following elements were present on the final draft site design drawing:

1. A 200' wooded riparian and a 200' meadow riparian buffer will be installed on both sides of the pond and all streams in the park. This buffer will bisect the park from southeast to northwest.

2. The existing riparian buffer will be remediated to remove invasive plant species in favor of native species that provide food and shelter for wildlife.

3. The existing grass pathways will be retained; this includes the perimeter pathway and the natural pathways that circle the pond and wetlands.

4. Farming will be allowed to continue on the park property in all areas not proposed for development. The last phase will convert the remaining farmed acres south of Swedesford Road to meadow.

5. The primary development at the park will take place to the south of Swedesford Road in the northwest quadrant of the site. The following facilities will be installed:

- Park entrance signs, rules signs, interpretive signs, wayfinding and directional signs, handicap parking signs, vegetation establishment signs,
- A primary park entrance located on Swedesford Road, across from the proposed location of the County park access road,
- Primary parking lot for 252 vehicles, including 8 handicap spaces with 2 van accessible spaces and access aisles and two planned overflow parking areas of stabilized turf grass for approximately 180 vehicles,
- Parking lot security lighting for all proposed lots
- Destination nature themed playgrounds, one for ages 2-5 and one for ages 5-12, featuring a zip line, tree house, and high ropes bridge,
- Sledding hill,
- Dog park,
- Lawn area sized to accommodate a cricket field and two multi-purpose athletic fields with embankment stadium seating graded into the existing slope,
- Accessible pathways connecting the parking lot with all proposed facilities,
- Buildings will include restroom buildings and pavilions,
- A multi-use trail to serve as a section of the Uwchlan to Chester Valley Trail to be installed from the Swedesford and Ship Roads intersection through the park and connecting with the County playground paved pathway system,
- 9-hole disc golf course,

- Benches and trash receptacles,
- Natural landscaping and rain gardens consisting of native plants will be installed in nearly all development phases,
- A second parking lot for 180 vehicles including 4 handicap spaces with 1 van accessible space and access aisle is planned for access to the existing athletic fields in the southeast quadrant of the site,
- A second natural playground area and a smaller event green with embankment stadium seating for 1700 visitors are also proposed for this area,
- Accessible pathways will connect the parking lot to all proposed facilities and to a boardwalk that is proposed to extend into the wetlands to create a birding and wildlife viewing area,
- Buildings proposed for this southeast quadrant include pavilions and a viewing pavilion,
- Rain gardens and other natural stormwater BMPs will be installed as required to manage stormwater naturally and on the site, and
- Native trees and shrubs will be installed in every development phase

The committee reviewed the design favorably and then gave priority to the following elements of the plan.

- High priority needs, to be accomplished within the next 1 to 5 years:
    - Paved ADA accessible pathways,
    - natural play areas,
    - multi-purpose fields,
    - restrooms,
    - paved access to the park and parking,
    - utility connections, and
    - bences, trash receptacles and signs.

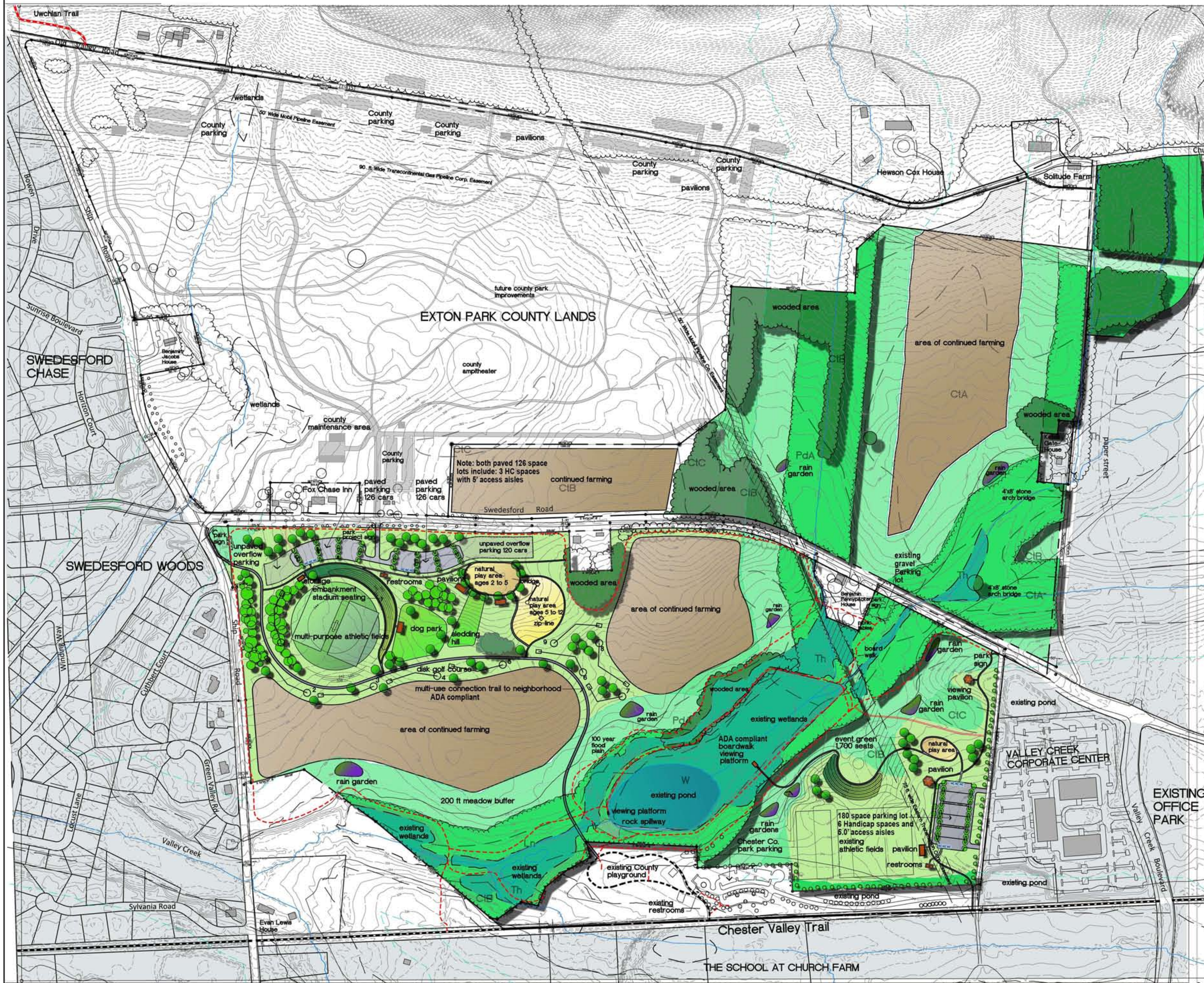
- Moderate priority, to be accomplished with the next 6 to 10 years:
    - Riparian buffers,
    - rain gardens, and
    - multi-purpose trail connecting to the CVT.

Evaluation of Final Draft Site Design Drawing at Second Public Meeting

The final site design was presented to the public at an advertised meeting held at the Township Building. The public reviewed the planning process, the plan and examples of what proposed elements might look like in addition to the cost estimate. An interactive board listing all plan elements ended the presentation. Visitors were asked to take five colored dots and place them on the elements they most wanted to see installed at the park.

The comments received were favorable to the concept plan. There was concern that improvements have taken too long since the acquisition of the Park and that delays would continue. A few people wanted to see athletic and active facilities installed first. Most were greatly favoring the expanded riparian buffers and native planting. While costs were a factor in the public's selection of facilities at the first public meeting, the cost estimate did not receive any public comments at the second public meeting. The following is the facility tabulation results, reporting the number of dots each plan element received:

FACILITY	VOTES
Riparian Buffers	18
Large Destination Natural Playground	15
Uwchlan to CVT Trail Connection	15
Restrooms	14
Dog Park	14
Multi-purpose Fields	13
Natural native plant landscaping	13
Rain Gardens	10
Paved accessible pathways	9
High Ropes and Tree House	9
Event Green	8
Natural Grass Pathways	7
Picnic Pavilions	6
Small Natural Playground	6
Education Center	4
Boardwalk with Observation Deck	3
Disc Golf – 9 Hole Course	2
Interpretive Signs	2
Park Signs	2
Zip Line	1



Plan Legend:

- wetlands
- 100 year floodplain
- existing 2 ft contour
- edge of waters of the Commonwealth
- 200 foot wooded riparian buffer
- continued farming
- 200 foot meadow riparian buffer
- existing park boundary
- existing forest area
- existing 10' wide ADA paved county trail
- existing 10' wide ADA paved CVT and Uwchlan Trail
- existing 6' wide grass/natural trail
- proposed 6' wide grass/natural trail
- proposed 10' wide ADA trail link Uchlin to CVT
- proposed 6' wide ADA paved walkways
- CtC existing soil classification

SITE DATA SUMMARY:

AREA: 279 AC. IN PARK MASTER SITE DEVELOPMENT PLAN
OWNER: WEST WHITELAND TOWNSHIP, CHESTER CO., PA
EXISTING ZONING: R-1 RESIDENTIAL, UNIFIED OVERLAY DIST.

SOILS:
CtA Conestoga silt loam 0-3% slopes
CtB Conestoga silt loam 3-8% slopes
CtC Conestoga silt loam 8-15% slopes
Ho Holly silt loam
Ln Lindside silt loam
Th Thorndale silt loam
W Water

UNDERLYING GEOLOGY:
Ledger Formation
Chickies Formation

TOPOGRAPHY: See slope mapping on legend of Existing Conditions Plan.

UTILITIES:
Municipal water service in Ship Road
Public sanitary sewage in Ship Road

WATERSHED:
East Branch of the Brandywine Creek

EASEMENTS: (areas within Township property)
Eastern Transmission Corporation (75 feet wide) 4.88 acres
Mobil Pipeline Company (50 feet wide) 0.99 acres
Transcontinental Gas Pipeline Corporation (90 feet wide) 2.54 ac.

NOTES:

1. See existing conditions plan for boundry lines of geologic formations and detailed slope range catagories.
2. See Master Site Development Plan report for Phasing Plans.
3. Work limits for the park project are the parcel boundaries.
4. No new enclosed habitable structures are proposed on this plan except restroom facilities. Other open structures include pavilions and storage buildings. No indoor recreation facilites are proposed.

0 100 200 400 600 800
SCALE: 1" = 200'

DATE: 08/31/16	
REVISIONS:	
1.	09/21/16
2.	12/07/16
3.	01/04/17
4.	05/09/17

West Whiteland Township
Exton Park
Master Site Development Plan
Chester County Pennsylvania

Master Site Development Plan
Exton Park

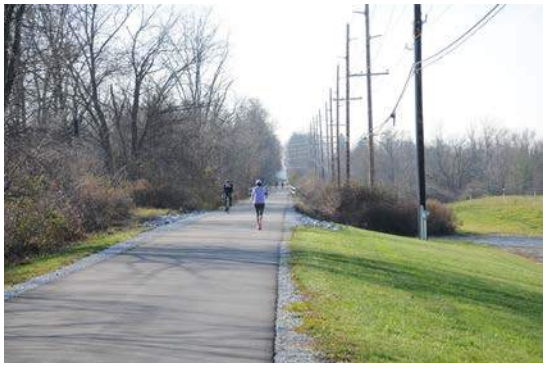
LEONARD J. POLICELLI REGISTERED LANDSCAPE ARCHITECT PENNSYLVANIA

Associated Consultant
Applied Ecological Services
467 East Church Road
King Of Prussia, PA 19406

Landscape Architects · Engineers · Planning Consultants
Urban Research & Development Corporation
28 West Broad Street · Bethlehem, Pennsylvania 18018 · 610-865-0701
URDC

NORTH

G. ESTIMATES AND PHASING



1. Design Cost Estimates and Phasing

The phasing program for Exton Park summarizes and prioritizes the Master Site Plan's proposed active, passive and support facilities. Items have been classified as High Priority (within 5 years), Medium Priority (5-10 years) or Low Priority (11 -15 years) by feedback collected from Study Committee members, residents and other park visitors. It is suggested that the implementation of these items be executed in eleven (11) phases, beginning with the highest-priority items.

The following pages provide detailed information regarding proposed improvements, the phasing of those improvements and the costs associated with those improvements.

SUMMARY OF PHASING			
Priority	**Phase**	**Amount**	
High	1	$	999,285
	2	$	520,095
	3	$	520,440
	4	$	527,260
High Priority Total		$	2,567,080
Medium	5	$	615,510
	6	$	507,440
	7	$	506,826
	8	$	662,900
Medium Priority Total		$	2,292,676
Low	9	$	873,584
	10	$	509,700
	11	$	406,500
Low Priority Total		$	1,789,784
Total Cost		**$**	**6,649,540**

High Priority

HIGH PRIORITY IMPROVEMENTS AND COST ESTIMATES (PHASES 1-4)												
	PHASE 1			PHASE 2			PHASE 3			PHASE 4		
Description of Item	QTY		Estimated Cost	QTY		Estimated Cost	QTY		Estimated Cost	QTY		Estimated Cost
WATER QUALITY & HABITAT												
Wooded Riparian Buffer - 200 ft minimum from edge of pond, streams and intermitent streams	0	AC	$ -	0	AC	$ -	15	AC	$ 450,000.00	15	AC	$ 450,000.00
Rain Gardens - Soil Mixes with plantings	635	SY	$ 25,400.00	650	SY	$ 26,000.00	650	SY	$ 26,000.00	650	SY	$ 26,000.00
LANDSCAPING												
Additional Trees and shrub plantings	0	LS	$ -	0.1	LS	$ 15,000.00	0	LS	$ -	0.1	LS	$ 15,000.00
Lawn Areas - seed	5.2	AC	$ 50,960.00	7.5	AC	$ 73,500.00	3.8	AC	$ 37,240.00	3.7	AC	$ 36,260.00
RECREATIONAL TRAILS												
Trails - Additional Grass Trails (8 ft wide)	0	LF	$ -	1795	LF	$ 1,795.00	0	LF	$ -	0	LF	$ -
Pathways - Paved ADA Accessible (6 ft wide)	3100	LF	$ 83,700.00	250	LF	$ 6,750.00	0	LF	$ -	0	LF	$ -
Pathways - Paved ADA Accesible Connector Trail to neighborhoods, CVT & Uwchlan Trail (10 ft wide)	520	SY	$ 23,400.00	3330	LF	$ 149,850.00	0	LF	$ -	0	LF	$ -
New Pedestrian Bridge for Connector Trail Crossing (10 ft wide)	0	EA	$ -	1	EA	$ 60,000.00	0	EA	$ -	0	EA	$ -
EDUCATIONAL												
Interpretive Signs for Education - History, Ecology, Archeology, Geology, Farming	2	EA	$ 3,000.00	2	EA	$ 3,000.00	2	EA	$ 3,000.00	0	EA	$ -
ACTIVE RECREATION												
Natural Play Areas - Community Destination Playground Area	1	EA	$ 60,000.00	0	EA	$ -	0	EA	$ -	0	EA	$ -
Zip Line - Community Destination Play Area	1	EA	$ 50,000.00	0	EA	$ -	0	EA	$ -	0	EA	$ -
High Rope Bridge with Climbing Towers - Community Destination Play Area	1	EA	$ 80,000.00	0	EA	$ -	0	EA	$ -	0	EA	$ -
Tree House - Community Destination Play Area	1	EA	$ 75,000.00	0	EA	$ -	0	EA	$ -	0	EA	$ -
Disc Golf Course (9 holes)	0	EA	$ -	1	EA	$ 10,000.00	0	EA	$ -	0	EA	$ -
Dog Park (2 acres)	1	EA	$ 85,000.00	0	EA	$ -	0	EA	$ -	0	EA	$ -
RECREATION SUPPORT FACILITIES												
Pavilions w picnic tables	0	EA	$ -	2	EA	$ 170,000.00	0	EA	$ -	0	EA	$ -
Restrooms	1	EA	$ 80,000.00	0	EA	$ -	0	EA	$ -	0	EA	$ -
New Access Drive - 24 ft wide bituminous pavement	710	SY	$ 31,950.00	0	SY	$ -	0	SY	$ -	0	SY	$ -
Parking - bituminous	5115	SY	$ 230,175.00	0	SY	$ -	0	SY	$ -	0	SY	$ -
Utilities - Sewer line to restroom	1100	LF	$ 49,500.00	0	LF	$ -	0	LF	$ -	0	LF	$ -
Utilities - Water line to restroom	1100	LF	$ 38,500.00	0	LF	$ -	0	LF	$ -	0	LF	$ -
Utilities - Lighting for parking	0.3	LS	$ 12,000.00	0	LS	$ -	0	LS	$ -	0	LS	$ -
Benches	2	EA	$ 1,600.00	2	EA	$ 1,600.00	2	EA	$ 1,600.00	0	EA	$ -
Trash Receptacles	1	EA	$ 800.00	1	EA	$ 800.00	1	EA	$ 800.00	0	EA	$ -
Park Entrance Signs	3	EA	$ 15,000.00	0	EA	$ -	0	EA	$ -	0	EA	$ -
Park Wayfinding Signs	0.1	LS	$ 1,800.00	0.1	LS	$ 1,800.00	0.1	LS	$ 1,800.00	0	LS	$ -
Park Rules Signs	3	LS	$ 1,500.00	0	EA	$ -	0	LS	$ -	0	EA	$ -
TOTAL COST ESTIMATE			**$ 999,285.00**			**$ 520,095.00**			**$ 520,440.00**			**$ 527,260.00**

See opposite the page for the plan view illustrating the High Priority Improvements.


Plan Legend
HIGH PRIORITY IMPROVEMENTS
The brightly colored area on this plan represents the
High Priority Improvements planned for Exton Park in Phases 1-4:
Wooded Riparian Buffer
Rain Gardens - Soil Mixes with plantings
Additional Native Tree and Shrub plantings
Seed Lawn Areas
Additional Natural 6.0' Grass Trails
Paved ADA 6.0' pathways to park facilities
Paved ADA 10.0' multi-use connector trail to neighborhoods
Pedestrian bridge for connector trail stream crossing
Interpretive educational signs - history, ecology, farming
Community Destination Playground to include:
Zip line, High ropes bridge with climbing towers & Tree house
Disc golf - 9 hole course
Dog park - 2 acres in size
2 pavilions with picnic tables
Restroom, ADA compliant with sanitary and water line connections
Entry drive - 24' wide
Bituminous parking for 120 vehicles and Security lighting
8 benches & 3 trash repectacles
Signs -
(3) Park entrance, (3) wayfinding and (3) park rules
SWEDESFORD ROAD
SWEDESFORD CHASE
Chester Valley Trail

Medium Priority

MEDIUM PRIORITY IMPROVEMENTS AND COST ESTIMATES (PHASES 5-8)												
	PHASE 5			PHASE 6			PHASE 7			PHASE 8		
Description of Item	QTY		Estimated Cost	QTY		Estimated Cost	QTY		Estimated Cost	QTY		Estimated Cost
WATER QUALITY & HABITAT												
Wooded Riparian Buffer - 200 ft minimum from edge of pond, streams and intermitent streams	0	AC	$ -	14	AC	$ 420,000.00	0	AC	$ -	0	AC	$ -
Meadow Riparian Buffer - 200ft minimum from edge of Wooded Riparian Buffer	0	AC	$ -	0	AC	$ -	0	AC	$ -	55	AC	$ 605,000.00
Rain Gardens - Soil Mixes with plantings	700	SY	$ 28,000.00	725	SY	$ 29,000.00	1640	SY	$ 65,600.00	700	SY	$ 28,000.00
LANDSCAPING												
Lawn Areas - seed	3.7	AC	$ 36,260.00	4.8	AC	$ 47,040.00	5.8	AC	$ 56,840.00	2.5	AC	$ 24,500.00
RECREATIONAL TRAILS												
Pathways - Paved ADA Accessible (6 ft wide)	0	LF	$ -	0	LF	$ -	4368	LF	$ 117,936.00	0	LF	$ -
Boardwalk and Viewing Platform	0	SY	$ -	0	SY	$ -	135	SY	$ 74,250.00	0	SY	$ -
EDUCATIONAL												
Interpretive Signs for Education - History, Ecology, Archeology, Geology, and Farming	2	EA	$ 3,000.00	2	EA	$ 3,000.00	2	EA	$ 3,000.00	2	EA	$ 3,000.00
ACTIVE RECREATION												
Natural Play Areas - Small	0	EA	$ -	0	EA	$ -	1	EA	$ 15,000.00	0	EA	$ -
Event Green (Gathering area with sloped seating)	1	AC	$ 50,000.00	0	AC	$ -	0	AC	$ -	0	AC	$ -
SUPPORT FACILITIES												
Pavilions w picnic tables	0	EA	$ -	0	EA	$ -	2	EA	$ 170,000.00	0	EA	$ -
Parking - bituminous	8400	SY	$ 378,000.00	0	SY	$ -	0	SY	$ -	0	SY	$ -
Utilities - Lighting for parking	0.4	LS	$ 16,000.00	0	LS	$ -	0	LS	$ -	0	LS	$ -
Utilities - Water line to restroom	245	LF	$ 8,575.00	0	LF	$ -	0	LF	$ -	0	LF	$ -
Utilities - Sewer line to restroom	255	LF	$ 11,475.00	0	LF	$ -	0	LF	$ -	0	LF	$ -
Restrooms	1	EA	$ 80,000.00	0	EA	$ -	0	EA	$ -	0	EA	$ -
Benches	2	EA	$ 1,600.00	4	EA	$ 3,200.00	2	EA	$ 1,600.00	2	EA	$ 1,600.00
Trash Receptacles	1	EA	$ 800.00	2	EA	$ 1,600.00	1	EA	$ 800.00	1	EA	$ 800.00
Park Wayfinding Signs	0.1	LS	$ 1,800.00	0.2	LS	$ 3,600.00	0.1	LS	$ 1,800.00	0	LS	$ -
TOTAL COST ESTIMATE			**$ 615,510.00**			**$ 507,440.00**			**$ 506,826.00**			**$ 662,900.00**

See the opposite page for the plan view illustrating the Medium Priority Improvements.


Plan Legend:
MEDIUM PRIORITY IMPROVEMENTS
The brightly colored areas on this plan represents the
Medium Priority Improvements planned for Exton Park in Phases 6-8:
Wooded Riparian Buffer
Meadow Riparian Buffer
Rain Gardens - Soil Mixes with plantings
5 acres of additional meadow
Seed Lawn Areas
Paved ADA 6.0' pathways to park facilities
Boardwalk and Viewing Platform
Interpretive educational signs - history, archeology, farming & geology
Small natural play area
Event Green - gathering area with sloped seating
2 pavilions with picnic tables
Bituminous parking for 180 vehicles with Security lighting
10 benches & 5 trash repeadacles
Signs -
(3) wayfinding
EXISTING OFFICE PARK
Chester Valley Trail
SWEDESFORD WOODS
GREENHILL ROAD

Low Priority

LOW PRIORITY IMPROVEMENTS AND COST ESTIMATES (PHASES 9-11)									
	PHASE 9			PHASE 10			PHASE 11		
Description of Item	QTY		Estimated Cost	QTY		Estimated Cost	QTY		Estimated Cost
WATER QUALITY & HABITAT									
Additional Meadow Areas - Farmland to eventually be returned to meadow	0	AC	$ -	31.5	AC	$ 346,500.00	31.5	AC	$ 346,500.00
LANDSCAPING									
Additional Trees and shrub plantings	0	LS	$ -	0.4	LS	$ 60,000.00	0.4	LS	$ 60,000.00
Lawn Areas - seed	1	AC	$ 9,800.00	0	AC	$ -	0	AC	$ -
RECREATIONAL TRAILS									
Pathways - Paved ADA Accessible (6 ft wide)	1017	LF	$ 27,459.00	0	LF	$ -	0	LF	$ -
EDUCATIONAL									
Interpretive Signs for Education - History, Ecology, Archeology, Geology, and Farming	2	EA	$ 3,000.00	4	EA	$ 6,000.00	0	EA	$ -
ACTIVE RECREATION									
Cricket & Multipurpose Fields Combination	1	EA	$ 600,000.00	0	EA	$ -	0	EA	$ -
SUPPORT FACILITIES									
Small viewing pavilion	0	EA	$ -	1	EA	$ 75,000.00	0	EA	$ -
Parking - bituminous	5185	SY	$ 233,325.00	0	SY	$ -	0	SY	$ -
Utilities - Lighting for parking	0	LS	$ -	0.3	LS	$ 12,000.00	0	LS	$ -
Benches	0	EA	$ -	4	EA	$ 3,200.00	0	EA	$ -
Trash Receptacles	0	EA	$ -	2	EA	$ 1,600.00	0	EA	$ -
Park Wayfinding Signs	0	LS	$ -	0.3	LS	$ 5,400.00	0	LS	$ -
TOTAL COST ESTIMATE			**$ 873,584.00**			**$ 509,700.00**			**$ 406,500.00**

See the opposite page for the plan view illustrating the Low Priority Improvements.


Plan Legend:
LOW PRIORITY IMPROVEMENTS
The brightly colored area on this plan represents the Lowest Priority Improvements planned for Exton Park in Phases 9-11:
Rain Gardens - Soil Mixes with plantings
58 acres of additional meadow, converted from current farmed acres
Additional Native Tree and Shrub Planting
Seed Lawn Areas
Paved ADA 6.0' pathways to park facilities
Interpretive educational signs - history, archeology, farming & geology
Multi-purpose field area with sloped seating
1 small viewing pavilion
Bituminous parking for 126 vehicles with Security Lighting
4 benches & 2 trash repectacles
Signs - (3) wayfinding
EXISTING OFFICE PARK
Chester Valley Trail
SWEDESFORD ROAD
SWEDESFORD CHASE

2. Funding Resources

Program	Description	Administering Agency
Community Conservation Partnership Programs (C2P2)	Provides matching grants to eligible entities for projects in the following areas • Planning • Technical Assistance • Acquisition • Development • Pennsylvania Recreational Trails • Land and Water Conservation Fund	PA DCNR
Community Revitalization Program	Very broad grant program. Officially intended to promote community stability, increase tax bases and improve quality of life. Applications may be made by municipalities, authorities, economic development organizations and nonprofit corporations. Public/non-profit/profit partnerships are encouraged. Generally can be used for infrastructure, community revitalization, demolition of blighted structures, public safety and park and greenways projects.	PA DCED & Governor's Office
PA Conservation Corps	Provides funding for work crews for community projects, such as trail improvements	PA Dept. of Labor and Industry
Environmental Protection Agency (EPA) Healthy Watershed Initiative	The EPA provides large Watershed Initiative grants ranging in size from $300,000 to $1.3 million. Twenty grants are given out each year. The program is very competitive and requires state endorsement of the proposed projects. Funds for assessment, development, planting, remediation, reclamation, education and outreach.	U.S. EPA (Philadelphia)
Growing Greener Program	As part of Pennsylvania's Growing Greener Program, PA DEP offers various grants that can be used for projects including Watershed Grants, Technical Assistance Grants and New or Innovative Technology Grants.	PA DEP
Land and Water Conservation Fund	The Land & Water Conservation Fund provides matching grants to state and local governments for the acquisition and development of public outdoor recreation areas and facilities.	National Park Service in cooperation with PA DCNR
Rivers, Trails and Conservation Assistance Program	The National Parks Service operates this program aimed at conserving land and water resources for communities. Eligible projects include conservation plans for protecting these resources, trails development and greenway development.	National Park Service
Pennsylvania Recreational Trails	Provides matching funds (80/20) to federal, state and local agencies and private organizations to develop and maintain recreational trails and facilities for motorized and non-motorized use.	PA DCNR

H. MAINTENANCE, OPERATING COSTS AND REVENUE

The maintenance of a public park is crucial to creating a place the community wants to use and visit often. Dedicated funding is necessary to provide the maintenance and programming for an attractive and safe public park. This does not happen without solid planning and community support. An ongoing commitment by the municipality and Township residents will be critical in developing and maintaining park improvements.

1. Existing Maintenance and Operations

A. Departments and Staffing

The West Whiteland Township Public Works Department is in charge of maintaining 110 acres of parkland with the land at Exton Park adding an additional 279 acres. Public Works is also responsible for the maintenance of local roads, storm sewer and storm water management maintenance within the Township. Currently, three full time employees are dedicated to park facility maintenance. Daily tasks at all parks include trash collection, mowing, and general debris cleanup, in addition to calls from residents or other departments with park maintenance requests. Pavilions and restrooms are serviced three times a week and after events. Trails are swept twice a year and ball fields are conditioned prior to spring and fall ball seasons. Yearly duties include safety checks and re-mulching, tree pruning and turf reseeding and fertilization, as well as fence repair or replacement and court resurfacing. Maintenance suggestions can be found in Appendix G – Monitoring and Maintenance Plan. This plan can be used as a roadmap for expected maintenance needs as development occurs at Exton Park. As Exton Park is developed, the Township should evaluate the need for additional staff.

The Township's annual general fund budget provides money for the necessary upkeep of facilities at all parks. The Board of Supervisors reviews the yearly budget and approves any proposed capital expenditures. The amount budgeted for 2017 is $554,225. The money for development projects is included in the Township's capital budget.

At Exton Park, volunteers and athletic clubs help reduce maintenance and operating costs as follows:

- The Weed Warriors, a volunteer group are working to remove invasive plant species from the riparian buffer surrounding the pond and streams. They are assisted by the Penn State Extension Master Watershed Steward Program which provides extensive training in watershed management to volunteers who, in return, educate the community about watershed stewardship based on university research and recommendations,

- Local Boy Scouts volunteer time, manpower, and solicit material donations for small improvements typically constructed as Eagle Scout projects. These volunteer projects include trail boardwalks, a viewing deck and a digital interactive tree inventory for the park,
- While the Township maintains the multi-purpose fields by mowing them regularly, local soccer clubs lease the fields providing revenue for the parks. These clubs provide their own equipment and stripe the fields thereby reducing Township maintenance costs,
- Friends of Exton Park conduct free weekly bird watching walks through the park. Members often collect litter and alert the Township to pond, trail and other maintenance issues and concerns, and
- West Whiteland Township's Friends of the Parks is a 501(c) 3 non-profit organization. Comprised of local volunteers, it helps organize events such as the yearly fireworks display at Exton Park. Use of their volunteers and deductible donations helps offset the costs of these events.

2. Sustainable Design Recommendations to Improve Maintenance and Reduce Operating Costs

A. Facilities

Pavilion & Restrooms

The recommendation for these new structures would involve building with maintenance-free products like CMU block, coated metals, stainless steel, and locally sourced and manufactured materials. Building materials with recycled content are recommended to be specified. Wooden elements exposed to the elements shall be wrapped with aluminum.

Building with maintenance-free materials will reduce maintenance costs. Coatings can be applied to the exterior finishes of the building that will allow graffiti to be removed easily. Lighting inside the restrooms should be motion activated and use LED light technology to reduce electricity costs. Waterless urinals, and flow regulators for toilets and sinks are some of the options that would reduce operating costs. New restroom facilities should be analyzed to ensure they are cost effective across their projected life spans. New utility lines for water and for sanitary service will be installed, connecting to the existing lines on Ship Road.

Playground

A destination playground and a small playground are proposed for Exton Park, both will promote a natural theme.

The plans for the park emphasize ADA access to all facilities. The best surface to ensure compliance and access is to install solid safety surfacing to at least half of the playground equipment. This surface is more expensive to install, but with routine sealant, the surface can last up to ten years. Some elements at the playgrounds will be underlain with mulch surface. Grouping the play elements together with a well thought out plan will ensure the mulch stays put throughout the season. Solid play surfaces, wide walkways, gathering spaces within the playground area and native plant pockets will reduce the need for time-consuming edging and hand mowing in playground areas. The selection of equipment can be simplified to singular pieces along a "play trail" to avoid the expense of the component pieces. Newer pieces of play equipment should be constructed from safe, recycled and/or sustainable materials, requiring less maintenance.

Paved Surfaces

The new pathways and trails proposed for Exton Park could be made from a pervious material, which uses recycled rubber, locally sourced granite and an environmentally friendly binder. It meets ADA criteria and is pervious to water. Maintenance of this type of pervious paving requires yearly vacuuming. This maintenance routine is minimal in comparison to the maintenance-required for trails made with crushed stone screenings, but greater than is required for other surfaces. Crushed stone screening trails allow for weed encroachment and reduced trail integrity and require necessary regular labor-intensive maintenance effort. Pervious paving has a higher installation cost than standard bituminous paving, although the use of pervious pavement reduces the amount of additional parkland necessary for vegetated infiltration areas and reduces overall development costs.

The pavement material used should be evaluated for lifecycle costs in the planning phase. Costs should be explored in relation to the environmental advantages achieved as well.

Additional parking surfaces within Exton Park are proposed as bituminous surfaces and include internal islands designed as stormwater collection basins. All or part of these parking areas may be constructed with pervious materials. This will allow for infiltration credits but require additional excavation and yearly vacuuming to maintain the pervious nature of the surface.

Vegetation

The Township and the public were overwhelmingly in favor of the proposed native riparian buffer zones surrounding the pond and streams at Exton Park. The large masses of native plantings will save the Township maintenance costs as compared to the option of installing lawn areas, which require frequent mowing. As invasive plants are removed in the existing riparian buffer, the seed bank for invasive plants will be dramatically reduced, therefore reducing the unfavorable plant population. Initially, for the first two growing seasons, maintenance will be intensive. It will include watering, mulching and weeding out any invasive plants that reemerge. As the plantings mature, the canopy will fill in and shade out invasive plants, (typically within 3-5 years) becoming more sustainable and requiring only occasional maintenance weeding. Continued volunteer support will be a critical aspect in ensuring the success of these plantings.

Based on information from the US Forest Service and Natural Resources Conservation Service, maintenance costs of a riparian wooded buffer are estimated to be approximately $80 per acre for weed control and $18 per acre for mowing (1997 figures adjusted for inflation). These tasks will be slowly reduced as the new trees mature, although the riparian buffer will never be maintenance free.

Maintenance tasks* that will need to be performed regularly include:

- Deep watering through the first growing season after planting and in the second if weather conditions are dry for an extended period of time,
- Weed control can be accomplished with a combination of mowing, and selective herbicides,
- Tree limbs will need to be pruned back from the natural pathways that weave through the buffer zones, and invasive plants encroachment should be monitored, and
- The riparian buffers should be inspected two times a year and after severe storm events.

  *Refer to Appendix G - The Monitoring and Maintenance Plan for additional information.

The installation of the riparian buffer areas at Exton Park will minimize lawn area to those needed for fields and open space. The proposed Township budget for 2017 provides $52,000 for contracted lawn mowing services at all parks. In past years, Exton Park mowing has accounted for 10-15% of mowing costs. Once the park is developed, the budgeted amount may need to be adjusted based on the actual amount of lawn area after development.

B. Administration and Personnel

West Whiteland Township's administrative staff is adequate to provide the guidance and support needed to implement and maintain programs and facilities at the parks. As of 2016, three full time employees are dedicated to park maintenance. A temporary redistribution of available Public Works personnel may be required during the installation of improvements at Exton Park. As Exton Park is developed, the Township should evaluate the need for additional staff.

Stronger relationships with area businesses, community organizations and residents may need to be developed. Businesses can provide essential funding to make development possible. Volunteer groups can provide important ideas and insights, complement the labor force and contribute to the funding of improvements. Groups that are involved from the concept and design phases will take ownership in the park and will be excited about providing future assistance as needed.

C. Equipment and Supplies

The Public Works Department is well equipped with maintenance equipment and supplies to perform the necessary maintenance at the parks.

D. Programming

Township staff and the Friends of the Parks determine most park events and programming. News of events is relayed to residents on the Township web site and through newsletters, social media, and flyers. Near future programming planned for Exton Park includes the annual fireworks, which had a turnout of about 4000 people last year, and a joint Community Day with Chester County. Another group, Friends of Exton Park, conducts weekly bird walks, which are open to the public. Additional programming will dependent on the phasing of developments at Exton Park. Programming events held at other parks in the Township will remain at those locations.

3. Revenue

Fees are collected for the use of pavilions in other Township parks, which are rented throughout most of the season. It is anticipated that the pavilions planned for Exton Park will require rental agreements as well. The Township charges athletic organizations to use all athletic fields within the Township. The existing multi-use fields at Exton Park are available for use by rental agreement. The proposed large multi-use green will also be rented by agreement.

The National Recreation and Parks Association reports that on average, recreation agencies across the country, recover 25% of their parks and recreation operational costs from programming fees. Athletic organizations can be charged to lease the fields they call home, and can be required to provide their own routine maintenance. Community-wide events can also be a successful source of revenue.

I. SECURITY ANALYSIS

1. Existing Security Issues

Security at Exton Park is not a serious problem at this time as reported by the administration and the police chief. There are only few improvements within the park and they are generally vandal resistant.

The park is accessed predominately by vehicles from the stone parking area off of Swedesford Road and is clearly visible from the road. The stone parking area is delineated with concrete wheel stops and fencing. Pedestrians primarily access the park from Chester County's Chester Valley Trail (CVT) and Trailhead. A few pedestrians access the park along Ship Road at its intersections with Swedesford Road and Green Valley Road and from the Valley Creek Corporate Center.

Limited vehicle access and parking with regular drive by police patrols helps maintain security at the park. Large areas of the park are clearly visible from the stone parking area, Ship Road, Swedesford Road, Church Farm Lane and the CVT Trail head. This aids in reducing security and vandalism risks, as most park areas are easily patrolled. The informal pedestrian crossing into the park on Ship Road at Green Valley Road provides the greatest risk to pedestrians.

The wooded pond and wetlands are the areas, which are not visible from a vehicle on the road or in the parking area. These wooded areas are frequented by birding groups who constitute a respectful group of visitors and provide a valuable presence on the site.

Wooden bulletin board/kiosk, wooden observation deck and bridge, picnic table, fencing and signage are the most vandal prone improvements at the park but no major problems have been reported. At this time, there are no major improvements (i.e. pavilions, restroom facilities, play structures, etc.) which might be more prone to vandalism within the park. No security lighting exists within the park and park use is limited to daylight hours.

Park rules are clearly posted at various locations and icons indicate where bicycles and dog walking is allowed. Location numbers are posted at various locations throughout the park and can aid park visitors in communication with officials should an emergency or other issue arise. 2. Security Recommendations

2. Security Recommendations

Security was discussed with the administration and study committee as part of the design process. As the park develops with more facilities, additional security measures may be needed. It is recommended that security lighting be incorporated into the new parking areas planned along Swedesford Road and Church Farm Lane. The security lighting in these areas where pavilions, restroom and other more vandalism prone facilities are located would provide more visibility and aid the patrolling of the park. The Township may consider adding motion activated lighting in areas or on specific facilities if vandalism becomes a problem in the future. Security cameras are recommended if and where security issues arise in the future.

New park "rules" signs should be posted at all main entrances to the park. All new signs (including interpretive signs) throughout the park should contain a location identifier so users can alert their location within the park if a problem arises.

Fencing is recommended for safety and security in the following areas. It is recommended that fencing be used around the natural play areas for younger children (ages 2-5) to provide a safe secure play area and make sure small children do not run out into the nearby parking area. Fencing should also be used along parking edges to direct pedestrians toward pathway connections between the parking and the park at locations where motorists would expect them. It is also recommended that fencing and a double gate system be installed around the dog park.

3. Posted Rules and Policies

A comprehensive list of all park rules and regulations for Exton Park will be posted at the major entry points. Signs should clearly state park hours, rules, safety warnings and include contact information to report issues in the park. Information should be added and updated as needed. The need for additional signs throughout the park will be evaluated as issues arise.

APPENDIX

Appendix A
List of Other Parks

Appendix A – List of Other Parks

Facilities and Amenities of Passive and Active Recreational Properties within the Exton Park Service Area

Park	Park Address or Primary Entrance	Acres	Pavilion	Gazebo	Playground	Restrooms	Picnic Tables/Benches	Grills	Concessions	Parking	Pet Friendly/Disbursement	Water Fountain	Scenic	Bleachers	Basketball Court	Multi Use Play Area	Tennis Courts	Ball Field/Backstop	Adult Baseball Field	Softball Field	Soccer Fields	Multi-purpose Field	Walking Trails	Walking Trails	Biking Trails	Open Space	Boat & Water	Roller Hockey Rink	Sand Volleyball Court	Outdoor Fitness Center	Stream/Intermittent Stream	Portable Toilet	Information Kiosk/Map	Wildflower Meadow	Bird Nesting Boxes	Butterfly Garden	Building for Rental	Bike Repair Station	Bocce Court
West Whiteland Township																																							
Albert C. Miller Memorial Park	220 Miller Way	20												1	3						1																		
Banbury Park	1400 Old Pottstown Pike	2												1																								
Boot Road Park	110 West Boot Road	26															1	1	1																			
Burke Road Nature Center	1500 Burke Rd	23																																				
Exton Park Site (Township-owned)	Swedesford Road	27.7																																				
Ivy Glen Park	206 Gypsie Lane	0.5																																				
Meadowbrook Manor	410 Swedesford Road	5															2	2																				
Mill Valley Park	1313 Amstel Way	3																																				
Joseph P. Roscioli Park	1425 Ship Road	14															3																					
Sunset Grove	1245 Samuel Road	1																																				
Waltz Park	50 Waterwillow Road	.5															2	1																				
	TOTAL acreage	**376.5**																																				
East Whiteland Township																																						
Battle of the Clouds Park	133 Phoenixville Pike	11.7															1				1	1																
Conestoga Trail Soccer Fields	Conestoga Road	3.3																				1																
Ecology Park	206 Conestoga Road	11.2																																				
Spring Mills Farm Park	Flintshire Road	4.4		P	P	P		P	P					P1			P2				P2			P	P												
Swarienburg Property	Swedesford Road	16.2		P	P	P		P	P					P1			P2				P2			P	P		P										
	TOTAL acreage	**46.8**																																				
Uwchlan Township																																						
Acker Park	Bauman Circle	5.9																																				
	TOTAL acreage	**5.9**																																				
Chester County																																						
Chester Valley Trail at Exton Park	Church Farm Road	16.1																																				
Exton Park (County-owned)	Swedesford Road	436	P																																			
	TOTAL acreage	**462.1**																																				

A numeral denotes the number of facilities on site.

The letter 'P' denotes a proposed amenity that is in the planning stage.

Other Parks
West Whiteland Township
Albert C. Miller Memorial Park
Banbury Park
Boot Road Park
Burke Road Nature Center
Exton Park Site (Township Owned)
Ivy Glen Park
Meadowbrook Manor
Mill Valley Park
Joseph P. Roscioli Park
Sunset Grove
Waltz Park
East Whiteland Township
Battle of the Clouds Park
Conestoga Trail Soccer Fields
Ecology Park
Spring Mills Farm Park
Swanenburg Property
Uwchlan Township
Acker Park
Chester County
Chester Valley Trail at Exton Park
Exton Park (County-owned)

Appendix B
Onsite User Survey Results

Appendix B – Onsite User Survey Results

Exton Park Master Site Development Plan

March 24 and March 26, 2016
Total number of surveys: 107

1. In what municipality do you live:

West Whiteland Township (20) 18.6%

Other: (87) 81.3%

Brandywine Valley (1)

Charlestown Township (3)

Chichester, Delaware County

Conshohocken

Delaware, State of (2)

Downingtown (2)

East Bradford

East Fallowfield (2)

East Goshen (1)

East Marlborough

East Nantmeal Township

East Whiteland Township (5)

Garnet Valley

Glen Mills (1)

Glenmore (1)

Goshen (1)

Hatboro

Haverford (1)

Kennett Square

Malvern (4)

Morgantown

Montgomery

Phoenixville

Radnor (2)

Reading

Schuylkill County/ Phoenixville / Washington, D.C.

Skippack Township, Montgomery County (2)

Tredyffirin Township (2)

Upper Oxford Township

Uwchlan Township (21)

West Bradford

West Brandywine Township

West Chester Borough (5)

West Goshen Township (5)

West Grove Township (1)

West Pikeland Township (4)

West Vincent Township

2. Do you live East or West of Rt. 100?

East - 45 West - 37

3. Do you live North or South of Highway 30?

North - 54 South - 35

4. Including yourself, list the number of people in each age group that reside in your household:

Under 5 years

1 (5)

2 (2)

5–9 years

1 (5)

2 (4)

4

10–14 years

1

15–19 years

1 (3)

20–34 years

1 (9)

2 (7)

3

35–54 years

1 (8)

2 (7)

55–64 years

1 (11)

2 (10)

65 years or older

1 (8)

2 (6)

5. Do you visit Exton Park?

Yes – 71 No – 25

6. How often do you visit Exton Park?

Daily – 10 Weekly – 21 Monthly – 15 Seasonally – 7 First time – 13

7. What activities do you enjoy when you visit Exton Park?

Bird related: (23)

Walks, bird watching, photography (2)

Birds, trees, butterflies; quiet

Birding (6)

Birding and photography

Birding; walking; weed warrior

Bird walk; dog walk (5)

Walking and birdwatching and biking

Bird walks and nature walks; children's park with grandchildren

Birdwatching; hiking (6)

Trail; bird walk; playground

Birdwatching; walking; biking (2)

Lead Weed Warriors effort; birding

Birding, hiking, biking , walking

Dogwalking (6)

Open Space Related: (4)

Trails thru diverse habitat

Open spaces for walking, nature

Eating lunch and enjoying nature

Near trail / quiet

Running/ Jogging-type Recreation Related: (19)

Walking (14)

Biking (6)

Running (2)

Walk/ bike (4)

Playground; lawn area for P/U games

Playground for kids / on C.T.

Playground / walking

Playground / untamed paved trail!

C.V.T. / playground

Playground / open lawn / grass path trail to pool

C.V.T. Trail; kids' playground

Run and bike; courts and playground

Jogging; kids riding bikes

Walk the C.V.T.

Bike the C.V.T., 3-4 days/ week all summer

Chester Trail

Run C.V.T. and stretching and biking; mostly use this trail

Walk the trails with Dad

Hiking (4)

Walking on Rails to Trails

Walking and running (4)

Walking / jogging (bike CVT)

Hike in natural area; access CVT (running and biking)

Other Active Recreation Related: (2)

Kite flying, running, bikes, picnic tables, rollerblading

Rollerblading; biking; walking

Drone flying

8. What do you think is Exton Park's best feature or asset?

Natural Setting related: (29)

It's natural setting and vistas (7)

Clean and natural and quiet (6)

Nature paths (7)

Habitat and location (3)

Habitats left for the birds (4)

Wild growth water variety of habitat

The nature and extensive open space (3)

Native wetlands, plants, trails, walkway (2)

Ponds and trails (6)

Open space (6)

Wetland habitat (2)

The variety of birds that pass through all year long; nice natural-like walking paths

Quality of Birds; quality of habitat

Walking paths (2)

Unpaved paths (2)

Paved parking (CVT)

Accessibility (2)

Scenery and walking

Wildlife

The natural world setting (2)

Left primitive / not developed

Wildlife / not over-developed

That it is protected land (1)

Walk/ bike (4)

Openness

Facility Related (non-trail): (8)

Restroom / parking / trailhead facilities

Trailhead; dog fountain; Restrooms

Safe; clean; room to run and play

Convenient location for meeting; restrooms

Playground; open; not night on road

Restroom good; trail / patrolling good / trail system

Restroom

Access to CVT; open fields; county playground

Trail Related: (10)

Accessible Chester Trail; connect to DT trails

Trail connection

Play areas / C.V.T. by bike

Good walking trails; access to C.V.T.; and great bathroom facilities

Mixed use (including county uses)

Path to trail

Rails to trails

Extensive trails with great traffic control

Trail ease of travel

Walking loop

Access related: (2)

Proximity to main road; easy access

Good location; scenic

Connect to other area trails

Other: (1)

Not enough knowledge

9. What improvements to existing facilities would you like to see at Exton Park? *Many answers address things they would like to see rather than an answer to the question asked..*

None Needed: (11)

All good / perfect

Clean; nice

None; use for the building historical center

Minimal Development/Nature Related: (17)

Improve line of sight vista along paths; put the lake back!

Benches on the trail

Attention to invisible species; better signage; more nature plantings

More access to pond area

More shade (3)

Put in willow trees near the water for nesting great blue herons; increase water level in pond; increase size of pond

Increase water area; save wild foliage

Seasonal goats

Maintain native areas

Improve bird habitat (2)

Improve health of pond

Removal of invasive plants (2)

Continued care; conservation / conservative uses (2)

Do not manicure

Preserve natural features

Trail Related: (1)

Trails are an asset; winter not usable; west farther–look to Phoenixville; King of Prussia; different run every day

Amenity Related: (17)

More benches near playground area; shade (2)

No splash pool; summer grass is rough and dangerous

OK for me; lights maybe

More playground maybe

More trash receptacles for diapers; benches

Maps; direction signs (2)

Get rid of the playgrounds

Restroom facility (4)

Pave the Parking lot (3)

Improve entrance; erosion (4)

Swimming pool / basketball

Larger plot

Water and bathrooms; for people and dogs (2)

Nice playground; open field for play; extend U. Trail to C.V.T.

A picnic table or two

Skate park–things for kids to do; cross country ski trails

Hard pavement for running / biking; bathrooms?

Fix erosion on trails; maintain trail surface (5)

Other: (1)

Possible development of Community Supported Agriculture on far west side

10. Is Exton Park easy to walk or bike to?

Walk: yes – 45 no – 69

Bike: yes – 52 no - 45

Other:

Depends where you're coming from

No – keep it that way

Perhaps with extension of Chester Valley Trail

No; busy road 2 miles away

11. In the future, how would you like to access Exton Park from where you live or work in the Township?

Walking - 47 biking – 58 drive – 40 public transportation - 3

Other:

East Goshen has new trail connector to here somewhere

12. Passive recreation improvements and opportunities needed.

None needed 20

More grass trails 24

More paved trails 21

Bird blinds 26

Picnic Areas 21

Removal of Invasive species 24

Amphitheater 10

Open Lawn for gathering 18

Outdoor classroom 7

Art in the Park 19

Educational Interpretive signs 24

Other:

Any improvements would ruin it

Try not to screw with it too much

Nature area

Some kind of natural play area for kids like Ollie Owls playground at Chester; more attention to plant diversity; more winter food / habitat for birds

Lots of nature walks available

Amphitheater

Covered picnic shelters; kid-oriented; bike trails

Shelters ok; octagon benches

More water needed

13. Active recreation opportunities needed.

None needed 46
Little League 5
Softball 7
Cricket 4
Soccer 11
Football 4
Disk Golf 16
Basketball 8
Tennis 10
Volleyball 19
Winter Activities 30

Other:

C.V.T. is cleared in winter

Track; enough field?

Multipurpose field for ultimate frisbee

A CSA and edible planting

Geocaching

Birding

Enough land to do both natural / active / passive

Swimming pool

Need activities for kids

14. What type of support facilities are needed at Exton Park?

None needed 17
Trash receptacles 33
Benches 25
Picnic tables 17
Pavilions19
Wayfinding signs 20
Doggy Stations 25
Lighting8
Small play equipment4
Destination playground 4
Restrooms 52

Other:

Very little needed or wanted!

More passive; sports make things too crowded

Rope climbing; something for risk; Bell Tavern; Splash pool

Splash pool; more swings; monkey bars

Plus shade and umbrellas near parking and playground

Recycling receptacles along trails (2)

Shade in summer for pavilions (2)

Great restroom; needs changing table

No pets!

15. Are there other parks in the township or county that you visit frequently?

Hibernia Park, Valley Forge

East Goshen and West Goshen

Battle of the Clouds; West Goshen Park; Boot Road daily; walking; RR/1

Games; soccer; travel team

Amb Park; Shade Side Park

Bell Tavern Courtyard (2)

Caln Park; Hibernia Park

East Goshen Park (2)

Downingtown; Bell Tavern; walking and bikes

Bell Tavern; Pick Valley School (PG); Kimberton Park

Trail heads; Woolrick Park – C.V.T. system

Black Rock preserve; Chester Preserve

Marsh Creek (3)

Ship Road Park; Boot Road Park

Savine Clayney Farm

Miller Park; Marsh Creek State Park

No, not in this county

Hibernia; Springton Manor

Wolf Hollow

Anson B. Nixon

Ride / drive Downingtown Swale Trail

Miller – concerts

Miller / Boot Road

All Chester County preserves

Marsh CreekState Park; French Creek State park

East Whiteland to Forest (2 miles)

Wilson Park

Marsh Creek State Park, Kerr Park Downingtown

Kerr Park Trail

16. What is the primary reason you frequent the park mentioned above?

Passive Activities

Love of nature, exercise (3)

Nature; great places to bring kids

Walking; paved walking trails; looped paths

Fenced in playground good

To see nature; to go birding; bring grandchildren to learn about nature; see beaver; see birds

Have birded here since 2004

First visit for birding walk; nice geocache put in by park too as bonus

Walking; biking; birding

Walks; playground area

Birdwatching (5)

Bird walk; recreational walking (3)

Birding; please don't underestimate the value of this park for both nesting and migrating birds

Dog walking (2)

It is pretty and is "natural"

Open at sunrise

Lunch breaks it's peaceful

Hiking (2)

Run / play basketball / bike

Walking / paved easier to walk on (2)

Rear game

Wooden playground; unique things that answers kids needs

Exercise and play; walking; biking; picnics

Playground (2)

Walk to CVT

Near home

Walking / picnics / exercise

Bike / walk

Running / kids biking

17. Do you support an increase in Township tax rates to pay for improvements to Exton Park?

Yes – 74

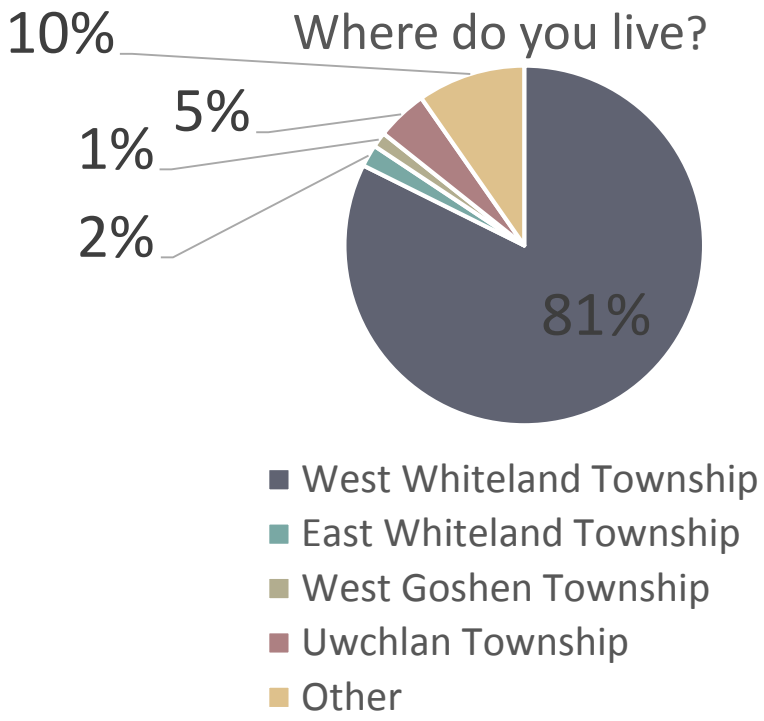
No – 48

Other:

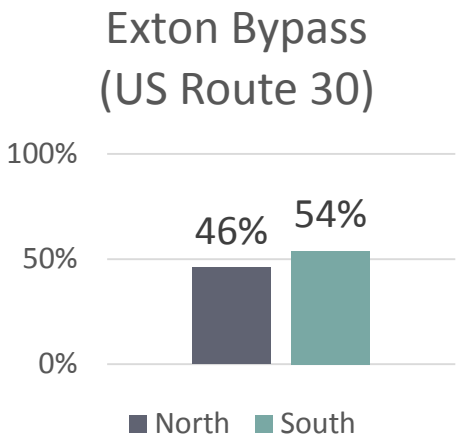
Charge a park entrance fee to non-residents

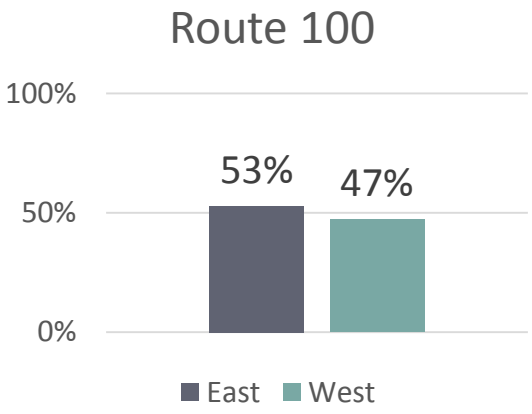
Appendix C – Public Survey Results

Appendix C
Public Survey Results

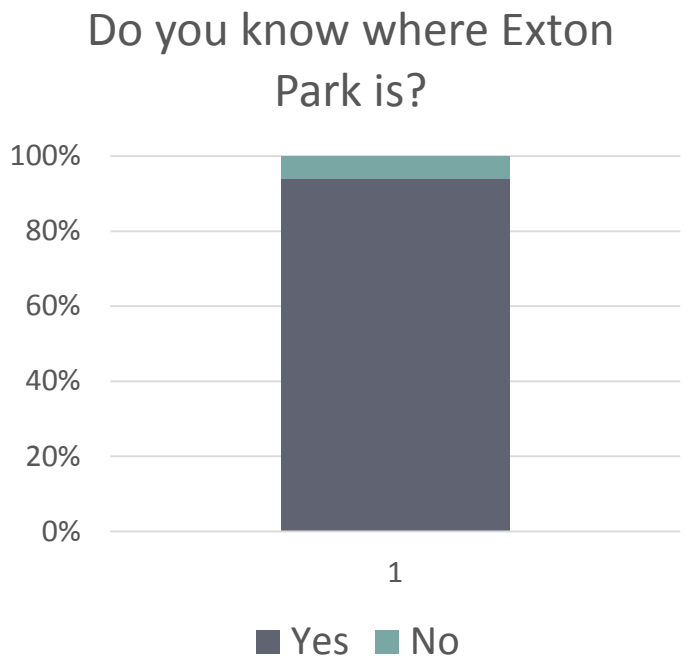


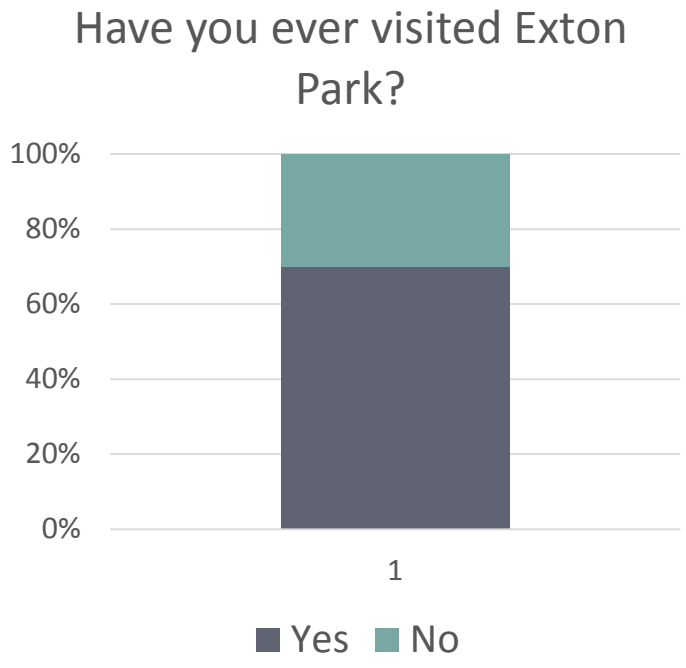
Where do you live in relation to:

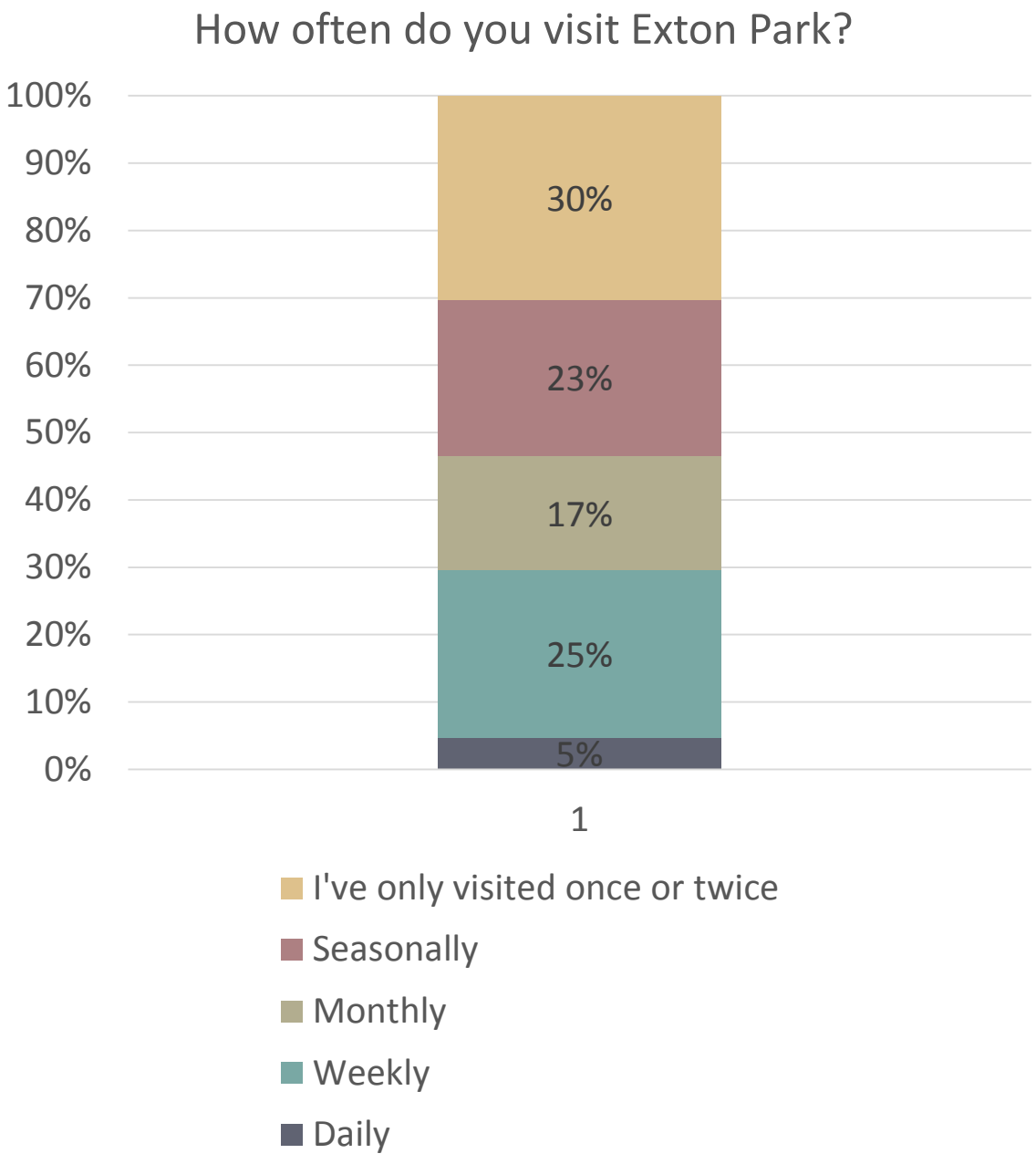


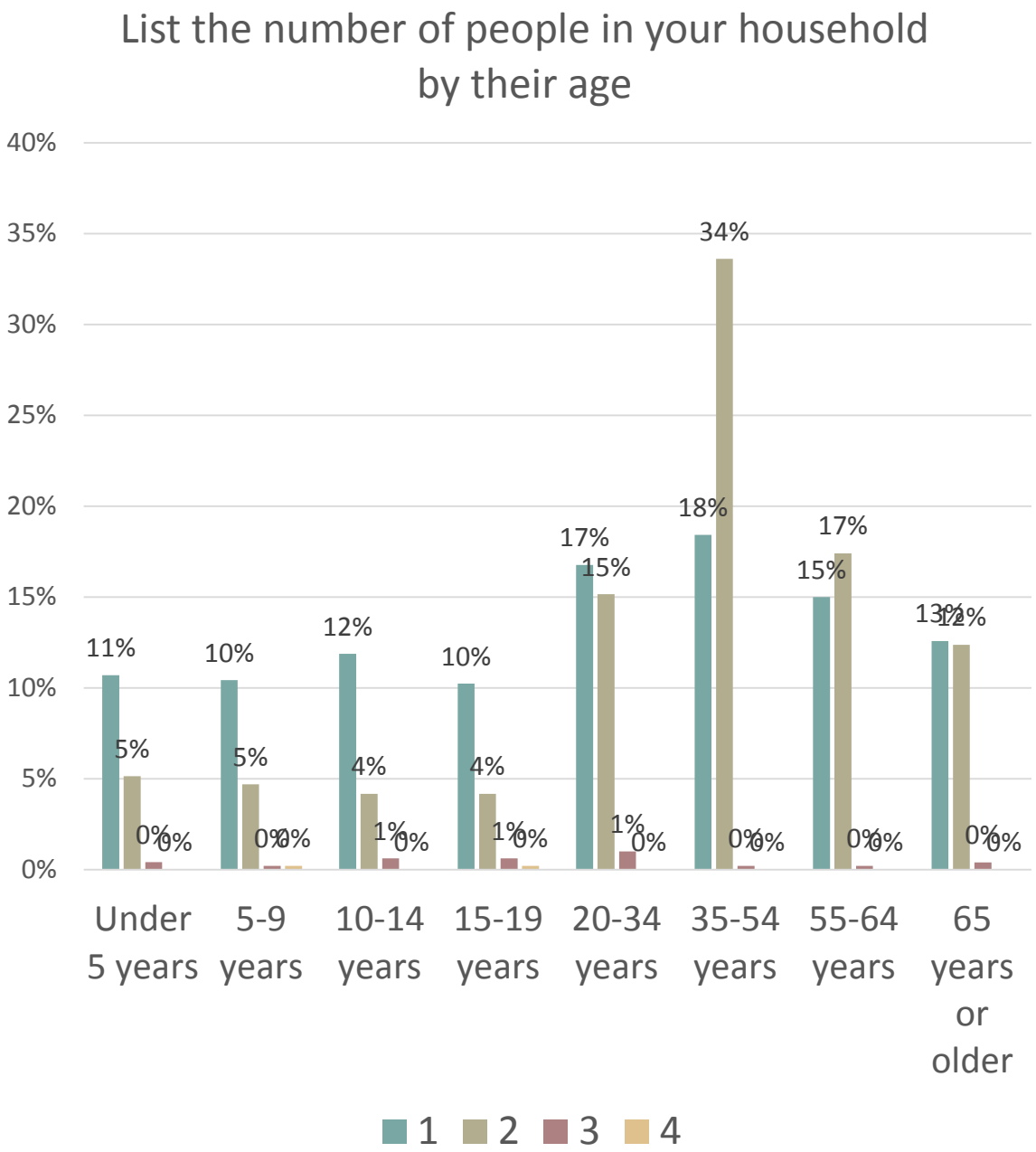


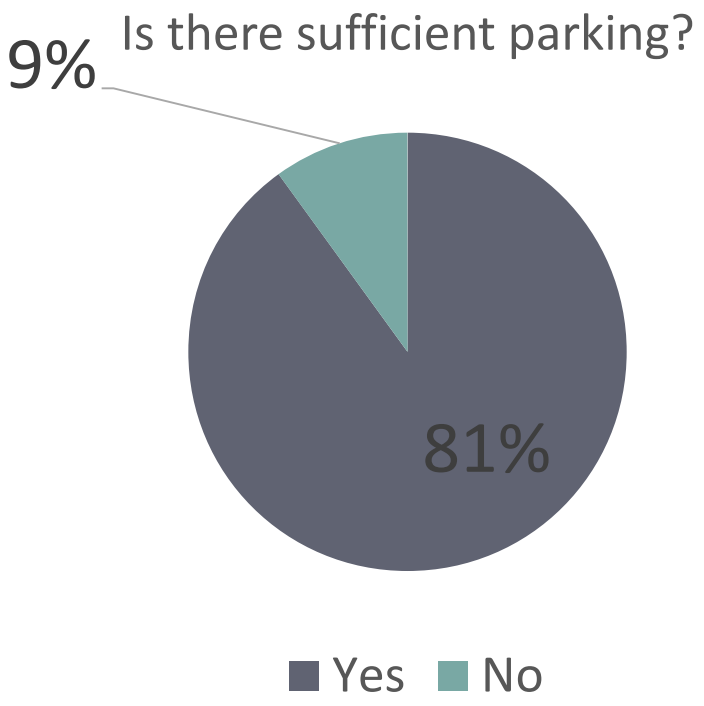
121 or 18% of respondents lived both north of the Exton Bypass (US Route 30) and east of Route 100

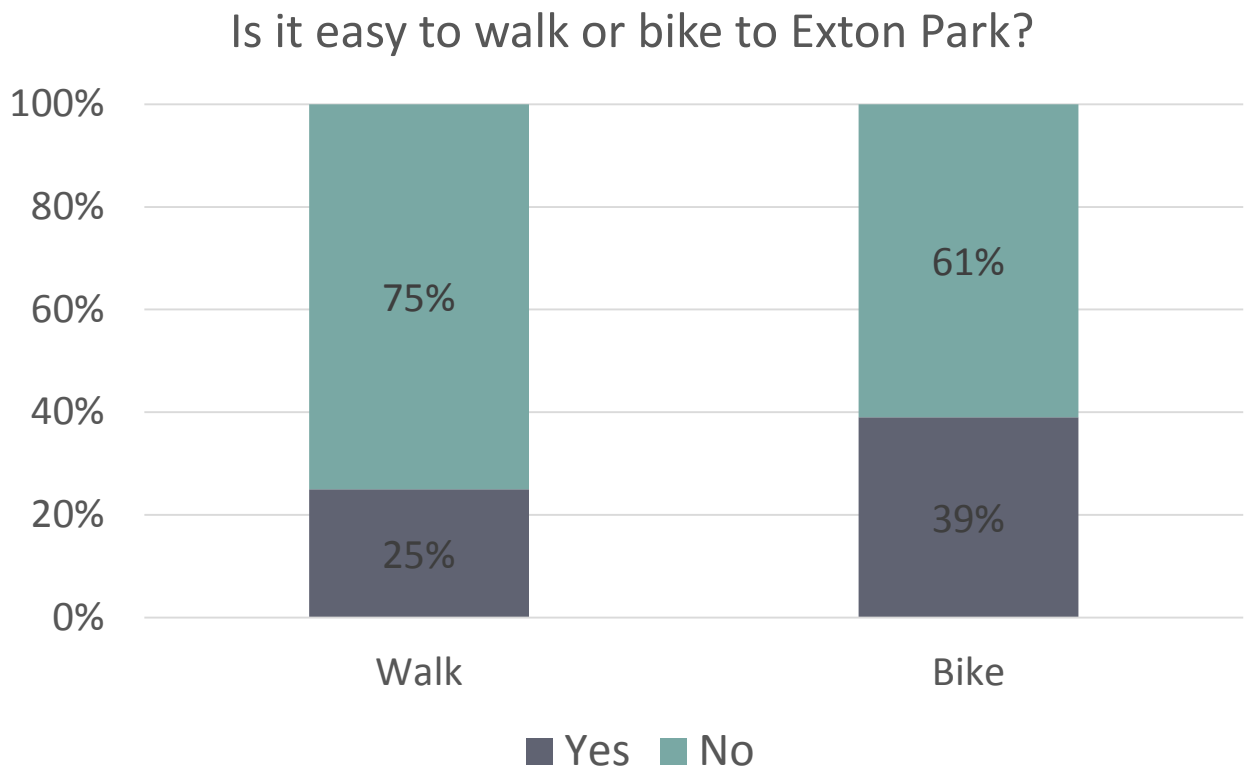

Do you know where Exton Park is?
100%
80%
60%
40%
20%
0%
1
Yes
No

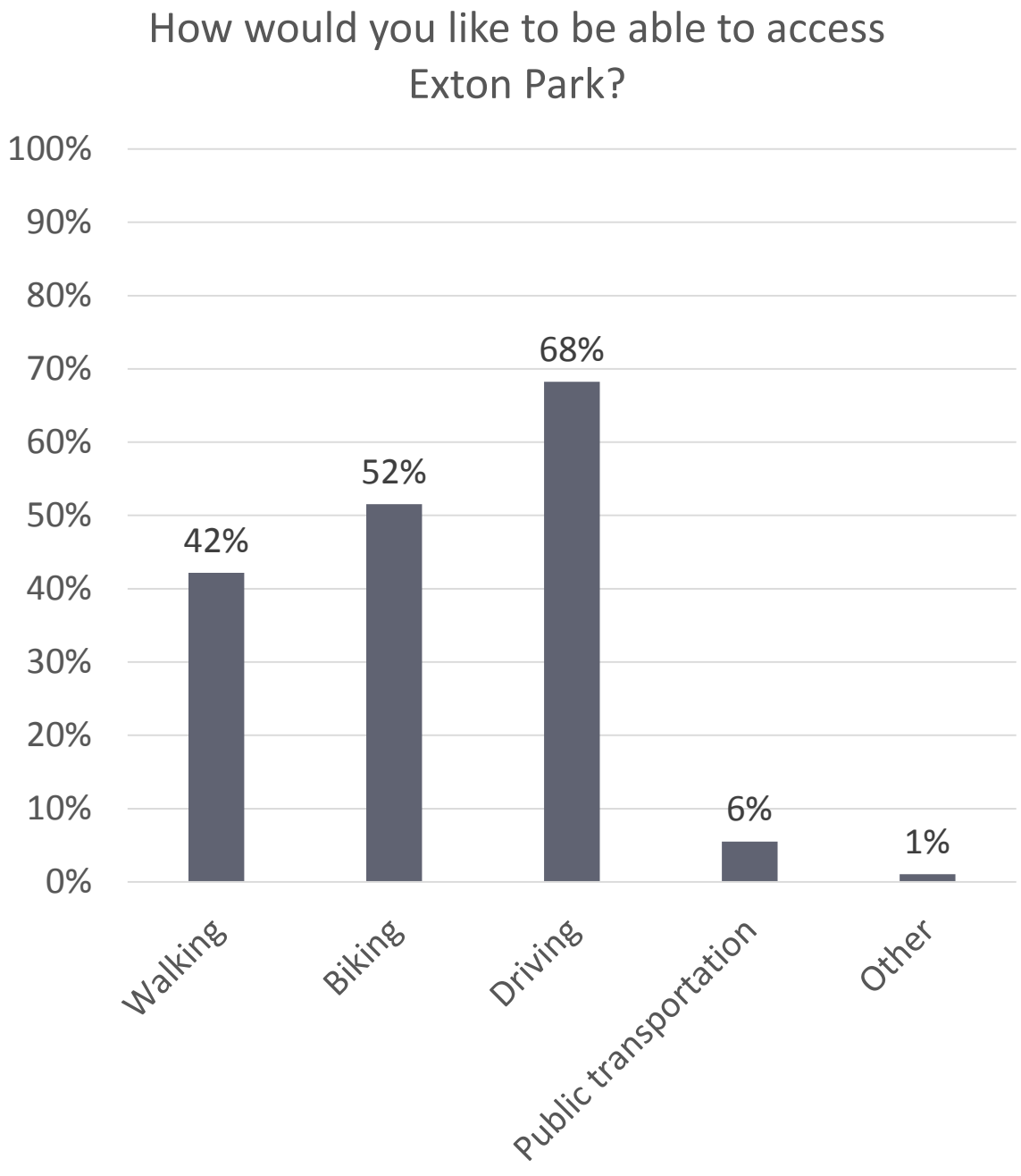

Have you ever visited Exton Park?
100%
80%
60%
40%
20%
0%
1
Yes
No

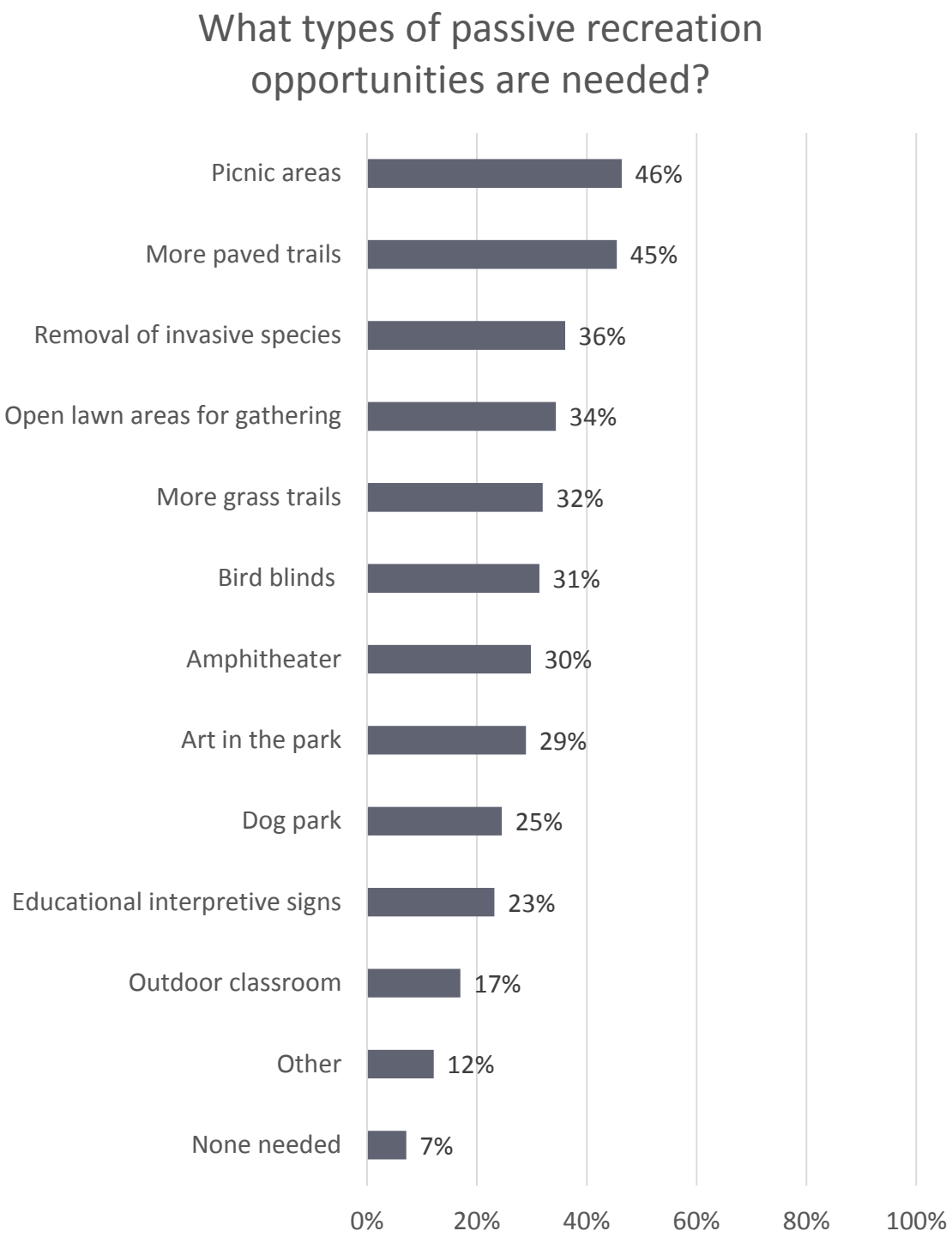

How often do you visit Exton Park?
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
30%
23%
17%
25%
5%
1
I've only visited once or twice
Seasonally
Monthly
Weekly
Daily

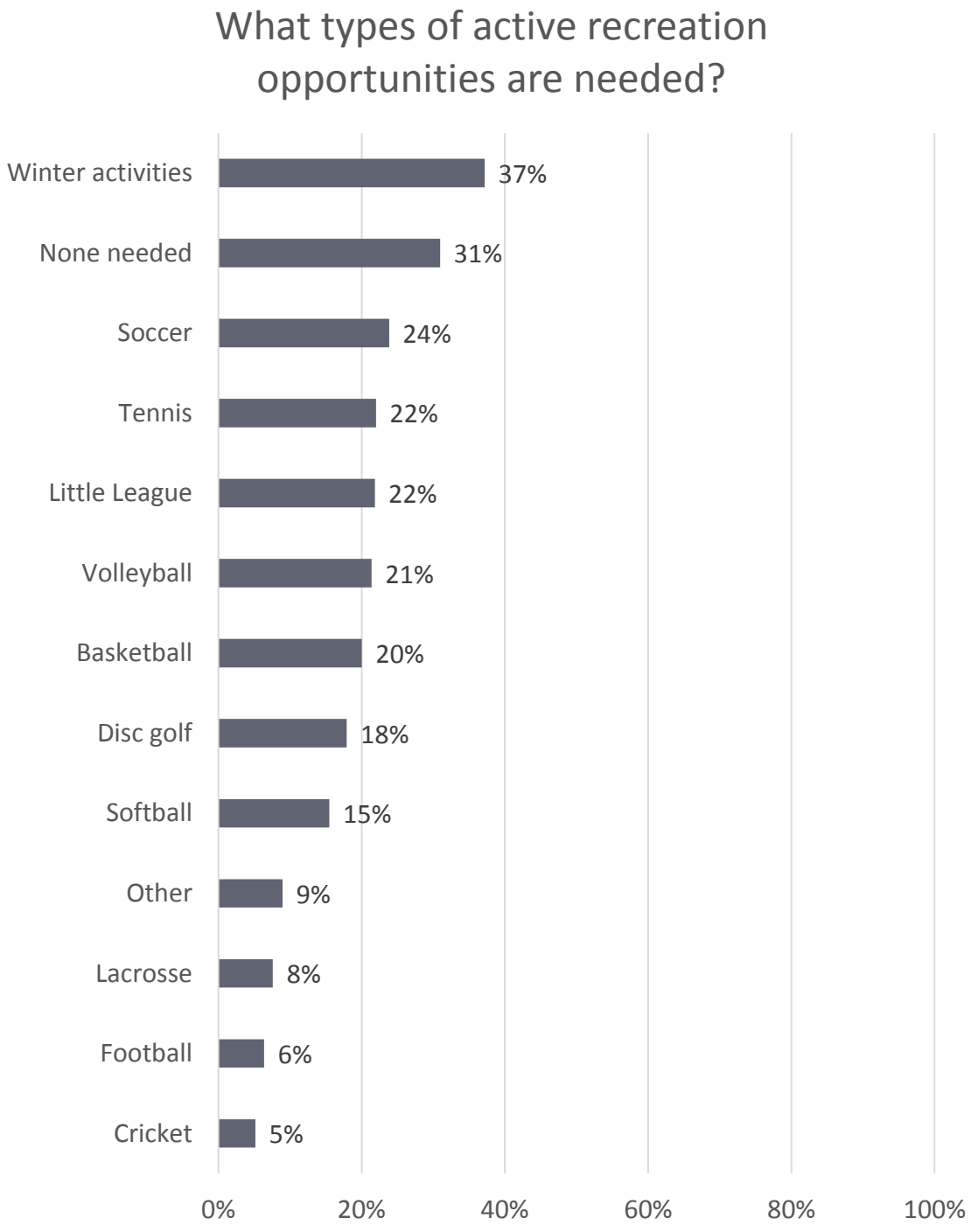

List the number of people in your household by their age
40%
35%
30%
25%
20%
15%
10%
5%
0%
11%
5%
0%
0%
10%
5%
0%
0%
12%
4%
1%
0%
10%
4%
1%
0%
17%
15%
1%
0%
18%
34%
0%
0%
15%
17%
0%
0%
13%
12%
0%
0%
Under 5 years
5-9 years
10-14 years
15-19 years
20-34 years
35-54 years
55-64 years
65 years or older
1
2
3
4

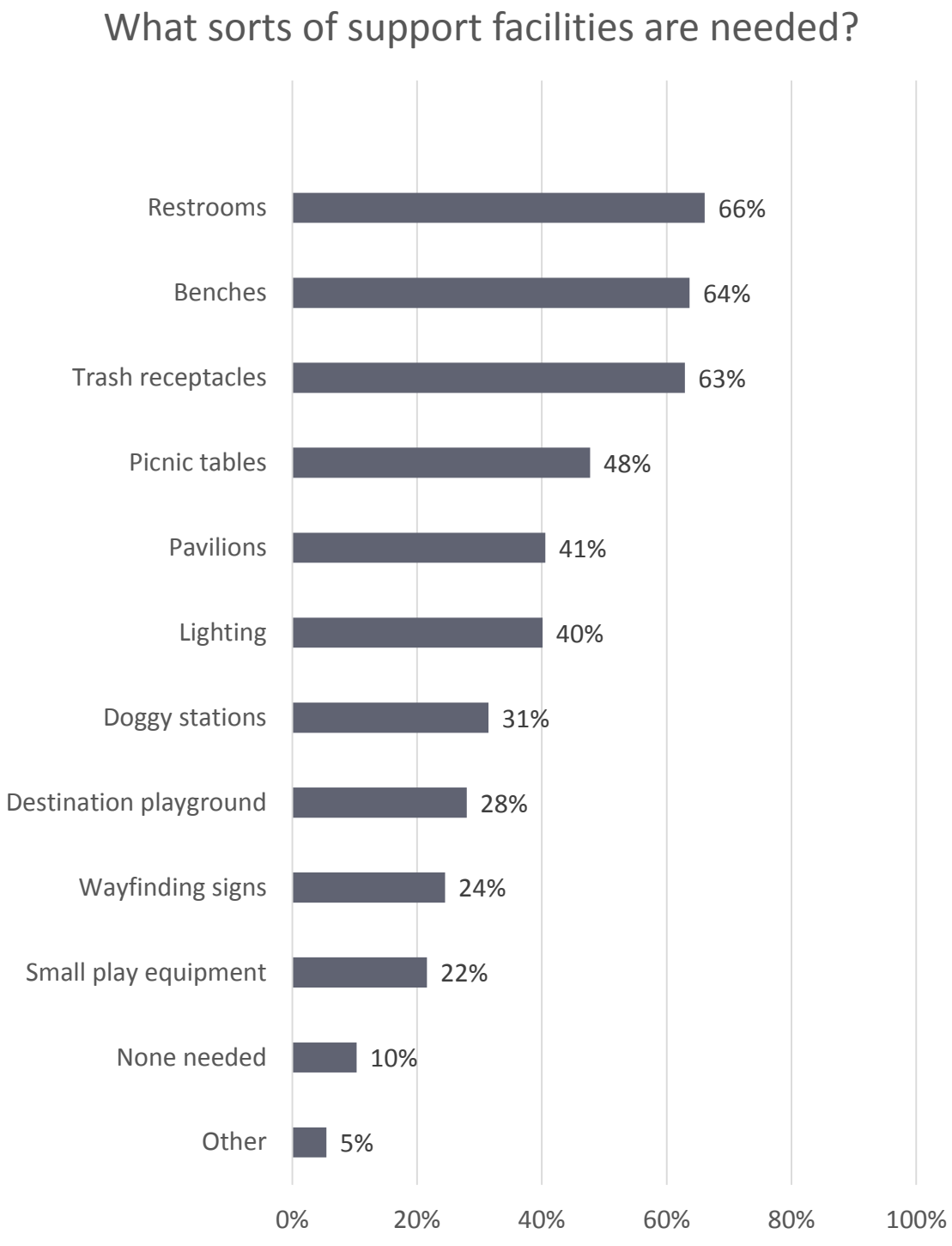

Is there sufficient parking?
9%
81%
Yes
No


Is it easy to walk or bike to Exton Park?
100%
80%
60%
40%
20%
0%
75%
25%
61%
39%
Walk
Bike
Yes
No

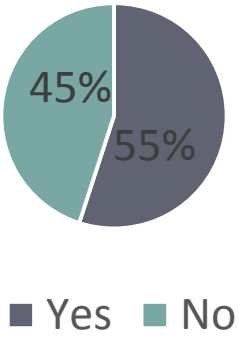

How would you like to be able to access Exton Park?
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
42%
52%
68%
6%
1%
Walking
Biking
Driving
Public transportation
Other


What types of passive recreation opportunities are needed?
Picnic areas
46%
More paved trails
45%
Removal of invasive species
36%
Open lawn areas for gathering
34%
More grass trails
32%
Bird blinds
31%
Amphitheater
30%
Art in the park
29%
Dog park
25%
Educational interpretive signs
23%
Outdoor classroom
17%
Other
12%
None needed
7%
0%
20%
40%
60%
80%
100%


What types of active recreation opportunities are needed?
Winter activities
37%
None needed
31%
Soccer
24%
Tennis
22%
Little League
22%
Volleyball
21%
Basketball
20%
Disc golf
18%
Softball
15%
Other
9%
Lacrosse
8%
Football
6%
Cricket
5%
0%
20%
40%
60%
80%
100%


What sorts of support facilities are needed?
Restrooms
66%
Benches
64%
Trash receptacles
63%
Picnic tables
48%
Pavilions
41%
Lighting
40%
Doggy stations
31%
Destination playground
28%
Wayfinding signs
24%
Small play equipment
22%
None needed
10%
Other
5%
0%
20%
40%
60%
80%
100%

Do you support an increase in taxes to fund park improvements?

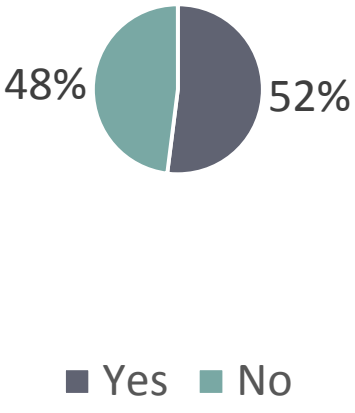


What improvements would you like to see at Exton Park?

- ✓ Bathrooms
- ✓ Trails
- ✓ Parking

Do you support an increase in taxes to fun park improvements?

(West Whiteland residents only)



What activities do you enjoy at Exton Park?

- ✓ Walking
- ✓ Hiking
- ✓ Biking
- ✓ Birding
- ✓ Using the playground

Appendix D – Public Meeting Results

Appendix D
General Public Meeting Notes & Results

Summary of Public Open House Visioning Meeting
Public Meeting #1 May 19, 2016

By head count, approximately 100 people attended the open house. Not all signed in. Of those attendees that signed in, 50% left addresses that were from West Whiteland Township and 24% left no address. The remaining attendees (26%) that signed in came from an area that stretched from Coatesville to Mont Claire.

The following summarizes the results of questions asked at each table.

Question Results By Table:

Table 1 Welcome Table

Share your favorite memory or experience at Exton Park! :

1) "In the fog, my husband and I heard a whoosing sound behind us. Out of the dense fog emerged a swarm (murmuration) of starlings. None hit us, but we were in the swirl for sure."

2) "The bird walks at Exton Park! Love to see the bald eagles, osprey, great horned owl, and all the ducks and songbirds!"

3) "Bird walks at the park and volunteer habitat work."

4) "I see birds that I see nowhere else in Chester County (cout, yellowlegs, osprey and many more."

5) "Watching a family of great horned owls flying near the ponds."

6) "Enjoying the wide open space."

Table 2 How important is a meadow/riparian buffer to you? T= 28

Important: ***100%*** *(28)* Not Important: 0% (0)

How important is the protection and expansion of wildlife habitat? T=28

Important: ***96.4%*** *(27)* Not Important: *3.6% (1)*

Table 3 Do you think Exton Park should provide educational and learning Opportunities for youth and families in these subject areas?

History? T= 30
Yes ***96.7****% (29)* neutral: *3.3% (1)* No: 0% (0)

Environment? T= 31
Yes ***100%*** *(31)* No: 0% (0)

Farming? T= 27
Yes ***74.1%*** *(20)* neutral: *3.7% (1)* No: *22.2% (6)*

Archeology? T= 28
Yes ***100%*** *(28)* No: 0% (0)

Table 4 Are more walking trails needed in Exton Park? T= 29
Yes: *58.6%* *(17)* No: *41.4% (12)*

Are equestrian trails needed in Exton Park? T= 30
Yes: *30.0% (9)* **No: 70.0%** *(21)*

Should connections to the Chester Valley Trail be improved? T= 27
Yes: 70*.4%* *(19)* No: 29.6% *(8)*

Should connections to the Uwchlan Trail be improved? T= 31
Yes: *83.8%* *(26)* neutral: *6.5% (2)* No: *1% (3)*

Table 5 Should all paved surfaces in the park be permeable? T= 27
Yes: *81.5%* *(22)* neutral: *7.4% (2)* No: *11.1% (3)*

Should storm water controls be ‘Green’ (natural vegetated swales/raingardens)? T= 27
Yes: *92.6%* *(25)* No: *7.4% (2)*

Should the pond area be returned to a creek with a wetland system or should the pond be maintained and enhanced? T= 27

Creek & wetland system:	neutral:	**Pond Maintained & Enhanced:**
7.4% (2)	*7.4% (2)*	***85.2%** (23)*

Table 6 No/minimal/moderate or substantial additional improvements needed? T= 28

No additional Improvements	*14.3% (4)*
Minimal passive and support	***42.9%** (12)*
Moderate improvements and enhancements	*21.4% (6)*
Substantial improvements and enhancements	*21.4% (6)*

Meeting Notes
For the
Exton Park Study Site Development Master Plan
General Public Meeting #2
Thursday, September 22, 2016 from 6:00-8:00 PM

The committee and audience in attendance reviewed boards that briefly explained the design process, the overall draft master plan for the park, a close up draft master plan of the area of the park where the development is proposed, and the cost estimate. The last board provide the public with an opportunity to select their top 5 development choices. A copy of the draft final concept was available for visitors to take home.

Drew Sonntag of URDC prepared a formal power point presentation and provided two presentations during the 6-8 time period. The presentation explained in more detail, the process and the resulting plan elements.

The public comment to the plan was favorable. The following comments were received at the priorities board:

The township should plan for a roundabout at the Swedesford Ship Road intersection. This is a dangerous crossing and signals are long.

There is the potential for solar power fields perhaps in the areas that are not going to be developed. The township could use the cost savings provided.

The wording "Uchwlan CVT Trail Connection" should be changed to "Trail Connection" as this connection serves to connect many things besides just the Uchwlan and CVT.

When we bought our home in Swedesford Chase we were promised the park would be developed "soon." My kids are grown and nothing has happened. I do not want to see things installed there that are already there. There is a rest room at this park and a playground. Those two things should not be the first things to go in.

The previous plan called for lots of soccer fields. They installed two fields. There is no place to play soccer in the township. You have to drive to other places for fields. Soccer fields first.

<u>The top priorities or development priorities of the meeting attendees were as follows:</u>

Riparian Buffers - 18 dots

CVT to Uwchlan Trail - 15 dots, Large Natural Play Area - 15 dots

Restrooms - 14 dots, Dog Park - 14 dots

Natural Landscaping - 13 dots, Multi-purpose fields - 13 dots

Rain gardens - 10 Dots

High Ropes Bridge and Tree House - 9 Dots, Paved Trails - 9 Dots

Event Green - 8 Dots

Grass Trails - 7 Dots

Small Natural Play Area - 6 Dots, Picnic Pavilions - 6 Dots

Educational Center/Pavilion - 4 Dots

Boardwalk/Observation Deck - 3 Dots

Interpretive Signs - 2 Dots, Park Signs - 2 Dots, Disc Golf - 2 Dots

Zip Line - 1 Dot

The next meeting will be a committee meeting to be held on October 27, 2016 starting at 6:30.

Appendix E – Pennsylvania Natural Diversity Inventory

Appendix E
Pennsylvania Natural Diversity Inventory

1. PROJECT INFORMATION

Project Name: **Exton Park**
Date of review: **11/30/2015 10:34:42 AM**
Project Category: **Recreation,Other**
Project Area: **295.9** acres
County: **Chester** Township/Municipality: **West Whiteland**
Quadrangle Name: **MALVERN** ~ ZIP Code: **19341,19355**
Decimal Degrees: **40.040692 N, -75.606575 W**
Degrees Minutes Seconds: **40° 2' 26.5" N, -75° 36' 23.7" 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	No Known Impact	No Further Review Required

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 two years** (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: Lyonia mariana
Common Name: Stagger-bush
Current Status: Endangered
Proposed Status: Endangered

Scientific Name: Quercus falcata
Common Name: Southern Red Oak
Current Status: Endangered
Proposed Status: Endangered

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: No impacts to **federally** listed or proposed species are anticipated. Therefore, no further consultation/coordination under the Endangered Species Act (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq.* is required. Because no take of federally listed species is anticipated, none is authorized. This response does not reflect potential Fish and Wildlife Service concerns under the Fish and Wildlife Coordination Act or other authorities.

* 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

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. 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
Pennsylvania Field Office
110 Radnor Rd; Suite 101, State College, PA 16801
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: Kevin Draper
Company/Business Name: Urban Research and Development Corporation
Address: 28 W Broad St
City, State, Zip: Bethlehem, PA 18018
Phone:(610)865-0701 Fax:(610) 868-7613
Email: kdraper@urdc.com

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 3/23/17 date

Appendix F
Maintenance and Monitoring Plan

Appendix F – Maintenance and Monitoring Plan

Appendix F Monitoring and Maintenance Plan

Exton Park

Master Site Development Plan

West Whiteland Township, Chester County, PA

Prepared by Urban Research & Development Corporation

Table of Contents

Introduction

Woodland and Meadow Buffer Plantings and Trail development are a crucial component of the Exton Park Master Site Development Plan. The Monitoring and Maintenance Plan is intended to accompany the Restoration Plan for the Woodland and Meadow Buffer. Potential sources for plants can be found in Table 3 - *Potential Seed and Plant Sources*. Time, effort and money will be expended to develop Exton Park and, therefore it is important to have a Monitoring and Maintenance Plan in place in order to set measurable goals and determine maintenance priorities and procedures. This Monitoring and Maintenance Plan outlines procedures to be followed for the project site to evaluate the condition of restoration interventions relative to project goals and to maintain the trail improvements using observation and an Adaptive Management Methodology*. Short term construction period monitoring efforts focus on the accuracy and quality of the initial installation and observations of its success. Longer term monitoring focuses on the adaptation of flora and fauna to the restored areas along with the long term stability of the introduced plan components with regard to restoration efforts and integrity and safety with regard to the trail system components. Successful establishment of recommended plant communities will result in increased diversity and abundance of both plants and the animals that inhabit the Park. Developing a solid, cost-effective monitoring plan will allow for scientifically-valid metrics to evaluate performance and overall success. The leading indicators for the ecosystem creation will be vegetation survival, growth rates and recruitment of additional native plant species. Additionally, wildlife should be monitored through standardized survey methods and interviews with/information from visitors/citizen scientists. Hydrologic system observations will include monitoring surface and flood water levels and chemical components. Trail system monitoring should focus on trail surface wear and tear, problematic areas, and wayfinding signage integrity and wear. Photographic documentation and recorded observation will allow for comparison over time. All photographs should be taken at the same locations at each observation session. Map 1- *Observation Locations* suggests locations for observations and photographs. All monitoring efforts should be supervised by a qualified ecological restoration professional.

*Adaptive Management Methodology is designed to provide unbiased data for use in evaluation of success and failure according to expectations, the degree of that success and failure and what repair and maintenance are necessary. Data to be collected, procedures for acquisition of that data and a timetable for data collections will be suggested.

Monitoring Plan Objectives

The restoration buffer areas are shown in Map 1 - *Observation Locations*. The woodland and meadow installation process should follow the accepted Buffer Restoration Plan. The Monitoring Plan assumes all design suggestions are in place or following a phased plan. A certain period of inspections and monitoring of the restoration site is suggested to ensure that the construction is properly executed in accordance with the design documents, and to ensure general health of the plantings. Conditions that detract from the original design intend and/or which create undesired circumstances can be identified early thorough the monitoring process and can be remedied on a timely basis. As is usual for any development, monitoring of and inspections of the installation should be done during the construction phase. Post-construction monitoring should begin during the first growing season after the

installation is approved by the supervising professional. If the installation work is phased into multiple growing seasons then the monitoring period shall follow the completion date (season). Inspections should be comprehensive for efficiency and performed within similar time frames each year for consistency. Unforeseen events such as extreme weather or human impacts may impact the woodland and meadow plantings. Inspection visits should occur in a timely fashion and should be in addition to regular monitoring activities. Annual Monitoring Reports should be presented to the township and a Preliminary Monitoring and Maintenance Report should be made after the first 5-year period. At that point a Final Report would review and a qualified restoration professional can assist in providing procedures for an additional designated time period.

Specific Goals

The monitoring program contained in the Monitoring and Maintenance Plan seeks to reach the following goals:

1. To ensure that the requirements of the original design documents and approved changes have been properly implemented.
2. To analyze the project post-construction to assess whether the design intent and restoration goals have been met and if not to what degree are they deficient.
3. To suggest repairs for items that have the potential to compromise the success of the restoration project and site design.
4. To assess the degree to which recruitment has brought new native species to the site.
5. To assess the degree to which wildlife have adopted the areas as a functioning habitat.
6. To maintain vigilance against invasive species and to limit their impact to the area as much a practically possible.

Monitoring Report Submittals

At the end of each monitoring year, a bound copy of the monitoring report should be presented to the Township. The year one report should be given to the buffer planting contractor. Each monitoring report should include the following:

1. Map of monitoring points.
2. A written description of the general condition of the restoration sites and changes from the previous inspection.
3. A tabular summary of collected data.
4. Copies of laboratory testing results and on-site testing results.
5. Photographs of monitoring pints and general conditions.
6. A list of required corrective actions.
7. A written description of the status of the site.
8. A written conclusion and recommendations for the following monitoring period.

Construction Period

A complete inspection of all installed plants and materials should be made in the fall of the year following completion of vegetation installation. Records of the material tags, materials receipts, log book, etc. should be incorporated into the project library by the project

manager. The contractor should be required to maintain well organized and easily accessible records of the work. At least one copy of color photographs should be made and kept with the original project records. Baseline data collection will be collected prior to construction of any kind. These data are: stream flow data, flood levels, macro-invertebrate populations, water chemistry samples (water quality indicators) and photographic documentation of existing conditions.
Existing vegetation and wildlife populations should be documented using a combination of field surveys and pre-existing data. Pre and post-construction monitoring records should be kept in separate volumes. Additional archiving of documents and photographs can be in digital format.

Post-construction Monitoring Period

Data Collection

The suggested monitoring period is five year. Data should be collected at intervals throughout the year as suggested on the attached Work Schedule. At the end of each year an annual report will compile date in order to document success of the restoration design in terms of achieving its goals and to provide feedback for future restoration designs. Table 1 – *Data Collection* details what, where, how and why each data type is suggested for the Exton Park project.

Vegetation Monitoring: Buffer Plant Survival/Germination and Cover; Exotic Invasive Plant Coverage and Eradication
Wildlife Monitoring: Sightings and Signs
(Use taxa-specific methods for Birds, Mammals, Reptiles, Amphibians, and Pollinator Insects)
Trail and Signage Integrity: Wear and Tear
Hydrology: Flow rate and Flood Levels
Water Quality: Macro-invertebrates and Water Chemistry

Vegetation Survival and Cover - Woodland and Meadow Buffer

The Woodland and Buffer Planting Plan will specify the proper methods to prep the site prior to planting and the number of each species to be planted.* The system of planting should define patches or areas for organization and monitoring. After each 'area' is complete a baseline photograph should be taken at a pre-determined location which can them be revisited and retaken over time, thereby providing a visual record for comparison and determination of the success of the planting. Photographs should be taken at each location at the start of the growing season as well as monthly throughout the growing season for the first two years. Photographs and observations should also be taken at exceptional times, such as in extreme drought conditions and flood conditions. Due to the fragility of wetlands, care should be taken that they are not used for consistent observations and photographs. An 80% survival rate in the first year can be considered a success planting. Herbivory protection including goose protection and deer protection should be maintained for three years after completion of the installation. These measures should be inspected, photographed, and their condition described in the observation records. Repairs should be made in a timely fashion in order to protect the buffer plantings. These measures can be removed at the end of the

3-year post-construction monitoring period under direction of a restoration professional. Following the implementation of the Woodland and Meadow Buffer Planting Plan, the Monitoring Plan suggests an annual monitoring schedule for a 5-year period. At that point a preliminary report should be produced and reviewed in order to reassess the existing monitoring and maintenance plans, and to produce an adjusted Monitoring and Maintenance Report for an additional designated period.

*https://www.nps.gov/Plants/pubs/chesapeake/pdf/chesapeakenatives.pdf

Seeded Meadow Areas Site Preparation and Seeding*

Potential species and potential commercial seed mixes can be found in Table 4 – *Potential Meadow Seed Mix#1 and* Table 5 – Potential Meadow Seed Mix #2

Site Preparation

Due to the agricultural history of the meadow buffer areas, it is important to allow the appropriate interval for the residues of herbicides used to break down prior to planting the meadow. Some herbicide residues can prevent seedling germination therefore refer to herbicide documentation for breakdown information. Competition from invasive or undesirable vegetation is the most limiting factor in upland meadow preparation. Prior to planting, the meadow buffer areas should be disc harrowed every 2-4 weeks for a one to two month period. The underlying premise of this process is that the root system of perennial species will be worn out to the point of killing the species. In addition, tillage will stimulate germination of dormant weed seed which will be killed by subsequent tillage. Planting should not occur until perennial species are fully killed.

Use of an approved herbicide, such as glyphosate (Roundup® or Rodeo®), is the most common and least time-intensive protocol for controlling existing vegetation. Herbicides are most effective on actively growing plant tissues, so they are very effective on new growth in the spring. Spraying should begin when growth is approximately 6" high. One to two weeks later, a follow-up application of spray may be made to address skips or persistent species. If substantial plant tissues remain on the surface following a full kill by herbicides, a close mowing, tillage or burning may be necessary to achieve good seed-to-soil contact. If the Township does not have staff that are experienced in native habitat restoration and/or have updated herbicide applicator licenses, we strongly recommend considering using a native restoration firm to prep, seed, and install all plant material. This firm should also assume the responsibility of maintenance (involving tree tubes, spot-herbicide applications to proactively eradicate colonization of invasive plants, and other methods to ensure successful establishment).

Fertility

Natural fertility on upland or previously farmed sites is generally adequate for native flower and grass plantings. No fertilizer or lime is needed (the addition of fertilizer often helps weeds and invasive plants). Check your soil pH and select species adapted to that pH.

Seeding Method

Hand seed, broadcast, hydroseed or drill seed. Native seeds are light and fluffy, often requiring specialized seeding methods. We recommend using a truax native drill seed for optimal seed-soil contact and maximum germination.

Seeded Meadow Areas Maintenance

First Growing Season

Whenever overall vegetation height reaches 18"-24", use a mower to trim the meadow to a height of 8". This will reduce competition by fast-growing weeds for sunlight, water and nutrients needed by slower growing, perennial natives. Mowing should not be done with a lawn mower as the mower height will be too low and native seedlings will be killed. Mowing should cease by mid-September. Problem weeds should be spot sprayed with approved herbicides. Mowing must be curtailed during the breeding bird season. This is from April 30 – August 31. Therefore, we recommend a spring mowing (if plants are tall enough) and then another mowing in the first or second week of September. Spot-treatments using herbicide can successfully eradicate emerging/colonizing invasive species during the breeding bird season.

Second Growing Season

In the second spring, whatever vegetation was left over winter should be mowed to the ground before the start of the growing season. During the growing season, watch for invading weeds and remove any undesirable plants by pulling them out or cutting them off at ground level (unless a restoration firm is hired to conduct spot treatments). From the second year on, mow your meadow annually late in winter or early in spring before the next year's growth begins. If you notice a heavy infestation of ragweed or foxtail in the second growing season, trim the meadow to a height of 8". Trimming should cease by mid-September. Again, do not mow during the breeding bird season.

* Sources:

Ernst Seed Conservation Seed documents. For more information: http://www.ernstseed.com

Penn State Extension Service. For more information: http://extension.psu.edu/ /natural-resources/wildlife/landscaping-for- wildlife/pa-wildlife-5

PA DCNR. For more information: http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_20028672.pdf

Monitoring

Buffer Planting/Seed Establishment and Survival

Year 1 - Initial plant survival/germination, cover and mortality assessment
Year 2 - Plant survival, cover and mortality assessment; plant replacement
Year 3 - Plant survival, cover and mortality assessment
Year 4 - Plant establishment and plant reproduction
Year 5 - Plant establishment and plant reproduction

Coverage estimates should be made near the end of the growing season to permit maximum growth. A walking survey is required for this work. A listing of the general performance of various species within each buffer are should be made and recorded. Coverage should be defined as acceptable if the cover is maintained by one or more of the species installed. The diversity of the original installation should be noted during the monitoring period but not required for acceptable coverage. The monitoring report should include an interpretation of the performance of the various species within each buffer. If adequate cover is not attained at the close of the 3-year cover goal period, the restoration profession should make recommendations on how to mitigate the situation and reach acceptable cover requirements. The following vegetation coverage goals are reasonable for the Exton Park Project, although final determination should be made by the restoration professional in charge:

- Meadow buffer: 80% coverage in year 3
- Woodland (outer buffer): 60% coverage in year 3
- Woodland (riverbank buffer): 90% coverage in year 3

Exotic Invasive Plant Treatment Methods and Species Phenology

Phenology describes the life cycle of a plant species. Attention to the timing of flowering, germination and seed development can assist extermination of undesirable plant material. The following sheets entitled '*Exotic Eradication Strategy'* (Figure 2 to Figure 21) provide phenology information and treatment methods for the most troublesome exotic invasive plants at Exton Park. The vegetative structures of flower, seed and leaf as well as the germination period are color-coded by the appropriate month of the year. Suggested months for potentially successful treatment is shown, also color-coded, for each plant. Each Exotic Eradication Strategy Sheet also includes additional notes and photographs to aid in proper plant species identification.

Biennial herbaceous material forms rosettes in the first year and flower and seed in the second year. Woody plant material may take years to develop seed. Older woody plants are more difficult to exterminate and every effort should be made to eliminate undesirable species when they are young. The Exton Park stream corridor is overgrown with exotic invasive plants and complete elimination of all species is unreasonable. Selected species can be targeted in order to focus township efforts on the most troublesome species in order to reduce competition on buffer plantings. Exotic plant invasion is ongoing. Diligence in monitoring and quick extermination action once any species are found is suggested.

Flower

The flowering phrase is the germination phase for seed development. This period is useful for identification and preventive elimination techniques. If the flower head can be removed, the seed development process can be undermined and plant spread due to seed dispersal can be impacted.

Seed

Seed dispersal is one of the major methods for plant propagation. Removal of the seed heads on undesirable plants before the seeds develop may guarantee higher levels of eradication success. Methods of seed dispersal varies between species although commonly the seed head may explode and expel seeds on contact, attach to hair, fur and clothing with barbs or be so small they disperse unnoticed. Birds eat many exotic plant seeds and are responsible for extensive seed dispersal. Many seeds can remain viable in the soil for many years and germinate long after the parent plant is gone. Therefore, removal of seeds before ripening is crucial to an eradication strategy.

Leaf

Many exotic invasive plants come into leaf earlier and stay in leaf longer than native species. Some exotics remain green throughout the winter in the northeast. This period of time is useful for elimination techniques. The plant in question is easily sighted and damage to desirable natives can be minimized.

Treatment Methods

For the best results, many of the methods described below can and should be used in conjunction with one another as noted in the descriptions.

Cut and Paint With Glyphosate Method*

Most woody species can be manually cut to ground level with either a handsaw or chainsaw. Within one minute after cutting, paint the outer 1" of the stump with glyphosate. This will allow the glyphosate to translocate through the plant along the meristem and become fully activated as an herbicide. It is important to paint the plant quickly before the plant seals off the wound. Glyphosate is non-discriminative, it will impact any material it touches therefore be careful not to drip glyphosate onto desirable surrounding plant material.

Foliar Spray Glyphosate Method*

Glyphosate can be applied to exotic invasive plant material during the growing season when plants have foliage. The spray method uses a backpack sprayer (spot spray) or a sprig rig that is mounted on an all-terrain vehicle (blanket spray). Either method is appropriate for a specific task. Spot spraying is most appropriate in a setting where the exotic invasive plants are intermingled with desirable plant species. The person applying the pesticide spray must be able to identify the targeted exotic invasive plants and spray only the exotic invasive plant species. The rig-mounted spray method is most appropriate for large areas intended to be cleared, where all plant material is undesirable. Caution must be used when using this method that the spray does not blow toward desirable plant areas. Precaution must be taken to protect the person applying the herbicide by use of protective clothing and mask.

Black Plastic Sheeting Method

Thick 20 mil black vinyl sheeting can be laid down in over-lapping runs to completely smother herbaceous exotic invasive plant species (i.e. Ficaria verna, Lesser Celandine). Be advised that this method will kill all plant material beneath the sheeting.

Pull Method

Hand-pulling of exotic invasive plants works well at all times of the year except when seed heads are present. The rigor of pulling can shake the seed head and disperse the very plant intended to be eliminated. Hand-pulling is especially successful for young woody plants (i.e. Berberis thunbergii, Japanese barberry) or shallow rooted herbaceous plants (i.e. Allaria peliotata, garlic mustard). After the plants are uprooted, they should either be hung upside down on the surrounding vegetation well above ground level or they should be removed from the area and destroyed.

Four-Tine Rake Method

A four-tined rake is most useful for low-growing plants that can easily be uprooted and that are spread over a very wide area (i.e. Glechoma hedera, ground ivy; Rubus phoenicolasius, wineberry; or microstegium vimineum, Japanese Stilt Grass). Just as in hand-pulling, the plants should be raked when seed heads are not present and after removal the plants must be removed from the area and destroyed

Girdle Method

Girdling wounds the plant by removing a 1”-wide strip (cambial layer) around the circumference of the plant. The intent is to interrupt the process of translocation of water and nutrients within the plant thereby starving the portion of the plant above the wound. This method works best on plants that are large and may be difficult to remove (i.e. Ailanthus altissima, Ailanthus). Immediately after girdling the wound should be painted with glyphosate in order to introduce the herbicide to the interior of the plant and effectively translocate the herbicide. This method will successfully inhibit sprouting. The resulting dead tree can be allowed to remain or be removed once dead.

Burn Method

Properly timed burns are one of the most successful methods to encourage meadow species to flourish while suppressing exotic invasive species. This method should only be utilized with a properly trained fire crew. Ideal conditions for burning result in the most effective and safest results. This method is usually reserved for meadow areas.

Chip Method

The Chip Method is used for woody plant material that has been treated with glyphosate and IS NOT IN SEED. Chipping will decrease the amount of bulk plant material left on the ground or transported. The chipping debris can be left on the ground which helps to build an organic layer on top of existing soil. Plants that can be eradicated by this method include trees and woody shrubs (i.e. Acer plantanoides, Norway maple and Lonicera mackii, Amur Honeysuckle).

Weed Wrench

A weed wrench is a hand-tool that acts as a giant lever thereby providing a tremendous mechanical advantage. This method works best for plants that cannot be pulled by hand (i.e. Ligustrum vulgare, Common Privet or Lonicera mackii, Amur Honeysuckle)

Mow Method

Mowing is a common method used in meadow areas that cannot or will not be burned (i.e. near buildings). Properly timed, mowing can be as effective as a prescribed burn. The mechanism of mowing acts in the same way as fire. It inhibits growth of exotic invasive species, while providing an advantage to native herbaceous plants thereby encouraging their growth. Mowing can remove and suppress woody plant species from colonizing a meadow area. Mowing is most effective for controlling herbaceous exotic invasive plant species (i.e. Sorghum halepense, Johnson grass).

*Toxic Herbicidal Sprays – The exotic invasive plants found at Exton Park are commonly found and persistent in the northeast. Vigilance through mechanical methods is preferential to chemical sprays although requires persistence. If herbicidal methods are necessary, the work should be done by a professional due to specific strategies and highly toxic chemicals; many of which legally require certification for application. Even aquatically-safe herbicides should not be used near potable water supplies. Sprays can be used on leaf and woody cuts in the cambium layer and work best when sprayed o plant leaves during active growth. Herbicides are not selective and can damage desirable species as well. Spraying should be timed so that desirable plants can be protected or are not in leaf, if possible. The generic herbicide 'glyphosate' and '60% metsulfuron methyl' are generic names of herbicides found in many name brand herbicides. Many products are specific for non-aquatic and aquatic use. Due to the extensive floodplain in Exton Park, the products marked as 'Safe for Use in Aquatic Areas' should be used for any herbicidal treatment. Only products within a low range of strength are available over-the-counter. Products with a higher percentage of active herbicide require application by registered pest management personnel.

** *A Management Guide for Invasive Plants in Southern Forests* and *Non-Native Plants of Southern Forest – A Field Guide for Identification and Control* provides extensive information on procedures and plant specific eradication strategies. Both these booklets are free from the USDA and downloadable version are available online.

Trail System

The trail surface should be inspected two times annually - in the spring following winter inclement weather and in the fall after a full summer season. The trail signage should be inspected annually for stability and wear and tear on the same schedule.

Wildlife

Terrestrial (mammals, amphibians, and reptiles) and avian wildlife should be monitored through the written observations of sightings or signs of habitation during strategic monitoring visits from March through October. This can be achieved via the collection of wildlife observations using peer-reviewed survey methods and be supplemented by shared observations from park staff and visitors. Photography of terrestrial and avian wildlife is encouraged.

Recommended survey methods include Calling Anuran Surveys for breeding frogs and toads (using the NAAMP protocol), unlimited-distance single-observer point counts for birds, scat and track transects for medium and large mammals, Sherman live trapping for small mammals, and Time- and Area-Constrained Searches for reptiles. There are other, more intensive survey methods that may be employed, but the above-mentioned methods are easily implemented by a wildlife professional and are the cheapest and most cost-effective for determining wildlife abundance, distribution, and diversity. Changes in wildlife populations following ecological restoration are widely accepted methods for determining success and understanding adaptive management needs to achieve intended goals. Further, the data can be used in myriad educational formats (such as programmatic/citizen science, species lists, educational signage, etc.). Identification of certain wildlife species can warrant funding and technical support opportunities from local, state, and federal agencies as well. This is a high potential considering historically present wildlife, regional habitat loss, and the potential for particular rare, threatened, and endangered species to find suitable critical habitat within the restoration zones.

Stream Flow

Stream flow should be measured by direct observations utilizing hand deployed velocity measuring devices (timing a floating item for a specific distance). Quantitative data collection can be acquired with a V-notch weir. Procedures for V-notch measurement can be found in the US Bureau of Land Management Publication “Water Measurement Manual” available for download at: https://www.usbr.gov/tsc/techreferences/mands/wmm.html

Flood Levels

Flood levels should be measured and recorded for one year prior to woodland and meadow buffer restoration and park development construction. Two staff gauges, one secured within the normal flow stream corridor and another within the floodplain should be secured in a visible location, read on a monthly schedule as well as during and after storm events. These readings will provide record of water level during normal and flood stage. Local rainfall for the same time period should accompany this data. Observations (two staff gauge system) should made at two locations: downstream of the wooden pedestrian bridge along the Pond Loop Trail and upstream of the vehicular bridge at Ship Road and Valley Creek (see Map 1 – *Observation Locations*).

Water Quality

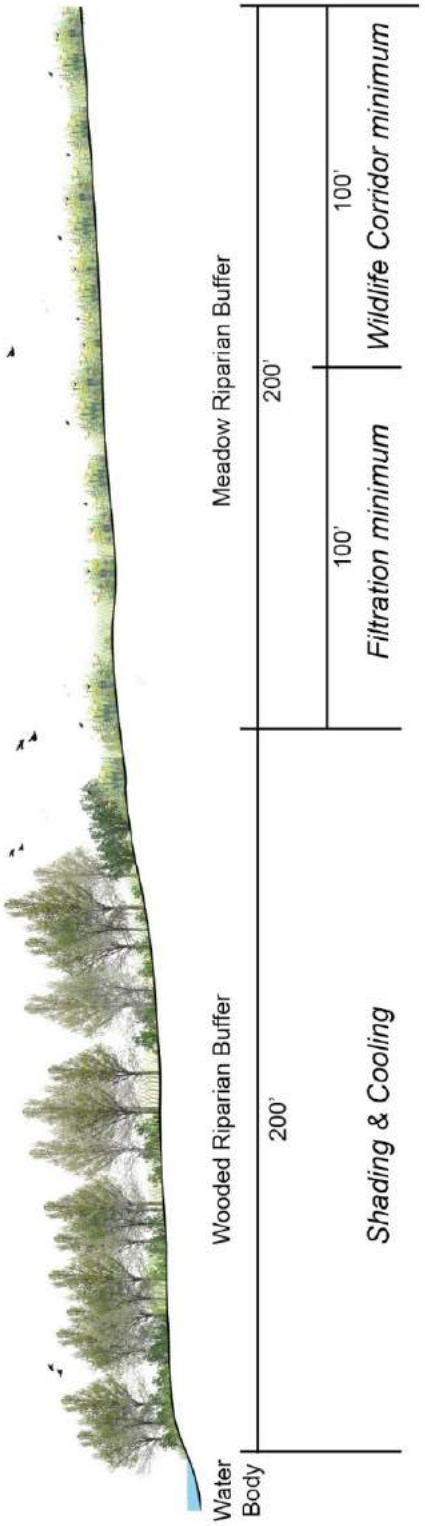
The number of macro-invertebrates and species diversity in stream water will provide measure of water quality. The relative numbers of organisms without regard to species identification can provide qualitative water quality information. For instance, finding large numbers of specimens and great diversity of species would suggest high water quality, finding no organisms would suggest low water quality and possible toxic conditions. The dominance of or lack of certain species can provide qualitative information on the degree of water quality, positive identification of organisms is necessary. For instance, caddis flies and dragonflies show high macro-invertebrate diversity and good water quality; Leaches, indicate poor water quality. Samples should be taken prior to any construction and during post-construction inspection visits. Successful collection requires a fine-mesh net, collection basins and curiosity to look in and under as many locations as possible within the stream corridor.

Chemical constituents in the water can be found by taking water samples prior to any construction and during post-construction inspection visits. These samples will monitor the chemical constituents in the water and aid in the identification of compounds that may be positively or negatively affecting vegetation and wildlife. A grab sample should be taken and analyzed within the time period prescribed by the testing/certifying laboratory. The sample containers, preservatives and sample management procedure specified by the laboratory should be followed for reach sample.

Analytical testing should include the following measurements:

- Water and ambient temperature (at time of grab sample and at testing)
- pH
- Oil and Grease
- Total suspended solids
- Ammonia – NH_3
- Nitrite –NO_2
- Nitrate –NO_3
- TKN (Total Kjeldahl Nitrogen)
- Total phosphorus
- Total organic phosphorus
- Fecal coliform

Figure F1- Cross-Section of Meadow and Woodland Buffer



Map F1 - Observation Locations

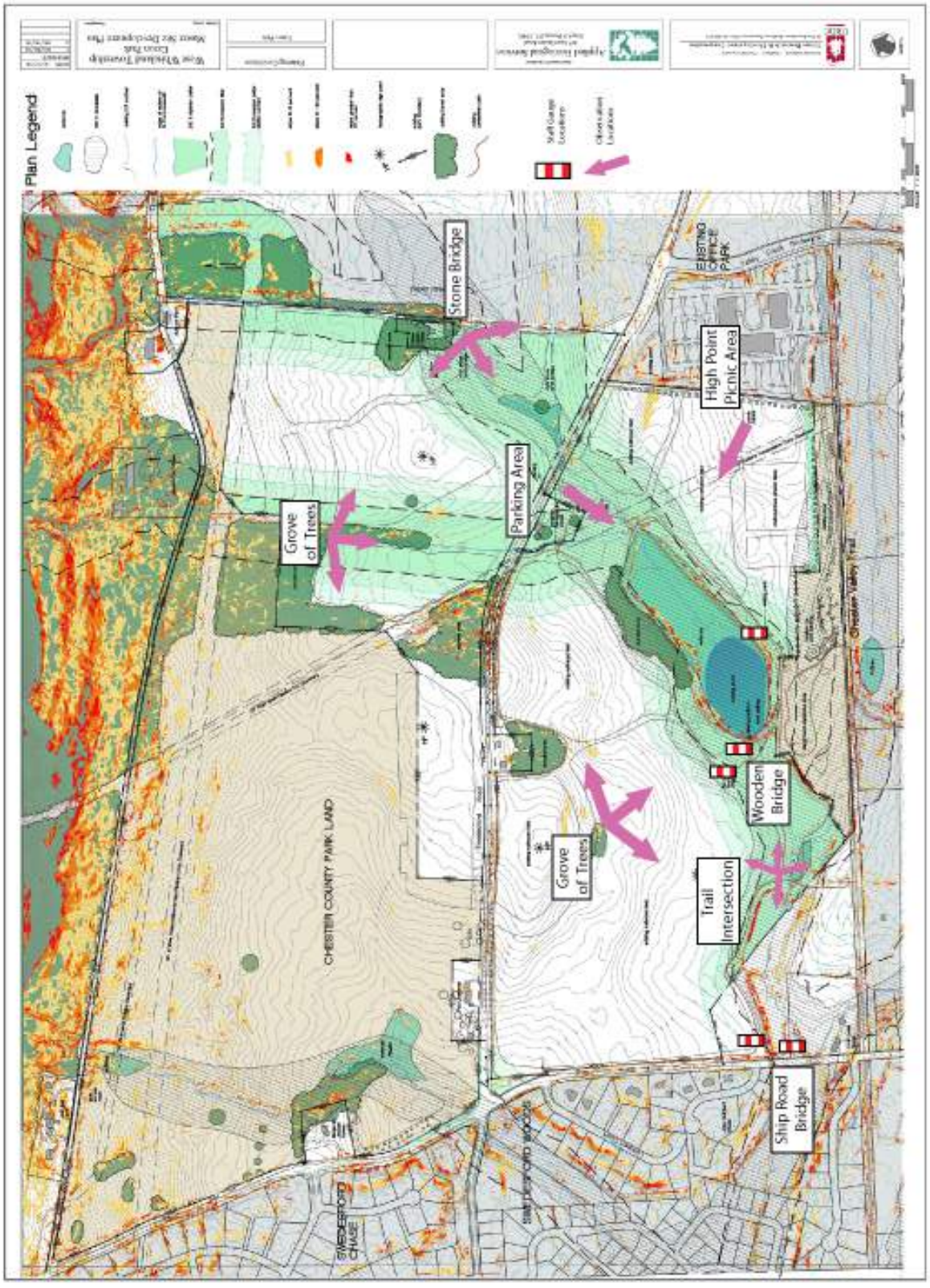


Table F1 - Data Collection

Data	Device/Method	Location*	Why	Goal
Vegetation				
Buffer Plantings Survival/Mortality/Coverage	Plot Sampling / Mortality Count /Photographs	Woodland & Meadow Buffer areas	Survival of planted species	80% survival after five years
Exotic Invasive Plant Coverage	Plot Sampling / Mortality Count /Photographs	Woodland & Meadow Buffer areas	Eliminate competition for buffer plantings	100% eradication after five years
Wildlife Use				
Breeding Bird Surveys	Unlimited distance, single-observer Point Counts	Sitewide	Determine all breeding birds on site before, during and after restoration of natural areas	Document increase in abundance and diversity of native breeding birds on site. Educational and funding drivers…
Migratory and Wintering Bird Surveys	Point Counts, walking transects, citizen science	Sitewide	Document the value of the site for neo-tropical songbirds and waterfowl in migration and wintering birds	Provide educational and programmatic amenities for local wildlife stakeholders. Inform adaptive management strategies. Funding opportunities
Calling Anuran Surveys	NAAMP Protocol	Near all wetland/water features	Understand changes in breeding amphibian populations	Educational, programmatic, and funding opportunities
Track and Scat Transects	Search Transects and Visitor Observations	Sitewide	Provide predator and deer population estimates	Informs hunting program and provides programmatic, educational, and funding opportunities

Reptile Surveys	Time- and Area-Constrained Patches	Sitewide	Document distribution and abundance of reptile species on site before, during, and after implementation	Provide educational and programmatic amenities for local wildlife stakeholders. Inform adaptive management strategies. Funding opportunities
Trail and Signage Integrity				
Wear and Damage	Observations /Photographs	Throughout park	Safety	Preemptive repair
Hydrology				
Flow rate	Timed Trial; Weir	Secured to bridges	Comparative flow throughout year	Reduced gully erosion
Flood Levels	Staff Gauge	Secured to bridges & in floodplain	Determine maximum flood level	Reduced stream level
Water Quality				
Aquatic Micro-invertebrates	Collection Net & Professional Guidance	Stream and pond	Water quality indicator	Stable or increased favorable micro-invertebrate population
Chemistry (O2, Phosphate, etc.)	Water sample & Off-site laboratory	Stream and pond	Water quality indicator	Reduced siltation & reduced chemical runoff

* See Map 1 for suggested locations of data collection

Table F2 - Monitoring Schedule

	Jan	Feb	Mar	Apr	May	Jun	July	Aug	Sep	Oct	Nov	Dec	Year	NOTES
VEGETATION														
Buffer Plantings Survival /Mortality			x			x							1-5	also in extreme conditions
Seeding			x	x					x	x				
Tree Planting									x	x	x			
Herbaceous Plant Planting			x	x					x	x				
Mowing – Meadow Buffer				x	x	x	x	x	x					no mowing by mid-Sept
Exotic Invasive Plant Coverage			x			x				x			1-5	also in extreme conditions
Herbivory Structure Integrity	x	x	x	x	x	x	x	x	x	x	x	x	1-3	
WILDLIFE														
Sighting and Signs			x	x	x	x	x	x	x	x			1-2	Baseline, Yr 2, Yr 3 & in 5th year
TRAIL INTEGRITY														
Wear and damage				x					x				1-5	also in extreme conditions
HYDROLOGY														
Flow rate	x			x					x				1-5	also in extreme conditions
Flood Levels	x			x					x				1-5	also in extreme conditions
WATER QUALITY														
Aquatic Micro-invertebrates				x					x				1-5	Baseline & in 5th year
Chemistry (O2, Phosphate, etc.)				x					x				1-5	Baseline & in 5th year

Manley, Patricia N. Multiple Species Inventory and Monitoring Technical Guide. Washington D.C.: United States Dept. of Agriculture, Forest Service, 2006. Print.

Munro, John, and Dwight L. Stolzfus. Final wetland construction plan for Resource Conservation Corp. JT mitigation site in Shade Township, Somerset County, Pennsylvania. Harleysville, Pa: Munro Ecological Services, Inc. 1989. Print.

URDC Team

Figure F2 - Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Acer platanoides*

Common Name: Norway Maple

Phenology (seasonal changes)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Flower													Flowers in rounded, upright clusters.
Seed													
Leaves													Persist until winter frost.
Treatment Methods													Cut and treat stem with glyphosate.
													Dig up/pull young seedlings.
													Girdle.
Cautions/Notes	Extremely invasive in forests. Exotoxin produced by roots reduces germination by native species under Norway Maple trees.												

Sources:

Peterson Field Guides: Eastern Trees, George A. Petrides and Janet Wehr

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro; Evansburg State Park

Exotic Invasive Species Eradication Plan, Jim Durkin and Sara Street 2011

A Management Guide for Invasive Plants in Southern Forests, USDA

http://www.dcnr.state.pa.us/forestry/invasivetutorial/norway_maple_M_C.htm

Pictures: http://www.invasive.org/browse/subinfo.cfm?sub=3002

Figure F3- Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Ailanthus altissima*

Common Name: Tree-of-Heaven

Phenology (seasonal changes)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Flower													Small, yellowish-green flower.
Seed													Wing shaped fruit. Single seed.
Leaves													Persist until frost.
Treatment Methods													For large trees, treat cut stumps with glyphosate.
													Foliar spray 2% glyphosate.
													Dig up/pull young seedlings.
Cautions/Notes													

Sources:

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro; Evansburg State Park

Exotic Invasive Species Eradication Plan, Jim Durkin and Sara Street 2011

A Field Guide for Identification and Control: Invasive Plants of Southern Forests, USDA

A Management Guide for Invasive Plants in Southern Forests, USDA

http://www.nps.gov/plants/alien/fact/aial1.htm

Pictures: http://www.invasive.org/browse/subinfo.cfm?sub=3003

Figure F4 - Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Allaria peliotata*

Common Name: Garlic Mustard

Phenology (seasonal changes)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Flower													
Seed													Pods form May-June; Pods are dry July - November
Leaves													Evergreen
Treatment Methods													Pull first year plants out January - May; Roots break off beginning in May. Can pull out throughout the year if done with care.
													Foliar Spray glyphosate
													Place 30 mil black plastic sheeting in select areas.*
Cautions/Notes	*Plastic Sheeting can be used to avoid killing other species if timed earlier or later. Biennial.												

Sources:

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro; Evansburg State Park Exotic Invasive Species Eradication Plan, Jim Durkin and Sara Street 2011

Pictures Jim Dirkin

Figure F5 - Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Berberis thunbergii*

Common Name: Japanese Barberry

Phenology (seasonal changes)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Flower													Small yellow flowers in April.
Seed													Berries turn red in October and persist into winter months, birds love to eat seeds.
Leaves													Leaves die with the first killing frost.
Treatment Methods													Pull small bushes out easily (use leather gloves), weed wrench works well on stem clusters that can be bunched to 2" wide.
													Cut larger bushes and basal treat stumps with 20% glyphosate mixture.
Cautions/Notes	Grows in disturbed woods, roadsides, and hedgerows. For plant communities that are fire-adapted, Japanese barberry can be eradicated with fire.												

Sources:

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro; Evansburg State Park Exotic Invasive Species Eradication Plan, Jim Durkin and Sara Street 2011

http://www.dcnr.state.pa.us/forestry/invasivetutorial/japanese_euro_barberry_M_C.htm

http://www.ct-botanical-society.org/galleries/berberisthun.html

Pictures: Connecticut Botanical Society

Figure F6 - Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Celastrus orbiculatus*

Common Name: Oriental Bittersweet

Phenology Seasonal Changes	Jan	Feb	Ma	Apr	Ma	Jun	Jul	Au	Sep	Oct	No	De	Notes
Flower Seed Leaves Seed Germination													
													Birds eat and spread seed
													Glossy leaves
													Late spring
Treatment Methods													Cut and paint with glyphosate at ground level. Make sure multiple rooting stems are cut and painted.
Cautions/Notes	Self-seeds readily and also propagates through root sprouts. Still cultivated and sold as an ornamental landscape plant. Carefully identify before eradication because the native bittersweet looks similar.												

Sources:

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro; Evansburg State Park Exotic Invasive Species Eradication Plan, Jim Durkin and Sara Street 2011

http://www.nps.gov/plants/alien/fact/ceor1.htm

Pictures: National Park Service Alien Plant Fact Sheet

Figure F7 - Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Cirsium arvense*

Common Name: Canada thistle

Phenology (seasonal changes)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Flower													Purple flowers late May into September
Seed													Dioecious plants
Leaves													
Seed Germination													
Treatment Methods													Glyphosate spray (20%). Do not spray when flowers are present. Mark the patch and spray in May the following year. When sprayed with flowers present, plant may "bolt" seed.
Cautions/Notes	Canada thistle reproduces primarily by vegetative means. Nodules on the roots can send up plant shoots. The key to control is to stress the plant and exhaust the reserved nutrients in the root system. Mowing at 21 day intervals prevents seeds from setting and reduces stored energy in roots. Species is clonal, rhizomes exist outside the diameter of the clone cluster. It will be necessary to re-spray the perimeter of the clone the following year.												

Sources:

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro; Evansburg State Park Exotic Invasive Species Eradication Plan, Jim Durkin and Sara Street 2011

John Courtney, Bowman's Hill Wildflower Preserve, 1997

http://www.ct-botanical-society.org/galleries/cirsiumarve.html

Pictures: Connecticut Botanical Society

Figure F8 - Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Elaeagnus umbellata*

Common Name: Autumn Olive

Phenology (seasonal changes)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Flower													Silvery white to yellow.
Seed													
Leaves													Leaves silvery beneath. Persist until winter frost.
Treatment Methods													Pull young plants.
													Cut main stem and paint with 20% glyphosate.
Cautions/Notes													

Sources:

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro; Evansburg State Park Exotic Invasive Species Eradication Plan, Jim Durkin and Sara Street 2011

A Field Guide for Identification and Control: Nonnative Invasive Plants of Southern Forests, USDA

Pictures: http://www.invasive.org/browse/subinfo.cfm?sub=3021

Figure F9 - Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Euonymous alatus*

Common Name: Winged Euonymus

Phenology (seasonal changes)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Flower													Inconspicuous
Seed													Birds eat and spread the seeds.
Leaves			~	~									Leaves begin to appear in April.
Treatment Methods													Pull young plants out; they pull easily.
													3-4% glyphosate foliar spray
Methods/Cautions/Notes	Use a weed wrench for large plants with few main stems (roots pull easily). Cut stems of large plants and paint with 20% glyphosate. Small bushes up to 24-26" pull easily with roots intact; hang upside down in crotch of tree if no fruits are present.												

Sources:

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro; Evansburg State Park Exotic Invasive Species Eradication Plan, Jim Durkin and Sara Street 2011

http://www.chicagobotanic.org/research/conservation/invasive/euonymus_alatus.php

Pictures: by Chicago Botanic Garden Invasive Plants

Figure F10 - Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Lonicera japonica*

Common Name: Japanese Honeysuckle

Phenology (seasonal changes)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Flower													White to yellow flowers.
Seed													Glossy berries are green and turn to pink then black.
Leaves													Persist into until frost.
													Foliar Spray Glyphosate.
													Cut stems and paint with 20% glyphosate. Don't chip.
Cautions/Notes	Evergreen to semi-evergreen persistence allows for a competitive edge over native species. Spreads through runners, roots and seeds. Vines can girdle and kill small saplings and dense thicket matting can shade native vegetation below. Regardless of method used, repeated monitoring and sprout removal may be necessary.												

Sources:

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro
A Field Guide for Identification and Control: Nonnative Invasive Plants of Southern Forests, USDA
A Management Guide for Invasive Plants in Southern Forests, USDA
http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_010263.pdf
Pictures: University of Georgia Center for Invasive Species and Ecosystem Health http://www.invasive.org

Figure F11 - Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Lonicera mackii*

Common Name: Amur Honeysuckle

Phenology (seasonal changes)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Flower													White to yellow flowers.
Seed													Glossy berries are green and turn to pink then red.
Leaves													Persist into until frost.
Treatment Methods													Chip live bushes.
													Foliar Spray glyphosate.
													Cut stems and paint with 20% glyphosate. Don't chip.
Cautions/Notes													

Sources:

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro; Evansburg State Park Exotic Invasive Species Eradication Plan, Jim Durkin and Sara Street 2011

A Field Guide for Identification and Control: Nonnative Invasive Plants of Southern Forests, USDA

A Management Guide for Invasive Plants in Southern Forests, USDA

Pictures: http://www.invasive.org/browse/subinfo.cfm?sub=3040

Figure F12 - Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Lythrum salicaria*

Common Name: Purple Loosestrife

Phenology (seasonal changes)	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Flower												Bright magenta flowers.
Seed												
Leaves												Persist until frost.
Treatment Methods												Foliar spray glyphosate.
Cautions/Notes	For foliar spray, use aquatic form of glyphosate (Rodeo). Also, roots will resist pulling and may often break, which leaves viable roots in the soil.											

Sources:

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro; Evansburg State Park Exotic Invasive Species Eradication Plan, Jim Durkin and Sara Street 2011

http://www.dcnr.state.pa.us/forestry/invasivetutorial/Purple_loosestrife_M_C.htm

Pictures: http://www.invasive.org/browse/subinfo.cfm?sub=3047

Figure F13 - Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Microstegium vimineum*

Common Name: Japanese Stiltgrass

Phenology (seasonal changes)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Flower													
Seed													
Leaves													
													Use foliar spray.
													Black plastic sheeting.
													Rake aggressively.
													Pull out plants.
Treatment Methods													Burn dried plants and seed. Use ground fire.
Cautions/Notes	During early growth where hundreds of seedlings have germinated together, hoeing or using the back of a rake can disrupt seedlings and keep them from growing.												

Sources:

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro; Evansburg State Park Exotic Invasive Species Eradication Plan, Jim Durkin and Sara Street 2011

A Field Guide for Identification and Control: Nonnative Invasive Plants of Southern Forests, USDA

Pictures: http://www.invasive.org/browse/subinfo.cfm?sub=3051

Figure F14 - Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Morus alba*

Common Name: White Mulberry

Phenology (seasonal changes)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Flower													
Seed													
Leaves													
Treatment Methods													Cut and paint with glyphosate or garlon
Cautions/Notes	This species will re-sprout from cut stems and roots if not treated												

Sources:

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro; Evansburg State Park Exotic Invasive Species Eradication Plan, Jim Durkin and Sara Street 2011

Sara Street, ISA Certified Arborist, PD # 1498A

http://www.invasive.org/search/action.cfm?q=morus%20alba

http://www.forestryimages.org/browse/Archivethumb.cfm?Arc=1&cat=57&order=249

Pictures: Ohio State University Weed Lab Image Archive and Center for Invasive Species and Ecosystem Health

Figure F15 - Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Phalaris arundinacea*

Common Name: Reed Canary Grass

Phenology (seasonal changes)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Flower													
Seed													Over time stands build a tremendous seed bank that erupts when sites are cleared by eradication methods.
Leaves													Stems do not remain standing during the winter.
Treatment Methods													Use wetland formulation foliar spray before native species erupt.
													Cover with black plastic for at least one growing season.
													Disrupting the roots every two or three weeks weakens established plants and depletes seed bank.
													Pull out plants when ground is soft.
													Mow.
Cautions/Notes	Spreads aggressively into most types of wetland areas by rhizomes. Forms dense colonies that displace native vegetation. It constricts waterways by promoting silt deposition and encourages erosion beneath its dense mats.												

Sources:

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro

http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_010232.pdf

Pictures: University of Georgia Center for Invasive Species and Ecosystem Health http://www.invasive.org

Figure F16 - Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Phragmites australis*

Common Name: Common Reed

Phenology (seasonal changes)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Flower													
Seed													
Leaves													Stems remain standing during the winter.
Treatment Methods													Use wetland formulation foliar spray or cut stem method for several years in a row.
													Cut stems to ground
													Cover cut stems with black plastic.
													Pull out plants when ground is soft.
													Mow.
Cautions/Notes	Spreads aggressively into most types of wetland areas by rhizomes, seeds and broken pieces. Forms dense colonies that displace native vegetation, change hydrology and alter wildlife habitat.												

Sources:

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro
http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_010286.pdf
Pictures: University of Georgia Center for Invasive Species and Ecosystem Health http://www.invasive.org

Figure F17 - Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Polygonum perfoliatum*

Common Name: Mile-a-minute

Phenology (seasonal changes)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Flower													Small and white.
Seed													
Leaves													Shaped like an equilateral triangle.
Treatment Methods													Pull young plants.
													Foliar spray glyphosate.
													Burn entire patch.
Cautions/Notes	Burning may be necessary in established patches that are several years old.												

Sources:

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro; Evansburg State Park Exotic Invasive Species Eradication Plan, Jim Durkin and Sara Street 2011

http://www.invasive.org/browse/subinfo.cfm?sub=3065

Pictures: http://www.invasive.org/browse/subinfo.cfm?sub=3065

Figure F18 - Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Pyrus calleryana*

Common Name: Callery pear

Phenology (seasonal changes)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Flower													
Seed													Birds eat the fruit
Leaves													Leaves present into late fall and early winter.
Treatment Methods													Basal bark spray with Garlon or cut and paint with glyphosate. Expect to retreat sprout growth.
Cautions/Notes	Planted as an ornamental.												

Sources:

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro; Evansburg State Park Exotic Invasive Species Eradication Plan, Jim Durkin and Sara Street 2011

http://www.hort.uconn.edu/plants/p/pyrcal/pyrcal1.html University of Connecticut Horticulture Database

Pictures: University of Connecticut Horticulture Database

Figure F19- Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Rhamnus cathartica*

Common Name: Common Buckthorn

Phenology (seasonal changes)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Flower													Flowers in rounded, upright clusters.
Seed													Remove and dispose of any ripened fruit and seeds
Leaves													Persist until winter frost.
Treatment Methods													Cut and treat stem with glyphosate.
													Dig up/pull young seedlings.
													Girdle.
Cautions/Notes	Extremely invasive in forests, edges and tree fall gaps. Dense thickets are population sinks for songbirds due to higher predation rates.												

Sources:

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro

A Management Guide for Invasive Plants in Southern Forests, USDA

http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_010287.pdf

Pictures: University of Georgia Center for Invasive Species and Ecosystem Health http://www.invasive.org

Figure F20 - Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Rosa multiflora*

Common Name: Multiflora Rose

Phenology (seasonal changes)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Flower													Five white petals. Many yellow anthers in the center.
Seed													
Leaves													Persist until frost (Nov or Dec).
Treatment Methods													Cut stem and paint with 40% Roundup.
													Spray foliar cover with 2% Roundup.
													Chip bushes.
													Pull seedlings (first year).
Cautions/Notes	For the first or second treatment, treat to kill bushes in year one. Wait one year and crush or chip dead bushes that will break up easily and give fewer problems with thorns. Once the thicket is removed, spot spraying any remaining plants will be much easier.												

Sources:

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro; Evansburg State Park

Exotic Invasive Species Eradication Plan, Jim Durkin and Sara Street 2011

A Field Guide for the Identification of Invasive Plants in Southern Forests, USDA

Pictures: http://www.invasive.org/browse/subinfo.cfm?sub=3071

Figure F21 - Exotic Eradication Strategy

Exotic Species Eradication Strategies

Scientific Name: *Sorghum halepense*

Common Name: Johnson Grass

Phenology (seasonal changes)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	Notes
Flower													
Seed													Seeds spread by wind and water and sprout readily.
Leaves													
Treatment Methods													Use foliar spray. Spraying may need to be repeated for several years.
													Pull out plants when ground is soft. Dig out broken stems and roots and remove all plant parts from area.
													Mow or till heavy infestations.
Cautions/Notes	Spreads aggressively by rhizomes, can adapt to a variety of habitats including open forest, old fields, roadside ditches and wetlands. Forms dense colonies that displace native vegetation and restrict tree seeding establishment.												

Sources:

Exotic Species Eradication Strategies, Munro Ecological Services, John Munro

A Field Guide for Identification and Control: Nonnative Invasive Plants of Southern Forests, USDA

http://www.dcnr.state.pa.us/cs/groups/public/documents/document/dcnr_012343.pdf

Pictures: University of Georgia Center for Invasive Species and Ecosystem Health http://www.invasive.org

Table F3 - Potential Seed and Plant Sources

Applied Ecological Services, Inc.
17921 Smith Road
Brodhead, WI 53520
Phone: (608) 897-8641
http://www.appliedeco.com

Environmental Concern, Inc.
PO Box P
St Michaels, MD (401)745-9620
http://www.wetland.org

Ernst Conservation Seeds, Inc.

8884 Mercer Pike
Meadville PA 16335
(800) 873-3321
http://www.ernstseed.com

Octoraro Native Plant Nursery
6126 Street Road
Kirkwood, PA 17536-9647
717-529-3160
http://www.octoraro.com

Pinelands Nursery & Supply
323 Island Road Columbus NJ 08022
(609-291-9486)
http://www.pinelandsnursery.com

Table F4 - Potential Woodland Buffer Species

BOTANIC NAME	COMMON NAME	SITE PREFERENCE	LIGHT PREFERENCE	WILDLIFE BENEFIT
TREES				
Acer rubra	Red maple	W to M	S to SH	Flowers, buds, leaves, and seeds
Betula nigra	River birch	W	S to SH	Catkins, foliage, host plant for butterflies
Celtis occidentalis	Common hackberry	W to D	S	Fruit
Diospyros virginiana	Persimmon	W to D	S to PS	Fruit
Fraxinus americana	White ash			
Fraxinus pennsylvanica	Green ash	W to M	S to SH	Seeds
Ilex opaca	American holly	W*	S to SH	Fruit
Pinus strobus	Eastern white pine	M to D	S to SH	Seeds, winter cover
Prunus serotina	Black cherry	M to D	S to PS	Fruit
Quercus alba	White oak	M to D	S to SH	Acorns
Quercus falcata	Southern red oak	M to D	S	Acorns
Quercus phellos	Willow oak	W to M	S to PS	Acorns
Quercus rubra	Northern red oak	M to D	S to PS	Acorns
Salix nigra	Black willow	W	S	Host plant for butterflies
Tsuga canadensis	Eastern hemlock	W	SH	Winter shelter

SHRUBS				
Aronia melanocarpa	Black chokeberry	W to D	S to S	Fruit
Cornus amomum	Silky dogwood	W to M	S to PS	Fruit
Cornus florida	Flowering dogwood	M to D	S to PS	Fruit
Cornus racemosa	Grey (swamp or red-panicle) dogwood	W to D	S to PS	Fruit, twigs, leaves
Ilex glabra	Inkberry	W to M	S to SH	Fruit
Ilex opaca	American holly	W	S to PS	Fruit, winter cover
Ilex verticillata	Winterberry	W to M	S to PS	Fruit
Kalmia latifolia	Mountain laurel	W	S to S	Foliage, twigs, winter shelter
Lindera benzoin	Spicebush	W to M	PS to SH	Fruit, nectar, host plant for butterflies
Lyonia mariana (difficult or impossible to locate from vendors)	Staggerbush	W	S to PS	nesting
Myrica pennsylvanica	Northern bayberry	M to D	S to PS	Fruit
Vaccinium corymbosum	Highbush blueberry	W	S to PS	Fruit
Vibrunum acerifolium	Mapleleaf viburnum	W to D	M to S	Foliage, twigs, fruit
Viburnum lentago	Nannyberry	W to D	S to PS	Fruit

HERBACEOUS PERENNIALS				
Ascelpias incarnata	Swamp milkweed	W to M	S to PS	Nectar, host plant
Aster novae-angliae	New England aster	M	S to PS	Nectar, seeds
Eupatorium maculatum	Joe-pye weed	W to M	S to PS	
Lobelia cardinalis	Cardinal flower	W to M	S to SH	Nectar
Lobelia siphilitica	Blue lobelia	W to M	S to SH	Nectar
Mitchella repens	Partridgeberry	M to D	PS to SH	
Monarda fistulosa	Bee-balm	M to D	S to PS	Nectar
Polygonatum biflorum	Solomon's seal	M	S to S	
Polystichum acrostichoides	Christmas fern	M	PS to SH	
Rudbeckia hirta	Black-eyed susan	M	S to SH	Nectar, host plant
Species to avoid: multiflora rose; mile-a-minute; purple loosestrife; autumn olive; Japanese barberry; norway maple; Japanese knotweed				
*Key: W=wet, M=moderate, D=dry, S=sun, PS=partial sun, SH=shade				

Source: http://extension.psu.edu/natural-resources/wildlife/habitat-management/pa-wildlife-16-riparian-buffers-for-wildlife

Table F5 - Potential Meadow Seed Mix #1

Deer Resistant Meadow Mix

Ernst Conservation Seeds, Inc.
8884 Mercer Pike, Meadville PA 16335
(800) 873-3321
http://www.ernstseed.com Prices are subject to change without notice. Please call (800) 873-3321 for current pricing

ERNMX # ERNMX-155
Cost Per Pound $42.02 (2016)
Seeding Rate 20 lb per acre
Mix Type Upland & Meadow Sites

- 38% Little Bluestem, Fort Indiantown Gap-PA Ecotype (Schizachyrium scoparium, Fort Indiantown Gap-PA Ecotype)
- 17.5% Virginia Wildrye, PA Ecotype (Elymus virginicus, PA Ecotype)
- 9% Indiangrass, 'Prairie View'-IN Ecotype (Sorghastrum nutans, 'Prairie View'-IN Ecotype)
- 4% Purple Coneflower (Echinacea purpurea)
- 4% Partridge Pea, PA Ecotype (Chamaecrista fasciculata (Cassia f.), PA Ecotype)
- 3% Marsh (Dense) Blazing Star (Spiked Gayfeather), PA Ecotype (Liatris spicata, PA Ecotype)
- 3% Tall White Beardtongue, PA Ecotype (Penstemon digitalis, PA Ecotype)
- 3% Ohio Spiderwort, PA Ecotype (Tradescantia ohiensis, PA Ecotype)
- 3% Purpletop, Southeastern VA Ecotype (Tridens flavus, Southeastern VA Ecotype)
- 3% Black-eyed Susan (Rudbeckia hirta)
- 3% Aromatic Aster, PA Ecotype (Aster oblongifolius (Symphyotrichum oblongifolium), PA Ecotype)
- 2.5% Lanceleaf Coreopsis, Coastal Plain NC Ecotype (Coreopsis lanceolata, Coastal Plain NC Ecotype)
- 2.25% Butterfly Milkweed (Asclepias tuberosa)
- 2% Oxeye Sunflower, PA Ecotype (Heliopsis helianthoides, PA Ecotype)
- 0.5% Blue False Indigo, Southern WV Ecotype (Baptisia australis, Southern WV Ecotype)
- 0.5% Wild Bergamot, Fort Indiantown Gap-PA Ecotype (Monarda fistulosa, Fort Indiantown Gap-PA Ecotype)
- 0.5% Gray Goldenrod, VA Ecotype (Solidago nemoralis, VA Ecotype)
- 0.5% Wild Senna, VA & WV Ecotype (Senna hebecarpa (Cassia h.), VA & WV Ecotype)
- 0.5% Early Goldenrod, VA Ecotype (Solidago juncea, VA Ecotype)
- 0.25% Hoary Mountainmint, MD Ecotype (Pycnanthemum incanum, MD Ecotype)

Total: 100%

Table F6 - Potential Meadow Seed Mix #2

Showy Northeast Native Wildflower & Grass Mix

Ernst Conservation Seeds, Inc.
8884 Mercer Pike, Meadville PA 16335
(800) 873-3321
http://www.ernstseed.com Prices are subject to change without notice. Please call (800) 873-3321 for current pricing

ERNMX # ERNMX-153

Cost Per lb. $37.88 (2016)

Seeding Rate 20 lb per acre, or 1/2 lb per 1,000 sq ft

Mix Type Upland & Meadow Sites

- 31.5% Little Bluestem, Fort Indiantown Gap-PA Ecotype (Schizachyrium scoparium, Fort Indiantown Gap-PA Ecotype)
- 20% Sideoats Grama, 'Butte' (Bouteloua curtipendula, 'Butte')
- 18% Virginia Wildrye, PA Ecotype (Elymus virginicus, PA Ecotype)
- 4% Tall White Beardtongue, PA Ecotype (Penstemon digitalis, PA Ecotype)
- 4% Partridge Pea, PA Ecotype (Chamaecrista fasciculata (Cassia f.), PA Ecotype)
- 3% Purple Coneflower (Echinacea purpurea)
- 2.5% Marsh (Dense) Blazing Star (Spiked Gayfeather) (Liatris spicata)
- 2% Butterfly Milkweed (Asclepias tuberosa)
- 2% Lanceleaf Coreopsis, Coastal Plain NC Ecotype (Coreopsis lanceolata, Coastal Plain NC Ecotype)
- 2% Oxeye Sunflower, PA Ecotype (Heliopsis helianthoides, PA Ecotype)
- 2% Blackeyed Susan, Coastal Plain NC Ecotype (Rudbeckia hirta, Coastal Plain NC Ecotype)
- 1.5% New England Aster (Aster novae-angliae (Symphyotrichum n.))
- 1.5% Smooth Blue Aster, NY Ecotype (Aster laevis (Symphyotrichum laeve), NY Ecotype)
- 1.5% Ohio Spiderwort, PA Ecotype (Tradescantia ohiensis, PA Ecotype)
- 1% Autumn Bentgrass, Albany Pine Bush-NY Ecotype (Agrostis perennans, Albany Pine Bush-NY Ecotype)
- 0.8% Browneyed Susan, WV Ecotype (Rudbeckia triloba, WV Ecotype)
- 0.5% Wild Senna, VA & WV Ecotype (Senna hebecarpa (Cassia h.), VA & WV Ecotype)
- 0.5% Wild Bergamot, Fort Indiantown Gap-PA Ecotype (Monarda fistulosa, Fort Indiantown Gap-PA Ecotype)
- 0.5% Maryland Senna (Senna marilandica (Cassia m.))
- 0.5% Blue False Indigo, Southern WV Ecotype (Baptisia australis, Southern WV Ecotype)
- 0.5% Early Goldenrod, VA Ecotype (Solidago juncea, VA Ecotype)
- 0.2% Hoary Mountainmint, MD Ecotype (Pycnanthemum incanum, MD Ecotype) = 100 %

Table F7 - Sample Stream Flow Data Sheet

LOCATION 1 - WOODEN BRIDGE					LOCATION #2 - SHIP ROAD		
DATE	IN STREAM	FLOODPLAIN #1	FLOODPLAIN #2	RAINFALL*	DATE	IN STREAM	FLOODPLAIN #1

*Note previous month rainfall in inches

Table F8 - Sample Flood Level Data Sheet

LOCATION 1 - WOODEN BRIDGE					LOCATION #2 - SHIP ROAD		
DATE	IN STREAM	FLOODPLAIN #1	FLOODPLAIN #2	RAINFALL*	DATE	IN STREAM	FLOODPLAIN #1

*Note previous month rainfall in inches

Figure F23 - SAMPLE Observation and Photographic Record Form

Observation and Photographic Record

Location # ☐

_____ _____

Name of monitoring person Date

Purpose of monitoring (circle one)
PLANT SURVIVAL INVASIVE ERADICATION WILDLIFE

Weather conditions

Photo Y / N Stereographic Photo Y / N Deer Damage Y / N

General Observations

Condition of site and site condition description
Excellent Good Fair Poor

Condition of Plant Stock

Exotic species present Y / N
(how many species, what percentage of cover area, list species if can ID)

Erosion evidence Y / N
(Describe - where, degree)

Wildlife evidence Y / N
(Describe – what, where)