DRAFT Natural Resources Stewardship Plan for the West Goshen Township Park

I. Natural Resources Inventory

General Description: The West Goshen Township Park covers approximately 168 acres and wraps around a new housing development and the Greystone Hall Property. The Park is predominantly forest and also includes a wet meadow, shrubland, and serpentine barrens. A separate management plan is being created for the serpentine barrens so that area will not be included in this plan. Taylor Run and three headwater streams, all tributaries to Taylor Run, flow through the Park. Other significant water resources include three ponds, hydric soils, and 100-year floodplains.

The Park is situated in Lenapehoking, the traditional and ancestral homeland of the Lenape. From the colonial period forward, much of the land in the region was used for agriculture, including the area where the new housing development sits. According to historical aerial photography, approximately one-third to one-half of the Park was forested in 1937, and much of that area has remained as forest since then. The areas that were continuously forested since 1937 are now mature red oak-mixed hardwood/tuliptree-beech-maple forests and red maple palustrine forests. The forest areas that were disturbed previously are now younger mixed hardwood forests.

Notable Features:

- Mature forest
- 3 headwater streams
- 2 manmade ponds
- Serpentine Barrens

Geology

Formation Name	Lithology 1	Lithology 2	Lithology 3	Origin
Glenarm Wissahickon	Oligoclase-mica schist	Hornblende gneiss	Gneiss, amphibolite	Metamorphic
Ultramafic rocks	Serpentine	Pyroxenite	Steatite	Metamorphic

Soils

Name	Soil Type	Slopes	Drainage Class	Erodibility	Hydric	Farmland Importance
Baile (Ba)	silt loam	-	poorly drained	potentially highly erodible land	all hydric	not prime farmland
Califon (CaB)	loam	3-8%	moderately well drained	-	partially hydric	all areas prime farmland
Chester (CdB)	silt loam	3-8%	well drained	-	not hydric	all areas prime farmland
Chrome (ChB2, ChC2, ChE2)	silt loam (serpentine complex)	ChB2: 3-8%; ChC2: 8-15%; ChE2: 25-40%	well drained	-	not hydric	ChB2: all areas prime farmland; ChC2: farmland of statewide importance; ChE2: not prime farmland
Glenelg (GgB, GgC)	silt loam	GgB: 3-8%; GgC: 8-15%	well drained	GgB: potentially highly erodible; GgC: highly erodible	not hydric	GgB: all areas prime farmland; GgC: farmland of statewide importance
Glenville (GlB)	silt loam	3-8%	moderately well drained	potentially highly erodible	partially hydric	all areas prime farmland
Hatboro (Ha)	silt loam	-	poorly drained	not highly erodible	all hydric	not prime farmland
Manor (MaB, MaC, MaD, MaE, MaF)	loam	MaB: 3-8%; MaC: 81-15%; MaD: 15-25%; MaE: 25-35%; MaF: 35-60%	well drained	-	MaB, MaC: partially hydric; MaD, MaE, MaF: not hydric	MaB: all areas prime farmland; MaC: farmland of statewide importance; MaD, MaE, MaF: not prime farmland

Neshaminy (NvA, NvB)	silt loam (NvB serpentine complex)	NvA: 0-3%; NvB: 3-8%	well drained	-	not hydric	all areas prime farmland
Urban Land (UuhB)	urban land	0-8%	-	-	not hydric	not prime farmland

Plant Resources

Community	Size	Characteristics/Comments	Dominant Plant Species	
Red Oak-Mixed Hardwood/Tuliptree-Beech-Maple Forest		• Mature forest • Minimal native plants in understory • Pockets of invasive plants in understory • Riparian buffer • Forest intact since at least 1937 • High priority for stewardship	Canopy	tuliptree, red oak, beech
			Understory	red maple
			Shrubs & Vines	**barberry**
			Herbaceous	
Wet Meadow		• Downstream of new bridge/road construction • Planted woody species • Medium priority for stewardship	Canopy	
			Understory	
			Shrubs & Vines	
			Herbaceous	cattail, rushes, sedges
Red Maple Palustrine Forest		• Invaded understory • Riparian buffer • Medium priority for stewardship	Canopy	red maple
			Understory	red maple
			Shrubs & Vines	**barberry**
			Herbaceous	**common reed**
Mixed Hardwood Forest		• Younger forest areas, some areas cleared prior to 1937 • Heavily invaded, particularly by vines • Low priority for stewardship	Canopy	
			Understory	**devil's walking stick**
			Shrubs & Vines	
			Herbaceous	**Japanese stiltgrass**

Shrubland		• Riparian buffer • Predominately invasive plants • Mix of shrubland, wet meadow, and scattered mature trees • Possible restoration area for habitat/ecological improvement and passive recreation • Low priority for stewardship	Canopy	
			Understory	**devil's walking stick**
			Shrubs & Vines	**shrub honeysuckle**
			Herbaceous	**Japanese stiltgrass**
Serpentine Barrens		• See Fern Hill Barrens Restoration Plan		
				***Invasive Species in bold**

Water Resources

Type	Size / Length	Characteristics/Comments	PA DEP Designation
Taylor Run	0.86 miles	Significant sedimentation noted from construction activities	Trout Stocking Fishery (TSF)
3 unnamed tributaries to Taylor Run	1.24 miles	• Headwater streams • Significant sedimentation noted from construction activities in central tributary	Central tributary – Trout Stocking Fishery (TSF)
Ponds	4.39 acres	Significant sedimentation noted from construction activities	

Birds

American Crow	Dark-eyed Junco	Northern Cardinal	Tufted Titmouse
American Woodcock	Downy Woodpecker	Northern Mockingbird	Turkey Vulture

Black Vulture	Eastern Bluebird	Red-bellied Woodpecker	White-breasted Nuthatch
Brown Creeper	House Finch	Red-tailed Hawk	White-throated Sparrow
Carolina Wren	Mallard	Song Sparrow	Wood Cock
Carolina/Black-capped Chickadee	Mourning Dove		

Animal Species of Concern

Name	Habitat	Threats	Opportunities
Wood cock	Meadows, floodplains		

II. Stewardship Issues and Opportunities

Stewardship issues impact all of the plant communities to varying extents. The following are the main issues affecting the Park. Further issues are included in the Stewardship Recommendations section.

1. Lack of regeneration from deer browsing – Large deer populations overbrowse plants and seeds, leading to a lack of regeneration and growth. These conditions were noted during the site visits. Deer preferentially browse native species, which opens areas for further invasion by invasive plants. Deer management will be needed to create sustainable plant communities. Deer will also browse landscape plants, as noted during the site visits.

2. Invasive plants – Invasive plants outcompete native species and can create dense monocultures. The invasive plants are generally poorer food sources for wildlife, as wildlife did not evolve to eat these species. Invasive plants can also damage or kill existing native plants by girdling or over-topping them. Invasive plant management should follow two rules of thumb. The first is best to least. High quality areas should be prioritized over degraded areas as there is more ecological value to retain. The second rule of thumb is top-down. Within areas, invasive plants that affect the canopy, particularly vines, should be addressed first and then prioritized down the canopy layers. An exception to these two rules of thumb is that invasive plants that pose a threat to human health, such as poison-hemlock, should be addressed first.

In areas where invasive plants make up the majority of the structural layer (ex. shrub layer), half of the invasive plants should be removed at a time to retain some habitat value. Replanting of native species will likely be needed to restore the plant community structures, improve diversity, and provide habitat. One particular species of concern is fiveleaf akebia. According to DCNR, this vine can grow 20-40 feet a year. This can lead to dense mats over the ground and covering vegetation, smothering all other plants in the area. This extremely aggressive plant is a high priority for control.

3. Sedimentation from construction – During the December 2020 and February 2021 site visits, it was noted that Taylor Run and the central unnamed tributary were cloudy from sedimentation. The eastern unnamed tributary, which is not adjacent to new construction, was running clear. The ponds were also cloudy from sediment, and large amounts of mud/silt were noted along some areas of the banks of the ponds. Sedimentation can impact fish, eggs, and larvae of aquatic species, and it can disrupt normal stream processes such as the transfer of water between the stream channel and ground water. If possible, additional precautions should be taken to reduce the amount of sediment reaching the waterways during construction. Post-construction, the streams should be monitored to determine if they are recovering. This can include turbidity measurements or surveys of macroinvertebrates.

4. Hazard trees - Dead or damaged standing trees along roadways and at stopping points of future trails, such as benches and signs, which pose a risk to human safety and property, are considered hazard trees. All landowners are required to make a reasonable effort to prevent trees within their property from causing injury or property damage. The Township should implement a hazard tree management program to monitor for and remove hazard trees. The Park should be monitored once a year and after severe storms to identify hazard trees, particularly along roadways, parking lots, and trails. Hazard trees should then be pruned or removed to address the risk.

5. Climate change – Our region of southeastern Pennsylvania is already seeing the effects of climate change, including increased temperatures, increased precipitation, more severe storms, and increased flooding. The Department of Environmental Protection's latest report, *Pennsylvania Climate Impacts Assessment 2021*, indicates that these effects will continue into the future and will worsen. Additional future climate change impacts could include periods of drought and less snowfall. This has implications for managing natural areas. Changing precipitation patterns and heat zones could shift suitable habitat for plant and animal species. New plantings may be impacted more frequently by flood and drought. Increased stormwater could cause increased erosion and water quality issues.

   Key recommendations for adapting to climate change include:

a. Reducing existing stressors including deer browsing and invasive plants.
b. When doing plantings, include not only species adapted to the current climate, but also include seedlings sourced from areas predicted to reflect the future climate in 30 years and/or add species whose habitat is expected to shift into our region in 30 years. This is not meant to recommend adding exotic species from other countries, rather the intention is to add species that are native to other eastern or mid-west US states such as Virginia that are likely to be suited to the future conditions in our area.
c. Maintain the riparian buffers to protect streams from high temperatures and increased stormwater runoff.

Stewardship opportunities

There are key stewardship opportunities that can be capitalized on to improve natural resources and enhance the visitor experience.

1. Habitat restoration – The Park provides habitat for a variety of wildlife, including many birds as indicated by the included bird survey. Simple measures such as leaving brush piles (only of materials that fell in the woods, not from nearby landscaping) and dead trees where they do not create hazards can provide nesting and shelter sites for wildlife. Adding additional plants to the understory can increase habitat value. Bird and bat boxes can also improve habitat.
2. Environmental education/connecting to the neighborhood – The Park's proximity to the Greystone Elementary School and the neighborhood surrounding the park create opportunities to engage people and teach them about the natural world. This can be through programming or general trail access. The natural areas can be demonstration areas to show proper care of natural resources and to showcase native plants.

III. Conservation Values & Conservation Priority

Conservation Values	Conservation Priority?
Mature Forest	**X**
Water Resources	**X**
Wildlife Habitat	
Passive Recreation	
Serpentine Barrens	**X (see serpentine barrens plan)**

IV. Conservation Goal: Protect & Enhance ___*Water Resources, Mature Forest, and Serpentine Barrens*

V. Stewardship Recommendations

*Note: Where planting is recommended, species used should be native to the region or species from eastern or mid-west states that are predicted to be more resilient to climate change (see climate change section above).

Priority[1]	Stewardship Recommendations	Season	Who could implement?[2]	Whole Park	Mixed Hardwood Forest	Red Oak-Mixed/Tuliptree-Beech-Maple Hardwood	Shrubland	Wet Meadow	Red Maple Palustrine Forest	Ponds	Developed Areas
Forest Communities											
Goal: Improve forest health, structure, and diversity to enhance forest sustainability and habitat value. Maintain current extent of the forest and reduce management requirements over time.											
1	Control deer and invasive plants (see below)	Year-round	Staff	■					■		
2	If natural regeneration does not occur, plant trees in canopy gaps and areas where invasive plants were cleared; protect saplings with tree tubes	Spring or Fall	Staff or Volunteers		■	■			■		
3	Increase understory diversity by planting shrubs; protect seedlings from deer	Spring or Fall	Staff or Volunteers			■			■		
Shrubland											
Goal: Control invasive plants and restore to a native shrubland. Utilize the area for passive recreation and as a place to allow people to interact with nature.											
1	Control invasive plants (see below)	See below	Staff				■				
1	Restore area after invasive plant control with a variety of native shrubs and herbaceous plants - create a planting plan to determine species and layout	Spring or Fall	Staff, Volunteers, or Contractor				■				
3	Add a diveristy of native plants to increase pollinator value, bird habitat, and scenic beauty	Spring or Fall	Staff, Volunteers, or Contractor				■				
Wet Meadow											
Goal: Maintain new plantings to establish a sustainable wet meadow. If native plants encroach into area, allow to convert to forest.											
1	Maintain fencing and tree tubes	Annually	Staff or Volunteers					■			

1	Control invasive plants (see below)	See below	Staff									
3	If native trees encroach into area, allow to transition to forest	Anytime	Staff									
Deer Management												
Goal: Reduce deer population to the point that native plants are able to naturally regenerate and grow to full extent.												
1	Implement a deer management program utilizing a hunting program and/or a deer cull with professional sharpshooters	Dependent on approach chosen	Staff									
2	Protect new plantings and natural regeneration as needed with fencing and tree tubes	Year-round	Staff									
2	Monitor property for deer impact by assessing impact on plants (browsing evidence and level of regeneration)	Spring/Summer	Staff or Volunteers									
Invasive Plants												
Goal: Control invasive plants, using a least-first, top-down strategy, to support native plant regeneration.												
1	Monitor for and prevent colonization of new species	Year-round	Staff									
1	Share information with developer and new homeowners about common landscaping plants that are invasive, such as Bradford pear, barberry, wisteria, burning bush, and Chinese silvergrass. This could be in the form of pamphlets or annual neighbors meetings.	Anytime	Staff or Volunteers									
1	Control **tree-of-heaven** through mechanical girdling, manual removal, or a cut stump treatment. A basal bark application can be used for trees with 6" dbh or smaller.	Fall	Staff or Volunteers									
1	Control **wisteria** by cutting vines at ground level and at 5 feet above the ground.	Anytime - cut vines at ground level and at 5 feet above the ground; Fall - cut.	Staff and Volunteers									

1	Control **Japanese honeysuckle** by cutting vines at ground level and at 5 feet above the ground.	Anytime - cut vines at ground level and at 5 feet above the ground; Fall - cut and herbicide stumps	Staff and Volunteers								
1	Control **oriental bittersweet** by cutting vines at ground level and at 5 feet above the ground.	Anytime - cut vines at ground level and at 5 feet above the ground; Fall - cut and herbicide stumps	Staff and Volunteers								
1	Control **English ivy** by cutting vines at ground level and at 5 feet above the ground.	Anytime - cut vines at ground level and at 5 feet above the ground; Fall - cut and herbicide stumps	Staff and Volunteers								
2	Control **garlic-mustard** by hand pulling in the early spring before flowering.	Early Spring and summer	Staff or Volunteers								
2	Control **butterfly bush** through a cut stump treatment	Fall	Staff or Contractor								
2	Control **shrub honeysuckle** through a basal bark application or cut stump treatment	Fall	Staff or Contractor								
2	Control **privet** through a basal bark application or cut stump treatment	Fall	Staff or Contractor								
2	Control **barberr**y through cutting.	Fall	Staff or Contractor								
2	Control **linden viburnum** through a basal bark application or cut stump treatment	Fall	Staff or Contractor								
2	Control **wineberry** through a basal bark application or cut stump treatment	Fall	Staff or Contractor								
2	Control **common reed** by cutting.	Summer to Fall	Staff or Contractor								
3	Control **mile-a-minute** through repeated mowing.	Spring or Summer	Staff or Contractor								
3	Control **Chinese silvergrass** by removal.	Spring	Staff or Volunteers								

3	Control **Japanese stiltgrass** by removal.	Late summer	Staff or Volunteers								
3	Control **Japanese princess-tree** through mechanical girdling, manual removal, or a cut stump treatment. A basal bark application can be used for trees with 6" dbh or smaller.	Fall	Staff or Volunteers								
4	Control **multiflora rose** through a basal bark application or cut stump treatment. Alternatively, multiflora rose can be killed naturally by the rose rosette disease if present.	Fall	Staff or Volunteers								
2	Revegetate as needed after invasive control	Spring or Fall	Staff or Volunteers								
3	Educate visitors through interpretive signs about ways to prevent the spread of invasive plants.	Anytime	Staff								
Exotic Pests											
Goal: Minimize the impact of exotic pests on native plants. Spotted lanternfly and emerald ash borer are two pests currently of concern.											
1	Monitor for emerald ash borer	Year-round	Staff								
1	Identify and remove potentially hazardous ash trees	Year-round	Staff								
1	Follow quarantine requirements for emerald ash borer and spotted lanternfly	Year-round	Staff								
2	Replant as needed to replace ash trees	Spring or Fall	Staff or Volunteers								
2	Implement spotted lanternfly traps, using options that protect wildlife	Spring and Summer	Staff or Volunteers								
3	Scrape spotted laternfly egg masses	Fall - Winter	Staff or Volunteers								
Water Quality											
Goal: Protect water quality, particularly from development impact.											

1	Work with developer to improve water protection practices	As soon as possible	Staff							■	■
1	Protect springs and wetlands from disturbances by creating a 300ft no-disturbance buffer; avoid trails and use of heavy equipment within buffer	Year-round	Staff	■							
1	Regularly monitor stormwater basins for proper functioning	Quarterly	Staff								■
1	Expand riparian buffer around ponds, increasing density by planting understory trees and shrubs	Spring or Fall	Staff or Volunteers							■	
2	Develop a monitoring plan and monitor stream health through water quality testing and monitoring of macroinvertibrates	As determined by monitoring plan	Universities, research groups, volunteers	■							
Wildlife Enhancement											
Goal: Improve wildlife habitat for both the sake of wildlife and to create opportunities for wildlife watching.											
2	Leave dead wood and snags for wildlife habitat	Year-round	Staff or Volunteers		■	■					
2	Leave brush piles for wildlife	Year-round	Staff or Volunteers		■	■					
3	Increase plant diversity, chosing plants that fruit and flower at different times	Anytime	Staff	■							
3	Install bird (kestrel, screech owl, wood duck, bluebird) and bat boxes; maintain boxes annually	Year-round	Staff or Volunteers		■	■	■				
Hazards and Debris											
Goal: Manage hazards to protect people and structures. Avoid dumping landscaping debris into the natural areas. This adds excess nutrients to waterways, which can harm aquatic life, and can introduce invasive plants to the natural areas.											
1	Monitor for and remove hazard trees	Annually and after severe storms	Staff	■							
1	Avoid dumping landscape debris in natural areas	Anytime	Staff	■							

3	Remove scattered trash	Anytime	Staff or Volunteers								
Boundary Encroachment and Illegal Use											
Goal: Work to prevent encroachment and quickly address any encroachment and illegal use issues as they arise.											
1	Mark open space boundaries with vinyl markers or bird boxes and maintain as needed	Anytime	Staff								
1	Monitor preserve regularly for encroachment, including debris dumping	Year-round	Staff								
2	Recruit trail ambassadors and preserve monitors	Anytime	Staff								
Climate Change											
Goal: Improve climate change resiliency of plant communities to maintain ecosystem functions such as water quality protection, air filtration, habitat, and carbon sequestration.											
1	Increase plant diversity, choosing non-invasive species predicted to be resilient to climate change	Spring or Fall	Staff or Volunteers								
3	Monitor changes in precipitation and temperature, noting effects on plant or wildlife health	Year-round	Staff or Volunteers								
Volunteers											
Goal: Use volunteers to help with stewardship projects and regular maintanence. Appropriate projects could include trail maintenance, pulling invasive plants, installing and maintaining bird boxes, and monitoring for encroachment.											
2	Recruit regular volunteers to help with park management and monitoring	Anytime	Staff								

* Volunteers should not apply herbicide unless they have proper certification and personal protective equipment