



ENVIRONMENTAL RESOURCE INVENTORY

**BLOCK 1045, LOT 12
MIDDLETOWN TOWNSHIP
MONMOUTH COUNTY, NEW JERSEY**

SEPTEMBER 2024

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EXECUTIVE SUMMARY

This report provides a summary of environmental resources and environmentally sensitive areas identified on Block 1045, Lot 12 of Township of Middletown, New Jersey (the “Site”), and examines the potential environmental impacts that could or would likely occur if high density development were built on the Site. A series of on-Site environmental resource investigations and assessments in March 2024 found that the Site contains steep slopes and developing forest habitat. High density development of the Site is reasonably likely to directly impact several on-Site environmental resources and may also indirectly impact other on-Site and/or downstream environmental resources.

In summary, high-density development of the Site:

- Would require the removal of permeable land, replacing it with impervious surfaces (e.g. roads, buildings) and other less-permeable surfaces (e.g. lawns and other landscaped areas).
- Would likely require the removal and fragmentation of intact, developing forest.
- Would likely require the removal of small to mid-sized trees and other understory vegetation.
- Would likely require the disturbance of currently stable, steep slope areas.

These alterations to the Site:

- Are reasonably likely to increase local stormwater runoff, increase non-point source pollution, and decrease local groundwater recharge capabilities, which may result in the indirect degradation of downstream open waters and associated wetlands, depending on mitigating design features and best management practices.
- Are reasonably likely to reduce the quality and value of existing forest habitat by reducing total forest area, interrupting natural forest development, reducing wildlife by habitat capacity, increasing forest vulnerability to disturbance and invasive species, and decreasing other valuable environmental services provided by forest vegetation such as stormwater runoff reduction.
- Are reasonably likely to disturb steep slopes, decrease slope stability, and increase local soil erosion and runoff, which may in turn degrade the water quality of downstream open waters and associated wetlands, depending on inclusion, design, and maintenance of mitigating design features and best management practices.

Therefore, to a reasonable degree of professional certainty, it is likely that high density development of this Site would be detrimental to the local environment by reducing and degrading environmental resources and environmentally sensitive areas. Furthermore, such development would also be inconsistent with several environmental goals and recommendations established by the Middletown Township Master Plan.



1.0 BACKGROUND

1.1 INTRODUCTION

Princeton Hydro, LLC (Princeton Hydro) was contracted by Spiro Harrison & Nelson to perform a series of environmental resource inventory surveys on Block 1045, Lot 12 located in the Township of Middletown, Monmouth County, New Jersey (hereinafter referred to as "Site").

In March 2024, Princeton Hydro performed several on-Site environmental resource investigations and assessments, including a wetland delineation, steep slope analysis, tree and shrub inventory, threatened and endangered (T&E) species assessment, and ecological community assessment. This report serves as a summary of the Site's environmental resources. More detailed supporting data and information can be found in the report appendices.

A high-density development project has been proposed on the currently undeveloped Site, as shown in a concept development plan, published by CPL Partnership LLC, and provided to Princeton Hydro in July 2024 (**Appendix I**). This concept development plan has been overlain over the environmental resource maps presented in this report (**Appendix II**).

1.2 SITE DESCRIPTION

Based on digital parcel mapping distributed by the NJ Office of GIS (NJOGIS), the Site covers an area of approximately 2.56 acres situated along Red Hill Road, about one-quarter mile southwest of where Red Hill Road crosses over the Garden State Parkway (**Figure 1**). The Site is within the inner coastal plain region of New Jersey (Collins & Anderson 1994) in the headwaters of the Navesink River Estuary Watershed (Hydrologic Unit Code [HUC]-11: 02030104070). According to stream mapping published by The New Jersey Department of Environmental Protection (NJDEP), the headwaters of Nut Swamp Brook are located proximate to the southern property boundary; however, on-Site assessments confirmed that these headwaters begin off-Site. Nut Swamp Brook flows southward and eventually discharges to Shadow Lake, approximately four miles downstream, and, in turn, the Navesink River Estuary. According NJDEP 2020 Land Cover mapping, the floodplains and riparian areas of Nut Swamp Brook downstream of the Site also contain extensive wetland habitats.

Based on a review of historic imagery published by the New Jersey Geographic Information Network (NJGIN), the Site appeared primarily non-forested in early 20th century (**Figure 2**). No obvious historical land use can be identified based on the imagery. By the 1980s, the Site was predominantly reforested, with the exception of a small unpaved lot/open field along the western edge of the Site (**Figure 3**). The unpaved lot/open field was expanded between the 1980s and 2023 (**Figure 1**). Site investigations in 2024 confirmed that the Site was composed of a cleared, unpaved lot along its western edge, upland forest along its eastern edge, with a cleared hillside connecting these two areas.

Figure 1: Site Overview – 2023

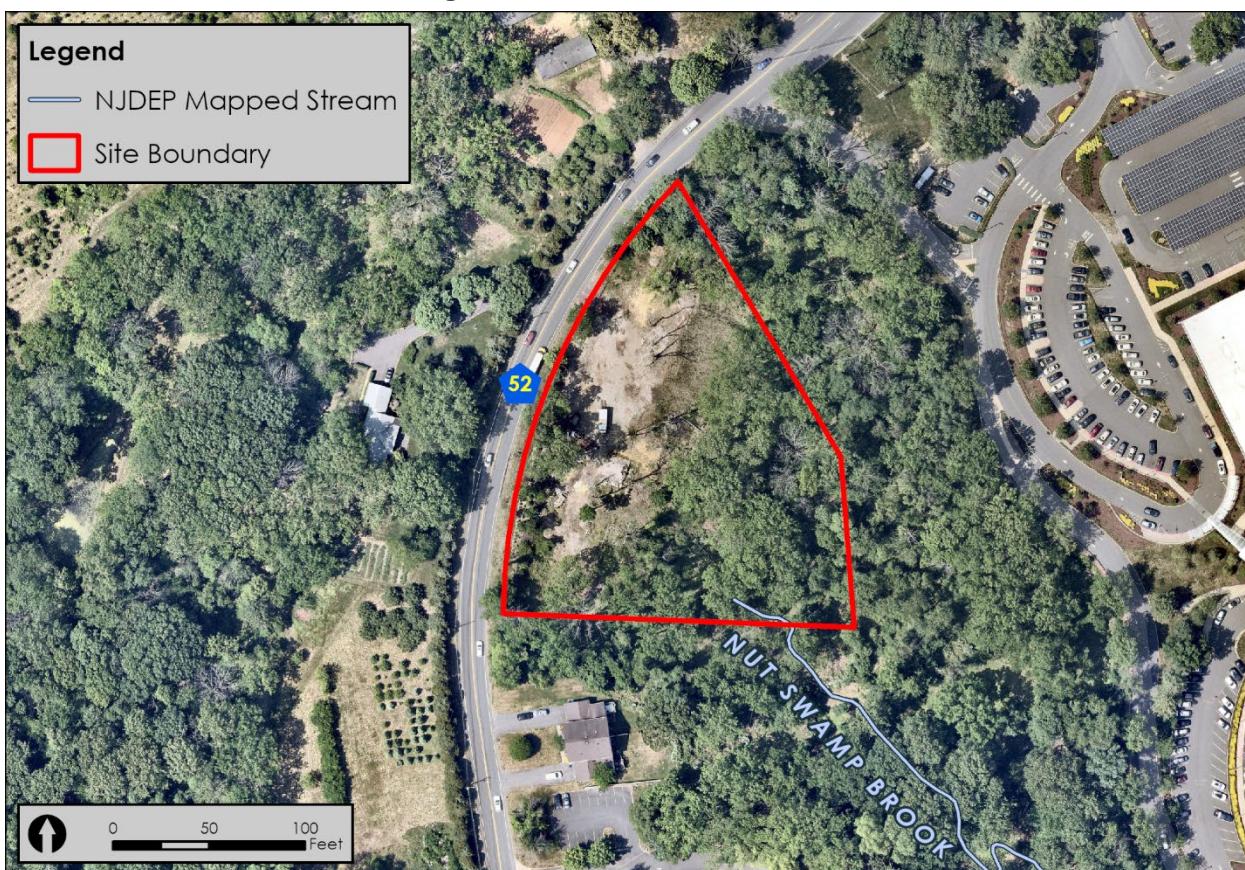


Figure 2: Site Overview – 1930s

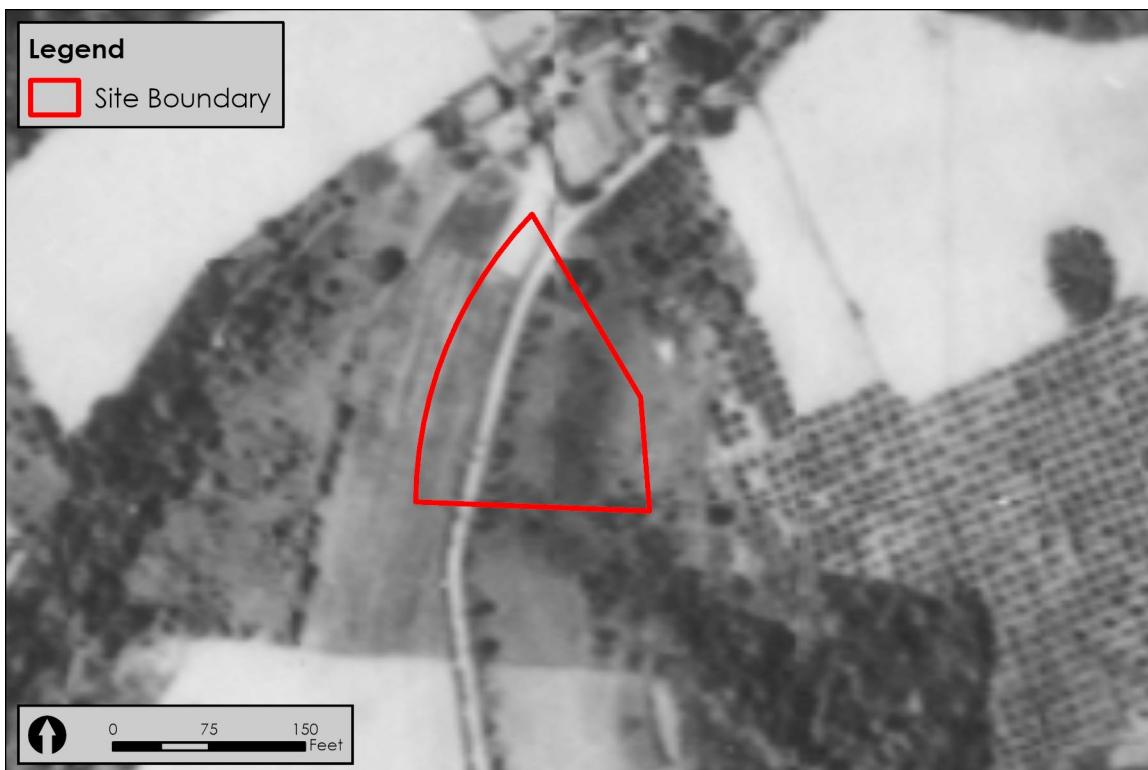


Figure 3: Site Overview – 1980s





2.0 WETLANDS AND STATE OPEN WATERS DELINEATION

2.1 METHODOLOGY

The delineation of wetlands on-Site was conducted in accordance with the *Federal Manual for Identifying and Delineating Jurisdictional Wetlands (Federal Manual)* (Federal Interagency Committee for Wetland Delineation [FICWD] 1989) and the U.S. Army Corps of Engineers' (USACE) *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic Gulf and Coastal Plain Region, Version 2.0 (AGCP Regional Supplement)* (Environmental Laboratory 2010). The Federal Manual's 'Routine On-Site Determination Method' was applied for both the collection and review of existing available background information on vegetation, soils and hydrology, and the on-Site delineation, with supplemental information provided by the AGCP Regional Supplement. The delineation was performed on March 25 and 26, 2024.

Based on the "three parameter" approach, an area is defined as a wetland if it exhibits, under normal circumstances, all of the following characteristics:

1. The land supports a dominance of hydrophytic vegetation.
2. The substrate is hydric soil.
3. The soil/substrate is at least periodically saturated or inundated during a portion of the growing season.

Princeton Hydro's wetland investigation involved the establishment of representative sampling points along wetland lines, if present, and at representative locations within each plant assemblage. At each sampling point, data regarding the vegetation, soil, and hydrology were collected. The data collected provided the information required to determine whether the area met the definition of a wetland.



2.2 RESULTS

A summary of the wetland and State open waters identified and delineated on-Site, and the total acreage and the percent area of each is presented in **Table 1**. A map of all wetland and State open water communities identified on-Site is presented on **Page 7**. A full list of species observed on the Site is available in **Appendix III**. A copy of the Freshwater Wetlands Letter of Interpretation (LOI) for the Site, issued by NJDEP on May 25, 2023, is available in **Appendix IV**.

Table 1: Summary of the Site's Wetlands and Open Waters

WETLAND / OPEN WATER HABITAT	TOTAL ACREAGE ON-SITE	PERCENT AREA OF THE SITE
Open Water	0.00 ac	0.0%
Wetland	0.00 ac	0.0%
Total	0.00 ac	0.0%

No wetlands or State open waters were observed on-Site. This result is consistent with the Freshwater Wetlands LOI, submitted by the Adoni Property Group, and approved by the NJDEP in May 2023 (NJDEP PI No. 1331-23-0003.1 [FWW230001]) (**Appendix IV**). Off-Site waters were not assessed, but stream mapping published by NJDEP indicated the headwaters of Nut Swamp Brook are located along the southern property boundary and flow south, discharging to Shadow Lake and the Navesink River Estuary approximately four miles downstream.



2.3 DISCUSSION

In New Jersey, wetlands, State open waters, and transition areas (i.e., upland buffers adjacent to freshwater wetlands) are primarily regulated by the New Jersey's Freshwater Wetlands Protection Act Rules (N.J.A.C. 7:7A). New Jersey's waters and their floodplains are also regulated under the New Jersey Flood Hazard Area Control Act Rules (N.J.A.C. 7:13), which establishes regulated flood hazard areas (FHAs) and riparian zones around regulated waters. NJDEP implements these rules and is responsible for the review and permitting of all regulated activities. Due to the lack of wetlands or State open waters on or in the immediate vicinity of the Site, it is unlikely that any development activities would be regulated under the Freshwater Wetlands Protection Act or Flood Hazard Area Control Act Rules.

Historically, New Jersey's wetlands and State open waters were often lost or degraded directly and with intention, through development activities such as filling or draining to create usable land for farming and building. However, direct impacts to wetlands and State open waters are no longer common in New Jersey due to regulatory protections. Instead, indirect impacts to wetlands and open waters are more prevalent. Indirect impacts can arise from any land development near a wetland or State open water, or in their watershed, comprised of the area of land which drains to the wetland or State open water. Land development generally increases the rate and volume of stormwater runoff into nearby surface waterbodies (NJDEP 2016). Increased stormwater runoff can overwhelm the natural capacity of downstream waterbodies, leading to structural issues such as stream bank erosion, stream migration, stability issues, and increased flooding. Land development also generally increases non-point source water pollution (i.e. diffuse contamination that does not originate from a single discrete source), because stormwater runoff flowing through developed landscapes tends to mobilize and transport pollutants into local waterways, such as excess nutrients from lawn fertilizers, oils and lubricants from automobiles, salt from winter road maintenance, and sediment from construction sites and eroding slopes. Any increase in non-point source water pollution may indirectly impact downstream waterbodies and wetlands by reducing their water quality.

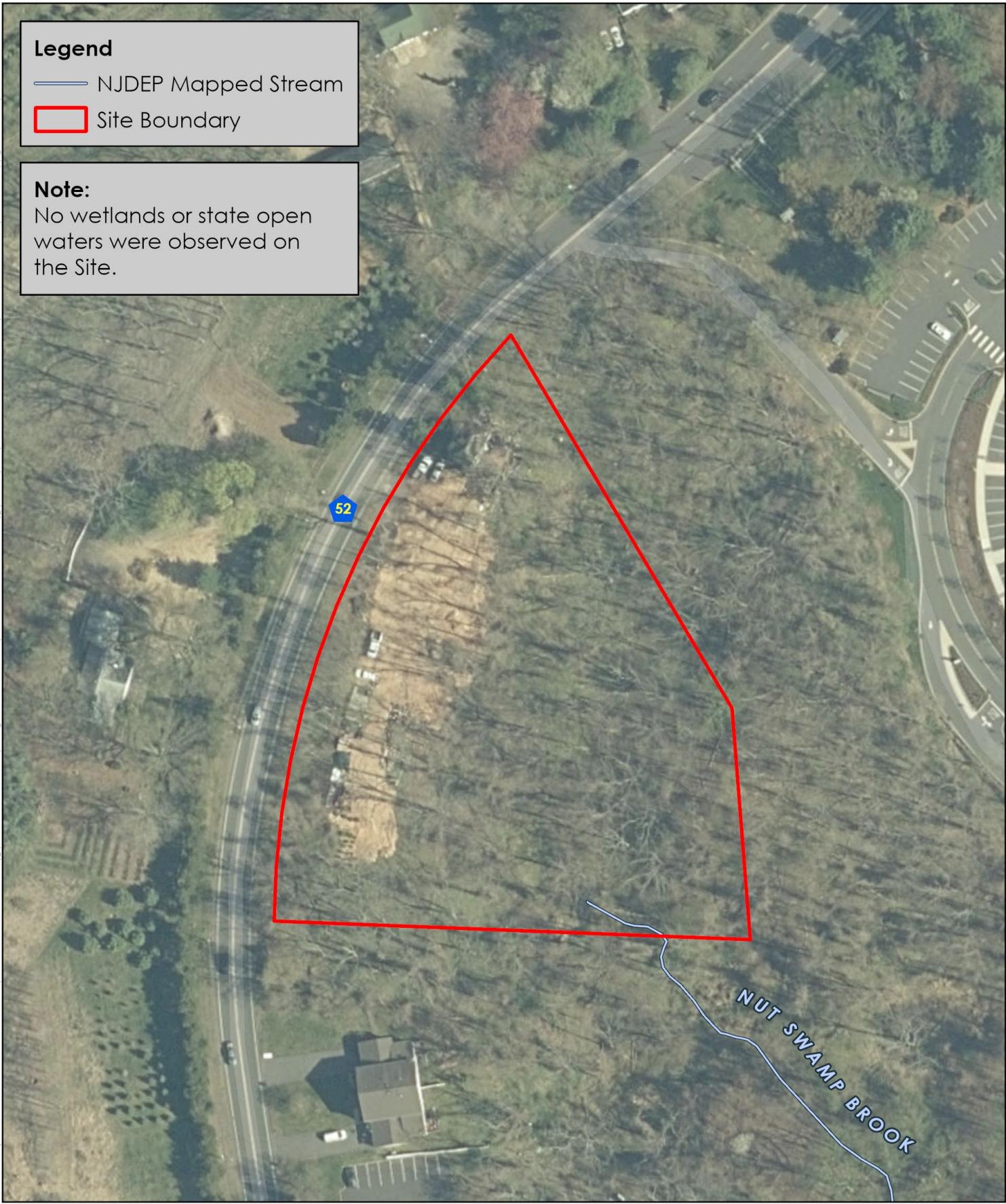
Land development on the Site would not directly impact any wetlands or open waters, or associated wetland transition area, riparian zone, or flood hazard area, as none are present on the Site. However, on-Site land development would remove permeable land in uplands, replacing it with impervious surfaces (e.g., roads, buildings) and other less-permeable surfaces (e.g., lawns and other landscaped areas). Such alterations are reasonably likely to increase local stormwater runoff, increase non-point source pollution, and decrease local groundwater recharge capabilities. This may result in the indirect degradation of on-Site and downstream open waters and associated wetlands, depending on inclusion, design, and maintenance of mitigating features such as storm sewers, stormwater basins, vegetated buffers, and/or other stormwater best management practices.

Legend

- NJDEP Mapped Stream
- Site Boundary

Note:

No wetlands or state open waters were observed on the Site.



NOTES:

1. NJDEP mapped streams obtained from the NJDEP GIS website: www.state.nj.us/dep/gis/
2. Wetland and state open water limits delineated by Princeton Hydro in March of 2024.
3. 2020 orthoimagery obtained from the NJ Geographic Information Network (NJGIN) Open Data portal.
4. Site boundary provided by CPL Partnership, transmitted on 07/24/2024.



0 50 100 Feet

Spatial Reference: NAD 1983 2011 StatePlane New Jersey FIPS 2900 Ft US

WETLAND & STATE OPEN WATER DELINEATION MAP

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3.0 STEEP SLOPE ANALYSIS

3.1 METHODOLOGY

Chapter 540 (Planning and Development Regulations) of Middletown Township's municipal code defines "steep slopes" as those areas where the average slope is 15% or greater as measured over a ten-foot interval. The code further defines steep slopes which are 25% or greater as "critical slopes". Site topography data was obtained from the Northeast NJ Post-Sandy 2014 LiDAR Digital Elevation Model (DEM), published by the U.S. Geological Survey Coastal and Marine Geology Program (CMGP) and distributed through the New Jersey Geographic Information Network. Percent slope was calculated using the DEM and ESRI's ArcGIS Pro Spatial Analysis Toolbox. Areas with a calculated slope of 15% - 25% or >25% over a ten-foot interval were extracted and their acreage was calculated.

3.2 RESULTS

A summary of the steep slopes identified on-Site, and the total acreage and the percent area of each is presented in **Table 2**. A map of steep slopes identified on-Site is presented on **Page 11**.

Table 2: Summary of the Site's Steep Slopes

STEEP SLOPE CLASS	TOTAL ACREAGE ON-SITE	PERCENT AREA OF THE SITE
15% - 25% Slope	0.67 ac	26.3%
>25% Slope	0.81 ac	31.6%
Total	1.48 ac	57.9%

Steep slopes (>15% slope) comprise approximately 1.48 acres, or 57.9% of the Site. Of those steep slopes, approximately 0.81 acres, or 31.6% of the Site, would be classified as critical slopes (>25% slope) under Middletown Township municipal code. The largest contiguous area not encumbered by steep slopes is present within the western portion of the Site.



3.3 DISCUSSION

In general, steeply sloping terrain is less stable, more prone to erosion, and more vulnerable to disturbance than gently sloping terrain. Steep slopes tend to become naturally stable over long time periods, as erosional forces shape the terrain into a stable topography and vegetation establishes, binding the soil and reducing water runoff.

Disturbances to steep slopes, such as construction, removal of vegetation, or increased water runoff, can destabilize a slope and lead to changes in topography, erosion, soil loss, and degradation of water quality. Once a steep slope has been destabilized, erosional forces can create a positive feedback loop in which erosion continues to decrease stability of the slope leading to even further erosion. Because of this, it is often difficult to restabilize a disturbed steep slope and slope erosion can become a chronic issue on a developed steep slope site. Middletown Township has recognized that the disturbance of steep slopes should be prevented or limited where possible and regulates the development and disturbance of steep slopes under Chapter 540 (Planning and Development Regulations) of the Township municipal code.

The Site's steep slope areas appear to be largely stable under current conditions; no signs of significant slope erosion, such as gully formation, were observed in these areas during on-Site assessments in March 2024. The Site's steep slope areas were generally vegetated with grasses and other herbs (**Figure 4**), which are providing additional stability to these slopes.

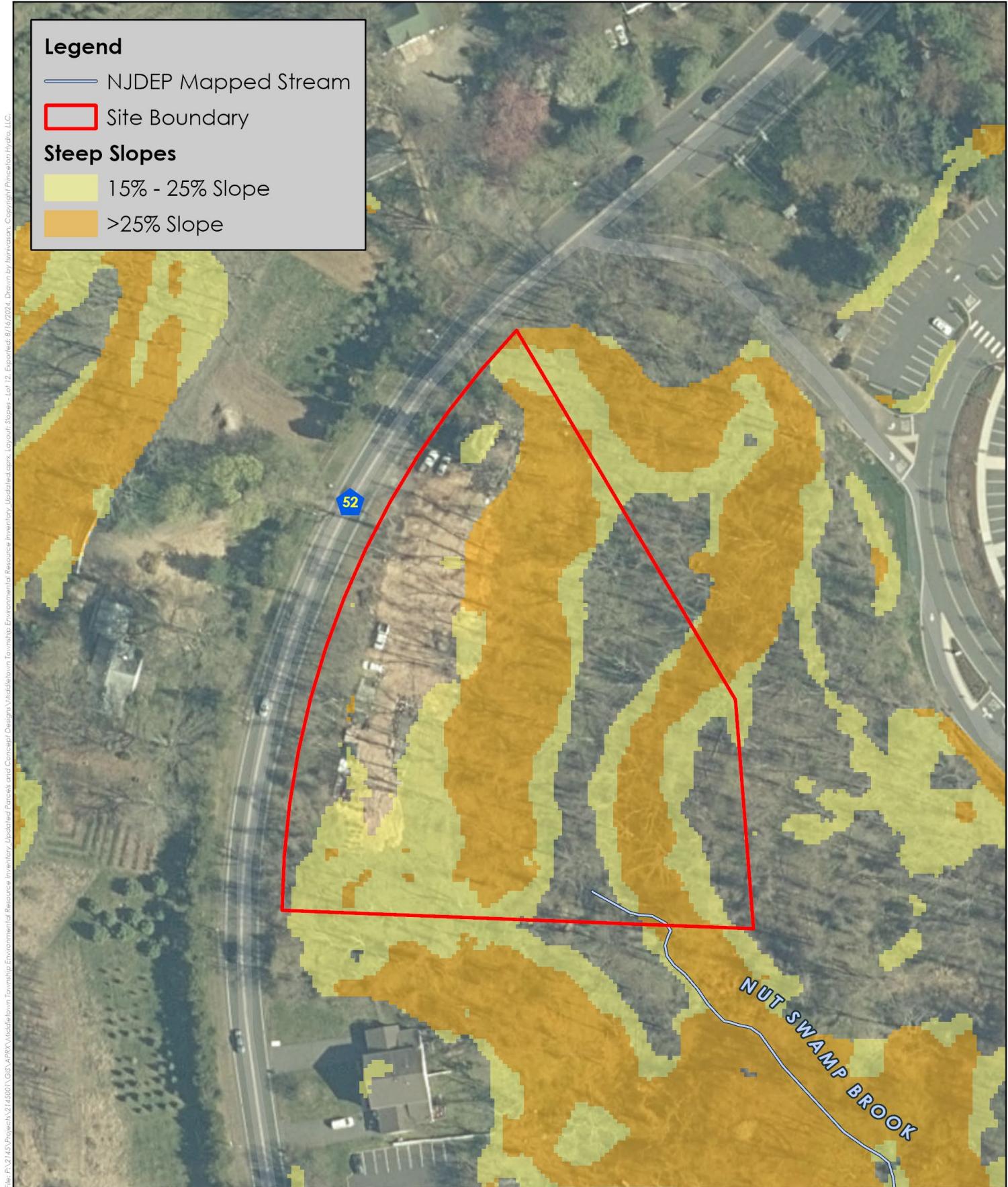
Based on the conceptual development plan, the footprints of the proposed building and paved surfaces would cover approximately 0.75 acres (~50%) of the Site's steep slope areas (>15% slope), including 0.43 acres (~53%) of the Site's critical slope areas (>25% slope), as defined by Middletown Township's municipal code. Actual disturbances to steep slopes would exceed these estimates, because the overall limit of disturbance required to construct the proposed development (i.e. including all Site clearing, earthwork/grading, landscaping, etc.) would extend beyond the exact footprints of the proposed building and paved surfaces. Furthermore, because the Site's steep slopes form a contiguous area bisecting the Site, the eastern part of the Site cannot be accessed or developed without crossing a steep slope. Land development and/or the removal of vegetation within these areas are reasonably likely to disturb steep slopes and increase local soil erosion and runoff, which may in turn degrade the water quality of downstream open waters and associated wetlands, depending on

Figure 4: Photo of an On-Site Steep Slope





inclusion, design, and maintenance of mitigating design features and best management practices. The replacement of existing vegetation in steep slope areas, such as removing established trees and shrubs and replacing them with turf grass or ornamental plantings, is also reasonably likely to decrease slope stability, because mature, well-established vegetation tends to more effectively bind and stabilize a slope.



NOTES:

1. NJDEP mapped streams obtained from the NJDEP GIS website: www.state.nj.us/dep/gis/
2. Slopes (2014 LiDAR) and 2020 orthoimagery obtained from the NJ Geographic Information Network (NJGIN) Open Data portal.
3. Site boundary provided by CPL Partnership, transmitted on 07/24/2024.



0 50 100
Feet

Spatial Reference: NAD 1983 2011 StatePlane New Jersey FIPS 2900 Ft US

STEEP SLOPES MAP

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4.0 TREE AND SHRUB INVENTORY

4.1 METHODOLOGY

In March of 2024, Princeton Hydro inspected the Site and inventoried all trees and shrubs falling under the following criteria:

- **Specimen Trees** – trees with a diameter at breast height (DBH) of 30 in. or greater
- **Tree Species of interest** – trees with a DBH of 1 in. or greater, and belonging to one of the following species:
 - American holly (*Ilex opaca*)
 - Flowering dogwood (*Cornus florida*)
- **Shrub Species of interest** – Shrubs with a root crown diameter of 3 in. or greater, and belonging to one of the following species:
 - Native species of the genus *Kalmia*; including, but not limited to:
 - Mountain laurel (*Kalmia latifolia*)
 - Sheep laurel (*Kalmia angustifolia*)

Species of interest were selected due to typical associations between these species and the overall condition and quality of the surrounding forest habitat. Tree species of interest were also selected because these species do not typically grow to the diameters that would classify them as “specimen trees”, even at maturity, so to exclude them on diameter alone could misrepresent the composition of the forest’s mature trees. On-Site trees and shrubs fitting these criteria were identified, measured, and geolocated by Princeton Hydro using an *EOS Arrow Gold RTK GNSS Receiver*, with RTK corrections received through the *HxGN SmartNet RTK* network.



4.2 RESULTS

A summary of the Site's tree and shrub inventory, broken down by species and abundance, is presented in **Table 3**. A map of all trees and shrubs fitting the inventory criteria is presented on **Page 16**, and a table listing each tree/shrub, their characteristics, and their geographic coordinates, is presented in **Appendix V**. Other tree and shrub species observed on-Site that did not satisfy the criteria of the tree and shrub inventory, can be found in the full list of species observed in **Appendix III**.

Five (5) individual trees fitting the inventory criteria were identified on-Site, specifically the criteria for a specimen tree, with a DBH of 30" or greater. The DBH of specimen trees ranged from 31.1 to 40.7 inches. The specimen trees were comprised of four species.

Table 3: Summary of the Site's Tree & Shrub Inventory

TREE/SHRUB INVENTORY CATEGORY	NO. OF INDIVIDUALS
Specimen Trees (DBH \geq 30")	5
Black Locust (<i>Robinia pseudoacacia</i>)	1
Sassafras (<i>Sassafras albidum</i>)	1
Silver Maple (<i>Acer saccharinum</i>)	2
White Ash (<i>Fraxinus americana</i>)	1
Tree Species of Interest (DBH \geq 6")	0
American holly (<i>Ilex opaca</i>)	0
Flowering dogwood (<i>Cornus florida</i>)	0
Shrub Species of Interest (Root collar dia. \geq 3")	0
Laurel (<i>Kalmia</i> sp.)	0
Total	5



4.3 DISCUSSION

All trees are valuable environmental resources providing ecosystem services including, but not limited to, reducing urban heat, reducing stormwater runoff, improved water quality, sequestration of carbon dioxide, and provision of wildlife habitat. These ecosystem services increase over time. Large-diameter specimen trees also have a strong influence on a forest's ecology, altering a forest's microclimate, shaping the understory environment through shading, influencing patterns of forest succession, and producing a larger portion of seed and fruit (Lutz et al. 2018).

Overall, the Site was dominated by small to mid-sized trees. The species and size class composition of the Site's wooded areas indicates that the Site is currently in an early stage of forest development. However, forests mature and evolve in stages spanning decades to centuries, and existing tree cover already reflects several decades of natural reforestation. It is generally expected that over time, barring frequent or large-scale disturbance, on-Site trees will continue to grow into larger specimens, the forest canopy will become denser, and the diversity of trees will increase as the forest composition evolves and more shade-tolerant species establish and reach maturity.

Land development on the Site may require the removal of small to mid-sized trees. Disturbance to the on-Site forest through the removal of trees is reasonably likely to interrupt and hinder the ongoing forest maturation process by removing established trees, creating canopy openings, and fragmenting the forest. Any remaining forest habitat after development is reasonably likely to be of lower ecological quality and higher vulnerability due to habitat fragmentation; Fragmented habitat generally has a lower diversity of plant and animal species, lower tolerance to disturbance, and greater vulnerability to non-native and/or invasive species which typically outcompete native species in disturbed settings (NJDEP 2020). The removal of trees, and other forest vegetation, is reasonably likely to increase the soil erosion and stormwater runoff, which may in turn degrade the water quality of on-Site and downstream open waters and associated wetlands, depending on inclusion, design, and maintenance of mitigating design features and best management practices.

The Middletown Township Code establishes several local regulations governing trees and forests in the Township, generally encouraging tree conservation and limiting tree removal. Any land development on the Site would require compliance with these local regulations, most notably Township Code §540-651 ("Wooded areas"), which sets limitations on the clearing of wooded areas, and Township Code §540-534 ("Tree removal and clearing on property"), which establishes a township review and approval process for certain tree removal and clearing activities. Per §540-651A, because the Site is within the R-45 zoning district with a maximum total lot coverage of 15%, no more than 20% of the Site's existing wooded areas may be cleared or developed, and the remaining 80% must be maintained as permanent open space or preserved within the lot. Per §540-651C, certain individual trees must also be preserved wherever possible, and any Site development plans must incorporate the preservation of said trees in relationship to proposed buildings, parking and open space. The



trees on-Site which would receive such protection under §540-651C include all healthy specimen and mature shade trees of twelve-inch caliper or greater, healthy specimen trees of eight-inch caliper or greater, and healthy ornamental trees of four-inch caliper or greater. Additionally, the extent of tree removal and clearing activities required by development of the Site would likely constitute a regulated activity under §540-534B. As such, per §540-534C and §540-534D, any Site development plans must undergo a review and approval process with the Township Zoning Officer and Township Engineer, and shall be reviewed for potential drainage or erosion impacts to adjoining properties, and potential alternative or optional measures that could mitigate the impacts of tree removal and clearing activities.

Legend

NJDEP Mapped Stream

Site Boundary

Specimen Trees (DBH \geq 30")

- Black Locust (1)
- Sassafras (1)
- Silver Maple (2)
- White Ash (1)



NOTES:

1. NJDEP mapped streams obtained from the NJDEP GIS website: www.state.nj.us/dep/gis/
2. Tree inventory performed by Princeton Hydro in March of 2024.
3. 2020 orthoimagery obtained from the NJ Geographic Information Network (NJGIN) Open Data portal.
4. Site boundary provided by CPL Partnership, transmitted on 07/24/2024.



0 50 100 Feet

Spatial Reference: NAD 1983 2011 StatePlane New Jersey FIPS 2900 Ft US

TREE INVENTORY MAP

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5.0 THREATENED AND ENDANGERED SPECIES HABITAT ASSESSMENT

5.1 METHODOLOGY

Threatened & Endangered (T&E) species habitat assessments involved both a desktop and field-based component. T&E species habitat mapping data was obtained from the New Jersey Landscape Project (version 3.3), published by the New Jersey Division of Fish and Wildlife (NJDFW 2017). This data was reviewed to screen for potential T&E species based on habitat characteristics and past species observations of record. T&E species observation records were later confirmed against two official searches of the New Jersey Natural Heritage Program Database (NJNHP 2024, NJNHP 2023). T&E species that could potentially inhabit the Site were identified with a subsequent field assessment conducted in March 2024. The T&E species field assessment consisted of documenting the existing habitat elements present throughout the entirety of the Site and comparing it to suitable habitat elements for listed T&E species. Suitable habitat was based on species habitat descriptions from the *Protocols for the Establishment of Exceptional Resource Value Wetlands Pursuant to the Freshwater Wetlands Protection Act (N.J.S.A. 13:9b-1 et seq.)* (NJDEP 2023), and T&E species profiles published by the New Jersey Division of Fish and Wildlife (NJDFW n.d.).

5.2 RESULTS

A map of potential T&E species habitat on-Site, as determined by the New Jersey Landscape Project, is presented on **Page 20**. The results of two searches of the New Jersey Natural Heritage Program Database for the Site, issued in May 2024 and February 2023, are presented in **Appendix VI** and **Appendix VII**, respectively. Per the Landscape Project, approximately 90% of the Site was classified as either rank 1 or 3 T&E species habitat.

Rank 1 habitats are those areas that meet one or more habitat specific requirements of T&E species, but where no observed occurrences of T&E species exist. Rank 1 habitats were identified on the Site along its northern and southeastern edges. The Site's Rank 1 habitats were ranked as being either wetlands or riparian corridors, which possess the potential to provide suitable habitat for T&E species.

Rank 3 habitats are those areas that meet one or more habitat specific requirements of T&E species and where there has been an observed occurrence of a species considered threatened by the State of New Jersey. Rank 3 habitats were identified throughout the majority of the Site with the exceptions being the extreme northwest and southeast portions. The Site's rank 3 habitats were comprised of wetlands and/or riparian corridors and by their proximity to an observed occurrence of Black-crowned Night Heron (*Nycticorax nycticorax*), a threatened species in New Jersey.

The Natural Heritage Database Results for the Site issued in May 2024 (**Appendix VI**) lists Black-crowned Night Heron as possessing foraging habitat within the Site. The Natural Heritage Database Results for the Site issued in February 2023 (**Appendix VII**) concurred with the listed



on-Site Black-crowned Night Heron habitat, and also listed several additional species of interest in the immediate vicinity of the Site, or within one mile, including:

- **Species of Special Concern**

- Wood Thrush (*Hylocichla mustelina*)
- Eastern Box Turtle (*Terrapene carolina carolina*)

- **Threatened Species**

- Black-crowned Night Heron (*Nycticorax nycticorax*),
- Bobolink (*Dolichonyx oryzivorus*)
- Grasshopper Sparrow (*Ammodramus savannarum*)
- Savannah Sparrow (*Passerculus sandwichensis*)
- Red-headed Woodpecker (*Melanerpes erythroccphalus*)

- **Endangered Species**

- Bald Eagle (*Haliaeetus leucocephalus*)
- Upland Sandpiper (*Bartramia longicauda*)

5.3 DISCUSSION

Black-crowned Night Heron is, primarily, a nocturnal forager, being generalist predators and feeding on a wide range of prey including but not limited to fish, crustaceans, tadpoles, lizards, snakes, and the eggs and young of other bird species (NJDEP 2023). The highly preferred habitat of Black-crowned Night Heron is along the edges of tidal creeks, ponds, and pools, as well as within salt marshes and estuary systems. In addition to saltwater and brackish marshes and ponds, freshwater ponds and mudflats are also considered to be suitable for Black-crowned Night Heron foraging. The Site did not possess (1) Black-crowned Night Heron preferred habitat types; or (2) their preferred prey. As such, suitable foraging habitat was not identified on-Site.

Species identified in the immediate vicinity of the Site, or within one mile, may have undocumented use of the Site, or may transit through the Site from nearby suitable habitat. The Site does not contain suitable nesting, foraging, or other transient habitat for Bobolink, Grasshopper Sparrow, Savannah Sparrow, Bald Eagle, or Upland Sandpiper, but may contain suitable habitat for Red-headed Woodpecker and may develop suitable habitat for Wood Thrush over time barring disturbance.

Red-headed Woodpecker habitat is generally characterized by a scattering of mature trees with an open or herbaceous understory or forest edge associated with nearby open areas. Nest cavities are usually in dead trees or, less frequently, dead limbs in living trees (NJDEP 2023). The Site contains such forest edge habitat, and notably contains several large standing dead trees (**Figure 5**) which could serve as potential nesting sites for Red-headed Woodpecker.

Wood Thrush prefers deciduous or mixed forests with dense tree canopy and a well-developed understory (NJDFW n.d.). During migration, wood thrush can be found within any forested habitat. While the Site's forest currently lacks a dense canopy and well-developed understory,



the Site does provide suitable habitat during migration. As the Site's forest continues to mature, development of a closed canopy and well-developed understory would offer suitable habitat for wood thrush during the breeding season. Given the Site's proximity to known suitable wood thrush habitat, its preservation would offer an opportunity for additional suitable wood thrush habitat.

In summary, development of the Site will not impact any confirmed threatened and endangered species habitat. However, development may reduce undocumented and/or potential nesting habitat for Red-headed Woodpecker, a threatened species in New Jersey, and may hinder the natural development of potential habitat for Wood Thrush, a species of special concern in New Jersey.

Figure 5: Photo of On-Site Large Standing Dead Trees





NOTES:

1. NJDEP mapped streams and T&E species habitat (Landscape Project v3.3) obtained from the NJDEP GIS website: www.state.nj.us/dep/gis/
2. 2020 orthoimagery obtained from the NJ Geographic Information Network (NjGIN) Open Data portal.
3. Site boundary provided by CPL Partnership, transmitted on 07/24/2024.



0 75 150 Feet

Spatial Reference: NAD 1983 2011 StatePlane New Jersey FIPS 2900 Ft US

**T&E SPECIES
HABITAT MAP**
ENVIRONMENTAL RESOURCE INVENTORY
BLOCK 1045, LOT 12
MIDDLETOWN TOWNSHIP
MONMOUTH COUNTY, NEW JERSEY



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6.0 ECOLOGICAL COMMUNITY ASSESSMENT

6.1 METHODOLOGY

An ecological community is a variable assemblage of interacting plant and animal populations that share a common environment (Edinger et al. 2014). Princeton Hydro identified and delineated the ecological communities that compose the Site through field investigations conducted in March of 2024 in conjunction with desktop analysis of geospatial datasets. During field investigations, plant assemblages were identified and the location of transitions between unique plant assemblages were geolocated. Field observations were compared to geospatial datasets, including 2015 and 2020 orthoimagery obtained from the New Jersey Geographic Information Network, and Site topography obtained from the Northeast NJ Post-Sandy 2014 LiDAR Digital Elevation Model (DEM), published by the U.S. Geological Survey Coastal and Marine Geology Program (CMGP) and distributed through the New Jersey Geographic Information Network. These geospatial datasets served to correlate in-field plant assemblage observations with other geographic patterns, such as topographic features observed in LiDAR data (e.g. ditches, depressions) or differing imagery signatures (e.g. varying color or texture).

Based on these field and desktop observations, on-Site ecological communities were classified, and their approximate limits were delineated. Ecological community classification was based on classification systems described in *Plant Communities of New Jersey: A Study in Landscape Diversity* (Collins and Andrews 1994) and *Ecological Communities of New York State, Second Edition* (Edinger et al. 2014).



6.2 RESULTS

A summary of the ecological communities identified on-Site, the total acreage, and the percent area of each is presented in **Table 4**. A map of all ecological communities identified on-Site is presented on **Page 26**.

Table 4: Summary of Site's Ecological Communities

ECOLOGICAL COMMUNITY CLASSIFICATIONS	TOTAL ACREAGE ON-SITE	PERCENT AREA OF THE SITE
<i>Upland Forest</i>	1.34 ac	52.2%
Successional Hardwood Forest	1.34 ac	52.2%
<i>Anthropogenic</i>	1.22 ac	47.8%
Cleared Lot	0.56 ac	21.9%
Open Hillside	0.38 ac	14.9%
Ruderal Wooded Roadside	0.28 ac	11.0%
Total	2.56 ac	100.0%

The Site is evenly split between upland forest communities, specifically successional hardwood forest, and anthropogenic communities, specifically cleared lot, open hillside, and ruderal wooded roadside.

Each ecological community identified on-Site is described in detail below. The ecological community descriptions include dominant species (species observed on-Site with the greatest abundance or percent cover), codominant species (species observed on-Site with relatively high abundance or percent cover) and characteristic species (species that were not observed on-Site but that are commonly found in that type of community, although not necessarily abundant). The species listed are a representative sample and do not list all species that may be present in a community. A full list of all plant species observed on-Site is available in **Appendix III**.



SUCCESSIONAL HARDWOOD FOREST

The successional hardwood forest community was observed, primarily, within the eastern half of the Site, and comprised just over half of the Site (52.2%). This community generally aligned with the “other successional plant communities” as described in *Plant Communities of New Jersey* (Collins and Andrews 1994), and the “successional southern hardwoods” as described in *Ecological Communities of New York State* (Edinger et al. 2014). On-Site, this community generally had a mostly closed tree canopy, with some canopy gaps and clearings, and an understory layer that varied in density from moderate to dense (**Figure 6**).

Topographically, the successional hardwood forest sat at a lower elevation than the rest of the Site, about 15 to 30 feet lower than the cleared lot and Red Hill Road.

The successional hardwood forest community was generally dominated by small to mid-sized trees, with few large specimens. The dominant trees of this community were black locust (*Robinia pseudoacacia*) and black cherry (*Prunus serotina*). In some areas, tuliptree (*Liriodendron tulipifera*) was a codominant tree. Other characteristic trees included black walnut (*Juglans nigra*), common hackberry (*Celtis occidentalis*), white ash (*Fraxinus americana*), and sassafras (*Sassafras albidum*)

The successional hardwood forest community understory contained mostly tree saplings, shrubs with sparse vines, and little to no herbaceous vegetation. The dominant shrub of the understory was northern spicebush (*Lindera benzoin*). Other characteristic shrub species included multiflora rose (*Rosa multiflora*), Morrow's honeysuckle (*Lonicera morrowii*), Japanese knotweed (*Polygonum cuspidatum*), and Japanese wineberry (*Rubus phoenicolasius*). The most common vine observed was poison ivy (*Toxicodendron radicans*). Other characteristic vine species included Japanese honeysuckle (*Lonicera japonica*), English ivy (*Hedera helix*), and an unidentified species of wild grape (*Vitis* sp.). Herbaceous species, where observed, were mostly ruderal and non-native species, including garlic mustard (*Alliaria petiolata*), purple dead-nettle (*Lamium purpureum*), and common reed (*Phragmites australis*).

Figure 6: Photo of the Successional Hardwood Forest Community





CLEARED LOT

The cleared lot encompassed about 22% of the Site. The area is generally level, surfaced with gravel, and devoid of vegetation (**Figure 7**). This community generally aligned with the “urban vacant lot” as described in *Ecological Communities of New York State* (Edinger et al. 2014).

Where vegetation is present, it was generally sparse unidentified grasses and herbs. A few large trees grow along the perimeter of the area, including silver maple (*Acer saccharinum*) and black locust (*Robinia pseudoacacia*).

Topographically, the cleared lot sat around the same elevation as Red Hill Road, about 15 to 30 feet higher than the successional hardwood forest. The topography of the cleared lot and surrounding slopes suggests that the area has been artificially graded in the past and potentially constructed with fill material.

OPEN HILLSIDE

The open hillside was an area comprised of steep slopes, encompassing about 15% of the Site, between the cleared lot and successional hardwood forest. The area was primarily vegetated with herbaceous vegetation, with little to no woody vegetation (**Figure 8**) observed.

Figure 7: Photo of the Cleared Lot Community



Figure 8: Photo of the Open Hillside Community





RUDERAL WOODED ROADSIDE

The ruderal wooded roadside community encompassed about 11% of the Site, along the narrow transition area between Red Hill Road and the cleared lot. This community generally aligned with the “urban vacant lot” as described in *Ecological Communities of New York State* (Edinger et al. 2014). The area contained a sparse mix of small trees, vines, and herbaceous plant species interspersed with piles of miscellaneous construction litter such as pallets, chopped wood, and cut stone (**Figure 9**).

Figure 9: Photo of Ruderal Wooded Roadside Community



6.3 DISCUSSION

The Site’s anthropogenic communities (the cleared lot, open hillside, and ruderal wooded roadside) provide little ecological value due to their sparse vegetation and poor species diversity. These areas are likely to remain stable over time barring significant alteration of the Site, or abandonment of any management (e.g. occasional mowing, clearing, herbicide).

The Site’s successional hardwood forest community provides ecological value and services such as wildlife habitat, carbon sequestration, stormwater runoff reduction, water quality improvement, urban heat mitigation, and urban noise reduction. The species and size class composition of the Site’s successional hardwood forest indicates that it is at a relatively early stage of forest development. It is generally expected that over time, barring frequent or large-scale disturbance, this early successional forest will continue to mature, the forest canopy will become denser, and additional mid to late-successional tree species will colonize the Site. As this forest community matures it is expected that the aforementioned ecological value and services provided will increase as well.

Development of the Site would directly decrease the area of the Site’s extant ecological communities, namely the successional hardwood forest. In addition to reducing the overall area of ecological communities on-Site, development is also reasonably likely to degrade the quality and character of any ecological communities remaining after development due to habitat fragmentation. Fragmented habitat generally has a lower diversity of plant and animal species, lower tolerance to disturbance, and greater vulnerability to non-native and/or invasive species which typically outcompete native species in disturbed settings (NJDEP 2020).

Legend

NJDEP Mapped Stream

Site Boundary

Ecological Community Assessment

Upland Forest

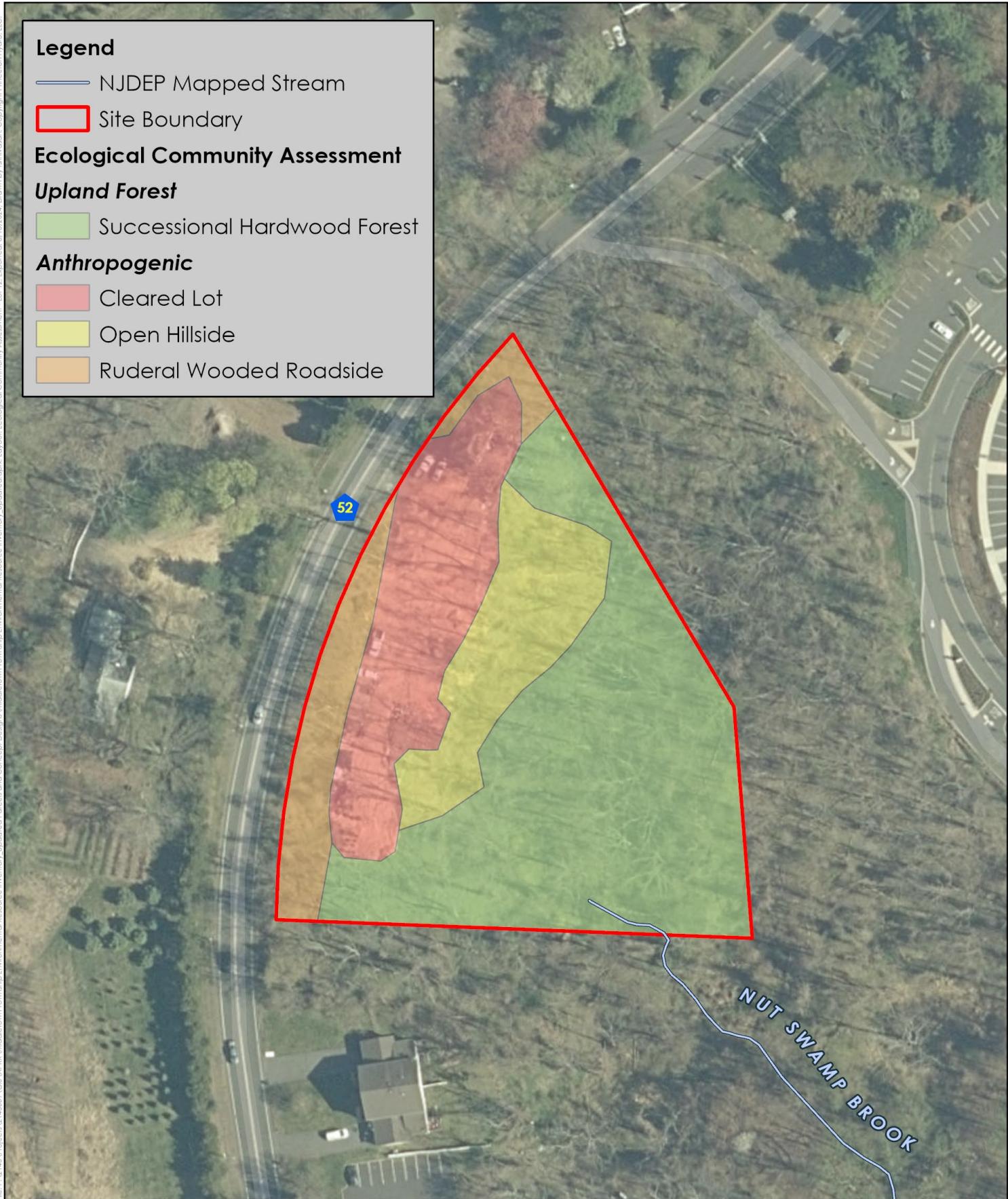
Successional Hardwood Forest

Anthropogenic

Cleared Lot

Open Hillside

Ruderal Wooded Roadside



NOTES:

1. NJDEP mapped streams obtained from the NJDEP GIS website: www.state.nj.us/dep/gis/
2. Ecological community assessment performed by Princeton Hydro in March of 2024
3. 2020 orthoimagery obtained from the NJ Geographic Information Network (NJGIN) Open Data portal.
4. Site boundary provided by CPL Partnership, transmitted on 07/24/2024.



0 50 100
Feet

Spatial Reference: NAD 1983 2011 StatePlane New Jersey FIPS 2900 Ft US

ECOLOGICAL COMMUNITY ASSESSMENT MAP

ENVIRONMENTAL RESOURCE INVENTORY
BLOCK 1045, LOT 12
MIDDLETOWN TOWNSHIP
MONMOUTH COUNTY, NEW JERSEY



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7.0 MASTER PLAN CONSISTENCY ASSESSMENT

To a reasonable degree of professional certainty, it is likely that high density development of this Site would be detrimental to the local environment by reducing and degrading environmental resources and environmentally sensitive areas. As a result, it is Princeton Hydro's professional opinion that high density development of the Site would be inconsistent with several environmental goals and recommendations established by the Middletown Township Master Plan, as published in October 2004, and last amended in March 2023 (Middletown Twp. Planning Dept. 2023). Most notably, high density development of the Site would be inconsistent with the Master Plan's overall objective to prevent the degradation of environmental resources by improper land use:

- "To promote the conservation of open space through protection of wetlands, stream corridors, steep slopes and valuable natural resources and prevent degradation of the environment through improper use of land." (Objective #12).

High density development of the Site would also be inconsistent with other elements of the Master Plan. The Township Conservation Plan, published as part of the Open Space, Recreation, and Conservation element of the Master Plan, establishes objectives to protect several distinct environmental resources, including several found on-Site:

- Steep slopes (2.E)
- Stream corridors and headwaters (2.G)
- Habitats for flora & fauna (2.I)

The Stormwater Management Plan element of the Master Plan reinforces these Conservation Plan objections by establishing that a key goal of municipal stormwater management is to:

- "Promote conservation of open space through the protection of wetlands, stream corridors, steep slopes and valuable natural resources and prevent the degradation of the environment through improper use of land." (Goal #11).

Furthermore, The Conservation Plan also acknowledges that:

- Wetlands are heavily influenced by adjacent upland transitional areas; and increasing stormwater flows can negatively impact wetlands (2.B).
- Stream flooding can be altered substantially by development; and stormwater runoff can be accelerated by stripping trees and shrubs, changing slopes, or covering the absorptive soil surface with buildings and pavement (2.C).
- Building on steep slopes requires excessive cut and fill which strips soils and vegetation; and steep slopes stripped of stabilizing natural vegetation can quickly be eroded or undercut, leading to water pollution and unstable ground conditions (2.E).
- Stream corridors encompass their surrounding wetlands, woodlands and steep slopes; intact stream corridors with dense vegetation improve water quality and moderate



flooding; and headwaters, intermittent streams, and spring areas are essential for stream quality, and also very susceptible to disturbances (2.G).

As previously discussed, high density development of the Site is reasonably likely to impact several environmental resources that the Conservation Plan specifically targets for protection.

high density development of the Site would result in the disturbance of steep slopes through excessive cut and fill; the covering of permeable land with impervious surfaces; and the removal of mature woodland habitat. Such activities and disturbances are specifically identified by the Conservation Plan as detrimental to environmental resources. While no waterbodies or wetlands lie directly on-Site, the Site lies just upstream of the headwaters of Nut Swamp Brook. As the Conservation Plan acknowledges, waterbodies, especially headwater areas, are heavily influenced by alterations to their surrounding landscape, and environmental degradation, such as stormwater runoff and slope erosion, often degrades downstream waters.



8.0 REFERENCES

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