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| IN THE MATTER OF THE | : | |
| APPLICATION | : | SUPERIOR COURT OF NEW JERSEY |
| OF THE BOROUGH OF | : | |
| MADISON, | : | LAW DIVISION: MORRIS COUNTY |
| a municipal corporation of the | : | |
| State of New Jersey, | : | DOCKET NO.: MRS-L-1694-15 |
| | : | |
| Plaintiff/petitioner. | : | (MOUNT LAUREL) |
| | : | |
| | : | CIVIL ACTION |
| Friends of the Drew Forest, | : | |
| Proposed <i>Amicus Curiae</i> | : | |

AMICUS CURIAE BRIEF ON BEHALF OF FRIENDS OF THE DREW FOREST

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PRELIMINARY STATEMENT

There are 53 acres of forest on the Drew campus known as the Drew University Forest Preserve (hereinafter the “Preserve”). Proposed *Amicus Curiae* Friends of the Drew Forest (“Friends”) submit this brief to inform the Court of the extremely high value of this preserved open space in its present condition and its limited development potential because of this high value and because of the significant environmental constraints faced under law to that development. In order to demonstrate and document these extremely high values and limited development potential, Friends contracted with the Davey Resource Group to analyze the attributes of the Preserve for its environmental value and its development constraints. Davey issued its “Environmental Review of the Drew University Forest” (hereinafter “Environmental Review”) on August 10, 2022. It is attached to this brief as Appendix A. The research demonstrated that the Preserve provides significant regional benefits including recharge to the Buried Valley Aquifer. Four municipalities rely almost exclusively on the aquifer for their drinking water:

- Madison draws all of its drinking water from the Buried Valley Aquifer System. It has no surface water intakes. See https://www.rosenet.org/DocumentCenter/View/15627/Borough-of-Madison-2022-WQR_Final?bidId=
- Florham Park draws up to 54,000,000 gallons of water from the Buried Valley Aquifer per month. See <https://www.fpboro.net/wp-content/uploads/2022/03/2022-Annual-Drinking-Water-Quaility-Report.pdf>
- Chatham Borough has three wells over 150 feet deep and draws its groundwater from the Buried Valley Aquifer. See

<https://www.chathamborough.org/government/documents/redevelopment-projects-documents/river-road-redevelopment-documents/announcements/1328-annual-drinking-water-quality-report/file>

- East Hanover system's source water comes from the Buried Valley Aquifer as well. See (<https://www.easthanovertownship.com/Content/pdf/CCR-2022.pdf>)

United States Environmental Protection Agency has declared this aquifer a sole source aquifer. Environmental Review at p. 1, 9. The United States Forest Service (USFS) has scored the site as 99 and 93 out of 100 for its "Importance to Surface Drinking Water" index. Forests to Faucets 2.0 Data Explorer (Mack et al. 2022); Environmental Review at p. 2.

Significant government and private time, effort and money has been dedicated to restoring the forest habitat within the Preserve. The USFWS entered into a 10-year contract with the University "to restore the forest for the long term." Letter from USFWS to Drew University Interim President dated April 28, 2021; Environmental Review, Appendix D. The Preserve is now a thriving mature native forest with additional natural regeneration. The Preserve received the Governor's Award for Healthy Ecosystems in 2013 for this success (Drew, 2022)." Environmental Review at p. 7 (brackets added).

Drew touts the environmental attributes of the entire campus and the Preserve on its website.

Drew University's campus is known for its majestic old oak trees and beautiful natural areas, with fertile forest ecosystems, ponds, and glacial features. Several major initiatives help to preserve and restore ecological integrity to the Drew University Forest Preserve and to the entire campus. Right on campus, the university's 45-acre Drew Forest Preserve is a natural laboratory for student research, ecology classes, and ecological restoration. Trails are open to the public, including a self-guiding nature trail around the ponds of the Zuck Arboretum section. Natural ecosystems are also being nurtured in the center of campus, with a meadow and ever-expanding conversion of lawn to ferns and other native vegetation during students' annual "Fern Fest" event.

<https://drew.edu/esss-department/about-us/biodiversity-and-ecological-restoration-at-drew/>

The Preserve also provides unique “habitat for forest fauna, aquatic wildlife and federally threatened and endangered species within a landscape where habitat is otherwise lacking.” Environmental Review at pp. 3, 9. “The entire 53 acres is mapped as habitat for the Federally endangered Indiana bat, and USFWS [United States Fish & Wildlife Service] project review would be required for future development.” Id at p. 9 (bracket added). Development of the site would remove prime habitat for the federally endangered Indiana bat and many large trees that are irreplaceable. Id at p. 9.

The northern most section of the Preserve includes the Zuck Arboretum (~12 acres) which is surrounded by deer fencing and contains self-guided nature trails that extend through a forested area around two large ponds. To the south of the Zuck Arboretum extending along Loantaka Way lies a second fenced forest area known as Hepburn Woods (~13 acres), which also contains a self-guided nature trail. Id at p. 1.

There are significant environmental and legal constraints on the ability to develop the Preserve. The presence of six wetlands on the Preserve and the possibility of vernal wetland habitat would limit development of the Preserve. “Wetland permitting could be very difficult to achieve” under these circumstances” Id. at 9. Steep slopes greater than 15% on the site also will constrain development. Id. See Environmental Constraints Map, Review Figure 10.

The United States Fish and Wildlife Service cautioned that “losing this part [the forest]of the campus would discount the extensive time and commitment that has been made to improve the forest and more importantly discount the future value in perpetuity of the forest to campus life, student health and learning opportunities, habitat to wildlife, benefits to the watershed, and benefits to the surrounding community.” Environmental Review, Appendix D.

For all of these reasons and those that follow, the Preserve should continue to be used as a source of drinking water, the thriving mature native forest that it has become, a home for endangered species, and an open space refuge. It should not be developed because of these extensive environmental benefits and the severe environmental impacts that development would have on the Preserve.

INTERESTS OF AMICUS CURIAE

Friends of the Drew Forest (“Friends”) is an all-volunteer organization founded in May 2021 by environmental leaders from the Borough of Madison and neighboring towns, dedicated community volunteers, concerned residents, and Drew alumni. Its mission is to protect and sustain the 53-acre Preserve, to raise awareness about the value of forests in aquifer protection, supporting biodiversity, climate resilience, temperature control, air quality, and quality of life, and to facilitate the enjoyment, understanding, and study of nature.

Friends was incorporated as a New Jersey non-profit organization based in Madison in January, 2022. The Internal Revenue Service has approved Friends’ application for non-profit status pursuant to section 501(c)(3) of the Internal Revenue Code.

Friends and its supporters live, work, and recreate in Madison and around Drew University. They benefit from the special environmental attributes of the Preserve, its supply from the aquifer beneath the Preserve of millions of gallons of the drinking water for Madison, Chatham Borough, Florham Park, and East Hanover, the open space that it provides, and the habitat that the Preserve furnishes for endangered species, and the importance and rarity of its healthy forest ecosystems. The Preserve also provides educational opportunities to families, scouts, and churches.

Friends and its supporters have a “special interest” in the Drew Preserve because it has been providing a myriad of services for residents of Madison and the region for over a century. There are numerous health, educational, recreational, and ecological benefits that impact residents’ daily lives. The USEPA has designated the aquifer that lies below the Preserve as a sole source aquifer. Four municipalities including Madison rely nearly exclusively on this aquifer for their drinking water. USEPA has declared the aquifer that lies below the Preserve as

the sole source of drinking water for surrounding municipalities including Madison. The sole source of drinking water is without doubt of critical importance to Friends and its many supporters. The environmental attributes of the Preserve are critical to maintaining the quality of life in and around Madison as well as the Drew student experience. The Preserve is an essential part of students' Drew education. Students and faculty use the Preserve for about a dozen classes. The Preserve also provides a living scientific on-campus laboratory and peaceful refuge for all students during challenging times.

Friends has collected over 13,500 signatures on a petition advocating the conservation purchase of the Preserve to sustain its benefits forever for all to enjoy. Friends maintains an informative website with as many as 550 visits per week and an engaging social media presence with over 1000 followers. Friends' email newsletter has 1000 subscribers. Over 325 residents of Madison and nearby towns have requested a "Save Drew Forest" yard sign to show public support for preservation of the Preserve and the work being done by Friends. The support for saving the Preserve is bipartisan.

Most of the members of Friends' steering committee have resided in Madison and its surrounding area for over two decades. All are dedicated volunteers with deep ties to the community. Steering committee members have relevant expertise in ecology, land conservation, hydrogeology, education, horticulture, and climate change. Some members represent organizations with a long-term stake in the restoration process such as the Garden Club of Madison and the Ken Martin and Christine Hepburn Foundation. Friends also represents the interests of hundreds of Drew alumni and students who agree that it is critically important to preserve this rare healthy forest and iconic feature of the "University in the Forest".

Support of Friends' efforts to preserve the Forest Preserve is widespread. Friends has developed partnerships with neighboring municipalities and key regional environmental organizations. The governing bodies of six towns have passed resolutions of support for preservation of the entire 53-acre forest via a conservation purchase: Chatham Borough, Chatham Township, Madison Borough, Morris Township, Morristown, and Parsippany-Troy Hills Township. The Environmental Commissions of Harding, Long Hill, and Mendham Townships also passed resolutions of support. The Great Swamp Watershed Association (1900 members), the Whippany River Watershed Action Committee, Sierra Club New Jersey Chapter (20,000 members), Native Plant Society of New Jersey (1000 members), Schiff Natural Lands Trust (300 members), Ridge and Valley Conservancy, Passaic River Coalition (1000 members), Old Growth Forest Network (4700 members), and the Garden Club of America Zone IV (1000 members) have also passed resolutions of support for preservation of the Drew Forest. A consortium of state-wide organizations including Environment New Jersey, the Association of New Jersey Environmental Commissions, The Watershed Institute, the New Jersey Highlands Coalition, NY/NJ Baykeeper, and Raritan Headwaters Association issued a joint letter of support for preservation of the Forest. All told, these non-profit organizations speak for well over 100,000 members. Friends and its thousands of supporters have significant interests in the environmental attributes of the Preserve and the harm that would be done to those environmental amenities were any part of the site to be developed.

ARGUMENT

I. **FOUR MUNICIPALITIES RELY ALMOST EXCLUSIVELY ON THE AQUIFER THAT UNDERLIES THE PRESERVE FOR THEIR DRINKING WATER**

The Boroughs of Madison, Florham Park, and Chatham as well as East Hanover Township rely heavily and almost exclusively on the aquifer beneath the Preserve for their drinking water.

The Drew University Forest is unique in that it lies within four different watersheds. Environmental Review at p. 1. These four watersheds sit above the Buried Valley Aquifer (“BVA”) which provides almost all of the drinking water for the above four municipalities. See *supra* at p. 2. The U.S. Environmental Protection Agency designated the BVA as a Sole Source Aquifer in 1980. 45 FR 30537 (1980). A sole source aquifer is one that constitutes the “sole or principal source of drinking water for the residents of that area” and if contaminated would create a significant hazard to public health since there are no viable alternative sources of drinking water. Environmental Review at p 1. Congress established the sole source aquifer designation in Section 1424(e) of the Safe Drinking Water Act of 1974 (Public Law 93-523, 42 U.S.C. 300 et. seq). The Sole Source Aquifer Protection Program is established by a federal program (53 CFR 23685, June 23, 1988).

The United States Forest Service (USFS) has scored the watersheds associated with the site as 99 and 93 out of 100 for their “Importance to Surface Drinking Water” index. Forests to Faucets 2.0 Data Explorer (Mack et al. 2022); Environmental Review at p. 2. These watersheds have a score of 48 to 63 for their “Ability to Produce Clean Water” thus stressing the need to preserve all existing areas that contribute to the production of clean water in the aquifer. *Id.* Impervious cover from development on the site would reduce ground water recharge for this precious resource. Environmental Review, Figure 2.

II. THE UNITED STATES FISH AND WILDLIFE SERVICE WORKED UNDER CONTRACT WITH THE UNIVERSITY FOR 10 YEARS TO RESTORE THE FOREST FOR THE LONG TERM.

Significant government and private time, effort and money has been dedicated to restoring a healthy forest habitat within the Preserve. The USFWS entered into a 10-year contract with the University “to restore the forest for the long term.” See Letter from USFWS to Interim President of the University dated April 28, 2021, Appendix D of the Environmental Review.

The University also used “larger scale university grants from the Andrew Mellon Foundation and NASA” to partner with the USFWS and local NGOs to remove invasive species, replant over “2000 native tree seedlings, [over] 750 native shrub seedlings, native vines, [and] 87 different native species of herbaceous plants. The Preserve is now a thriving mature native forest with additional natural regeneration. The Preserve received the Governor’s Award for Healthy Ecosystems in 2013 for this success (Drew, 2022).” Environmental Review at p. 7 (brackets added).

FWS understood that the intent and commitment demonstrated in the signed [10-year] agreement was to restore the forested area “for the long term.” Letter, Environmental Review, Appendix D. Friends agrees that the Preserve should not be developed both because of the successful and substantial restoration that has been achieved and the numerous benefits of the Preserve that the public enjoys every day.

CONCLUSION

For all of the foregoing reasons, the 53-acre Drew Preserve should be maintained in its current state because of its extremely high value as open space and not developed because of its limited potential for development.

Respectfully submitted,

/s/ Edward Lloyd

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Counsel for Proposed Amicus Friends of the Drew Forest

APPENDIX A

Davey Resource Group “Environmental Review of the Drew Forest, Borough of Madison, Morris County, NJ”, August 10, 2022



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ENVIRONMENTAL REVIEW OF THE DREW UNIVERSITY FOREST
Borough of Madison, Morris County, NJ

August 10, 2022

Prepared for:
Friends of the Drew Forest



DRGNJ 4830

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- Appendix A – US Fish and Wildlife Service’s Information for Planning and Consulting (iPAC) Report
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- Appendix C – USGS StreamStats Report
- Appendix D – US Fish and Wildlife Service Correspondence

Introduction

The Drew University Forest (hereafter referred to as the “Preserve”) consists of approximately 53 acres of forest on the Drew University campus located at 36 Madison Ave in the Borough of Madison, NJ. The Preserve can be divided into three main sections (Figure 1): The northern-most section includes the Zuck Arboretum, (~12 acres) which is surrounded by deer fencing and contains self-guided nature trails that extend through a forested area around two large ponds. To the south of the Zuck Arboretum, extending along Loantaka Way, lies a second fenced forest area known as Hepburn Woods (~13 acres), which also contains self-guided nature trails. The trail network exits the Hepburn Woods area into approximately 30 additional acres of forest to the southeast that borders Glenwild Road. Whereas Zuck Arboretum and Hepburn Woods have gently sloping topography, this third, unfenced section contains steeper slopes and depressional areas formed by glacial activity (Figure 2 & Figure 10).

The preserve is connected via a walking trail along the Giralda Farms office complex to nearby Loantaka Brook Reservation, a predominantly forested Morris County Park that offers an extensive recreational trail system (Figure 3). Both the Preserve and Loantaka Brook Reservation are located approximately one mile north of the Great Swamp National Wildlife Refuge. Thus, the Preserve provides an important component to a forest network that is otherwise surrounded by moderate to high density residential and commercial development.

Friends of the Drew Forest (FODF) have contracted Davey Resource Group (DRG) to perform an evaluation of natural resources associated with the Preserve, with the intent to identify significant ecological functions and values provided by the Preserve in its current, undeveloped condition. This evaluation consists of a review of publicly available natural resources mapping, as well as site-specific documentation provided to us by FODF as referenced herein. Additionally, DRG conducted a site visit to the publicly accessible Preserve on August 1, 2022. The summary of our findings follows.

Watershed & Sole Source Aquifer

The Preserve is located within four HUC-14 Watersheds which sit on top of a Sole Source Aquifer

A watershed is a defined area of land that channels rainfall and snowmelt to creeks, streams, rivers and eventually to specific outflow points into reservoirs, bays or oceans (NOS, 2022). Its scale is defined by its hydrologic unit code (HUC) in which the larger HUC number, the smaller the watershed and vice versa (USGS, 2022). The Preserve is unusual in that it lies within four different HUC-14 watersheds: Loantaka Brook (HUC 02030103010040), Black Brook (Whippany River, HUC 02030103020070), Spring Garden Brook (Upper Passaic River, HUC 02030103010150) and Black Brook (Upper Passaic River/Great Swamp National Wildlife Refuge, HUC 02030103010060) (Figure 4). These four watersheds sit above the Buried Valley Aquifer, which provides nearly all of the drinking water for the Borough of Madison (as well as the adjacent and nearby towns of Chatham Borough, Florham Park and East Hanover) and is classified as a Sole Source Aquifer (Figure 5) by the United States Environmental Protection Agency (US EPA). An aquifer is a permeable layer of underground rock or sand that holds or transmits groundwater and will also yield water for beneficial use (NWS, 2022). A sole source aquifer is one that constitutes the “sole or principal source of drinking water for the residents of that area” and if contaminated would create a significant hazard to public health since there are no viable alternative sources of drinking water. The Sole Source Aquifer Protection Program is established by a federal program (53 CFR 23685, June 23, 1988). This classification stresses the importance of the land sitting above these aquifers as its surface condition facilitates the recharge of the waters to the ground below. This recharge is only accomplished naturally when the land above lacks impervious surfaces, enabling water to infiltrate freely. Since impervious surfaces are extensive in the highly urban and suburban areas contained within the watersheds (Figure 6), it is critical to the sustainability of the Buried Valley Aquifer that the recharge zones such as the Preserve remain highly functional and thus undeveloped. Groundwater recharge mapping layers are presented on Figure 7, which highlights that the

area containing the Preserve has some of the highest levels (at 15 to 19 in/year) of groundwater recharge to the Buried Valley Aquifer.

Per the United States Forest Service (USFS) Forests to Faucets 2.0 Data Explorer (Mack et al. 2022), watersheds associated with the Preserve score from 97 to 99 for their “Importance to Surface Drinking Water” index, which classifies its importance to drinking water on a scale of 0 to 100, with 0 being very low importance, and 100 being high importance. Per this index, the watersheds with very high importance to surface drinking water supplies are those that correspond to locations with large populations that rely on surface drinking water and have a higher water use. Under the same system, the watersheds score from 48 to 63 for their “Ability to Produce Clean Water”, thus stressing the need to preserve all existing areas that contribute to the production of clean water in the aquifer.

The Borough of Madison Checklist C (Borough of Madison, 2021) is a “Preliminary Environmental Checklist” that aids in the Borough’s determination as to whether a proposed development should require an Environmental Impact Statement (EIS) to evaluate significant environmental impact during municipal project review. Per this checklist, proposed changes in relief or drainage patterns, discharge to groundwater and/or increases in impervious surfaces trigger the need for an (EIS).

Stormwater Management

The existing Preserve is providing Stormwater Management services for more developed areas of the campus

The southern portion of the Preserve contains numerous wetlands and drainage features, and stormwater runoff from more developed portions of the campus naturally (topographically) flows into this area and also flows there by way of stone and asphalt corridors (see photos below). There is also a culvert outlet structure just south of the tennis courts (which are adjacent to the Preserve), but where this pipe originates is unknown. Sediment deposition was observed in the depressional areas of this basin and indicates that this section of forest is providing stormwater management treatment associated with runoff from more developed portions of the campus. Disturbance to this area would disrupt existing stormwater management benefits (groundwater recharge, water quality, and water quantity) that would need to be accounted for elsewhere. The infiltration of stormwater into this area prevents its accumulation and release farther downstream. This provides a benefit to the extensive residential areas that occur immediately downgradient of this section of the Preserve, and ultimately to the Great Swamp National Wildlife Refuge.

One reported example of this is the low-lying area associated with Wetland #5 in Hepburn Woods (Figure 10; also, Wetlands Approximation Map in Appendix B), which has been observed to hold water in spring and after storms, and ice over in winter. After increased precipitation from Hurricane Ida, extensive surface water expansion in this area was observed. Standing water disappears from this area, despite there being no surface water connection or outlet structures associated with the feature. This indicates that the water is infiltrating through the ground surface and downward toward the aquifer.

It is recommended that an engineering analysis be conducted to quantify and provide greater context to the stormwater management services provided by the Preserve.



Photo 1 (above): Stone channels extend from the tennis courts and other paved areas into the southern portion of the Preserve, ultimately into Wetland #4.



Photos 2 (right): A paved corridor directs water off the south-central area of the Preserve. This feature flows into Wetland #2.

Wildlife Habitat

The Preserve is mapped as Active Season Sighting, Maternity Colony, and Roost Site for the Federally endangered Indiana Bat

The Preserve contains canopy, sub-canopy, shrub and flowering herbaceous layers largely composed of New Jersey native species, which aids in creating a balanced food web that is able to support habitat for a wide variety of pollinators, birds, and other wildlife. The New Jersey Landscape Project is a mapping tool developed by the New Jersey Department of Environmental Protection (NJDEP), Division of Fish and Wildlife, Endangered and Non-Game Species Program (ENSP) to identify and display critical habitats for wildlife species, including Federal and State listed threatened and endangered species. This tool was developed by combining data on documented species sightings and assigning land use and land cover classes to those species to model further additional areas of suitable habitat. It further classifies different types of occurrences such as nest, breeding, foraging, etc. According to NJDEP Landscape Project mapping of the Preserve, Federally Endangered (Landscape Project Rank 5) habitat patches identified as Indiana bat (*Myotis sodalis*) active season sighting, maternity colony, and roost site are mapped throughout almost all portions of the Preserve (Figure 8). In order for the habitat patches to receive these rankings, it means that the Preserve has a land use land cover class consistent with Indiana bat habitat and is located within 2km of a documented active season sighting, maternity colony, and roost site (NJ Division of Fish and Wildlife, 2017). Furthermore, Madison Borough is contained on the list of New Jersey Municipalities with Hibernation or Maternity Occurrence of Indiana Bat (USFWS, 2020). Additionally, the Great Swamp National Wildlife Refuge is documented to support a maternity colony (Kitchell, 2002).

The United States Fish and Wildlife Service's Information for Planning and Consulting (iPAC) Report (Appendix A) also includes Indiana bat as a species of concern, in addition to northern long-eared bat (*Myotis septentrionalis*)

and bog turtle (*Clemmys muhlenbergii*). No suitable bog turtle habitat is known to be present, although no formal Phase I Habitat Assessment for this species has been conducted.

The iPAC report additionally notes that consideration should be taken regarding birds protected under the Migratory Bird Treaty Act (MBTA; 16 U.S.C. § 703 *et seq.*), which makes it illegal to “take” (kill, capture, sell, trade, or transport) protected migratory bird species without prior authorization by the Department of Interior U.S. Fish and Wildlife Service. It is reported that at least 130 bird species have been observed in the Preserve, with heavy use in migration and for nesting.

During the site visit, DRG observed numerous trees (particularly shagbark hickory (*Carya ovata*) and sugar maple (*Acer saccharum*)) that had exfoliating bark and dead snags that contained small to large cavities throughout the Preserve. These are consistent with the characteristics of suitable habitat for Indiana bat and northern long-eared bat. DRG additionally observed numerous frog, turtle and waterfowl species utilizing the ponded areas within the Zuck Arboretum.

Because habitat for the federally listed Indiana and northern long-eared bat exists within the Preserve, future development projects proposed within the Preserve will require completion of specific project screening questions related to federal consultation and compliance with the Endangered Species Act of 1973. In Morris County, tree clearing over one acre requires project information to be sent to the United States Fish and Wildlife Service New Jersey Field Office for their review (USFWS, 2021). The presence of birds and other animals, presence of threatened or endangered plant or wildlife species and the preservation or enhancement of wildlife are all considered on the Preliminary Environmental Checklist C (Borough of Madison, 2021) which trigger the need for an (EIS) to evaluate significant environmental impact during municipal project review.

Wetlands and State Open Waters

NJDEP Wetlands within the Preserve would likely be classified as Exceptional Resource Value

In the state of New Jersey, freshwater wetlands and state open waters are regulated by the NJDEP, Division of Land Resource Protection, in accordance with the *NJ Freshwater Wetlands Protection Act (FWPA) Rules* [N.J.A.C. 7:7A-1.1 *et seq.*]. The central and southern portions of the Preserve outside of the Zuck Arboretum area were delineated for wetlands and state open waters by EcolSciences, LLC on December 15, 2020 (Appendix B). The evaluation concluded that six wetlands and no state open waters are located within this area. EcolSciences did not conduct wetlands delineation for the Zuck Arboretum area, but DRG observed two jurisdictional ponds with wetland fringes in this area during the site visit on August 1, 2022.

Under the *FWPA Rules*, wetlands are classified by resource value and are assigned transition areas of 50 or 150 feet in width depending upon the resource value classification of the wetland. Wetlands that are documented habitat for certain endangered or threatened species or are tributary to trout-production waters are classified as exceptional resource value subject to 150-ft transition areas. Wetlands such as ditches, swales, detention basins, and certain isolated wetlands are classified as ordinary resource value and are not subject to any transition areas. All other wetlands are classified as intermediate resource value and subject to 50-ft transition areas.

Based on the EcolSciences report Wetlands 2, 3, 4, and 5 are isolated. However, numerous “erosional gullies” were noted by EcolSciences during the delineation and it was noted that they could be regulated by NJDEP as State Open Waters because they are larger than two feet wide and six inches deep. If NJDEP determines that these channels are State Open Waters, three of the delineated wetlands would no longer be considered “isolated”, and that would limit the permits available to disturb these areas under the *FWPA rules*.

Identified wetlands also have the potential to be considered by the NJDEP as “vernal habitat”. Vernal habitat is a confined depression that lacks fish and supports breeding of fauna adapted to reproduce in aquatic conditions (N.J.A.C. 7:7A-1.4). Vernal habitat, along with forested hardwood wetland complexes, streams and waterbodies,

is used by Indiana bat for foraging (NJDEP, 2013 and 2022). Since these wetlands meet the habitat requirements for Indiana bat, it is anticipated that they would likely be considered “exceptional resource value” wetlands by NJDEP and thus have a 150’ transition area.

Confirmation of vernal habitat requires a survey be completed in compliance with NJDEP approved survey protocols. If the wetlands are confirmed to be vernal, this could result in additional permit limitations available to authorize future development under the FWPA.

Per NJAC 7:7A-5.7(6)15, “activities authorized under a general permit-by-certification or general permit shall not take place in a vernal habitat, or in a transition area adjacent to a vernal habitat, with the exception of activities associated with general permits 1, 6, 6A and 16, which shall be reviewed on a case-by-case basis in accordance with N.J.A.C. 7:7A-5.3.” If further studies document that the isolated wetlands are confirmed vernal habitat, this would preclude the use of these general permits (1, 6, 6A and 16). Depending on the specific nature of future proposed activities within regulated wetlands and transition areas, other General Permits and/or an Individual Permit may be available to authorize development in accordance with the Freshwater Wetlands Protection Act at N.J.A.C. 7:7A; however, no general permit, nor an Individual permit is available for projects that will “destroy, jeopardize, or adversely modify a present or documented habitat for threatened or endangered species; and shall not jeopardize the continued existence of any local population of a threatened or endangered species”. Therefore, it is unlikely that future development could comply with NJAC 7:7A due to the presence of Indiana bat habitat. Additionally, any work proposed for projects within 200 feet of a water body (ponds, streams, wetlands, etc.) are considered on the Preliminary Environmental Checklist C (Borough of Madison, 2021) which triggers the need for an (EIS) to evaluate significant environmental impact during municipal project review

EPA priority wetlands include all wetlands within the Passaic River Basin “except for isolated wetlands which occur outside of the 100-year floodplain, as defined by either the Federal Emergency Management Agency’s (FEMA’s) 100-year flood elevation or the NJ Flood elevation, whichever is higher”. All of the wetlands are likely isolated as the only one with an outlet is Wetland 2, which only further carries stormwater into Wetland 3 and it exists within a closed depressional area. The Preserve does not fall within any FEMA Mapped floodplains, thus based on current knowledge, none of the wetlands would be classified as EPA priority wetlands.

Riparian Zones/Flood Hazard Area

Waters onsite may qualify as areas regulated by the NJ Flood Hazard Area Control Act Rules

The NJDEP regulates areas under the *NJ Flood Hazard Area Control Act (FHACA) Rules* [N.J.A.C. 7:13-1.1 et seq.]. Regulated waters are subject to two regulated areas: flood hazard areas, and riparian zones of 50, 150, or 300 feet in width depending upon their association with certain environmental characteristics. Specifically, regulated waters are subject to 300-ft riparian zones if they are associated with Category One waters. Regulated waters that are trout-production waters or tributary to these waters; are trout-maintenance waters or are located within one mile upstream of these waters; are documented habitat or are located within one mile upstream of these habitats for certain endangered or threatened plant or animal species are subject to 150-ft riparian zones. All other regulated waters are subject to 50-ft riparian zones.

The nearest streams mapped downgradient of the Preserve include unnamed tributaries (UNTs) to Loantaka Brook, Black Brook (Whippany River), Spring Garden Brook and Black Brook (Passaic River) (Figure 3). These are classified by the *NJ Surface Water Quality Standards* (N.J.A.C. 7:9B) as freshwater, non-trout waters (FW2-NT) and therefore are not tributary to any trout-production waters. Additionally, in accordance with the *NJ Surface Water Quality Standards* at N.J.A.C. 7:9B, these tributaries are not classified as Category One (C-1) waters, but the UNTs to Loantaka Brook and Black Brook (Passaic River) occur upstream of mapped C-1 waters. Therefore, regulated waters would carry a 50-foot riparian zone in the Spring Garden Brook and Black Brook (Passaic River) watersheds, but 300-foot in the Loantaka Brook and Black Brook (Whippany River) watersheds, since they are upstream of C-1 waters.

The FEMA flood map does not indicate any 100-year FEMA floodplains within the Preserve (Figure 9). Numerous “erosional gullies” (see photos below taken by DRG on August 1, 2022) were noted by EcolSciences during the delineation and it was noted that they could be regulated by NJDEP. Since these areas clearly exhibit defined bed and banks, they could potentially be regulated under the FHACA rules. Therefore, a Flood Hazard Area Verification is recommended to establish whether “regulated waters” are present onsite. DRG performed a USGS Streamstats evaluation (Appendix C) of the southern portion of the Preserve where the erosional gullies are located, and the drainage area was determined to be 0.037 square miles/23.7 acres. This is less than the 50 -acre threshold for which regulated flood hazard areas are present under the rules, but riparian zone provisions may apply.



Photo 3 (above): An erosional gully associated with flow directed from the asphalt channel noted in Photo 2.



Photo 4 (right): An erosional gully that extends from a culvert and channels stormwater to Wetland # 4.

Climate Resiliency

The Preserve provides multiple Climate Resiliency services

According to the New Jersey State Forest Action Plan (NJDEP, 2020), New Jersey’s forests are one of our greatest resources in the fight against climate change.

Soil Erosion

The Preserve provides a buffer from human-induced disturbances that are abundant in the developed area in which it is located. Forests provide excellent pervious surfaces that allow infiltration and thus absorb overland flow from adjacent impervious surfaces such as roads and sidewalks, etc. These pervious surfaces reduce the risk of soil erosion, distributing water into deep aquifers below. They prevent water from being channeled into high intensity flows along pavement, which then cause significant erosion when waters do encounter soils. Most importantly, leaves and branches of trees intercept rain, regulating the speed and amount of water that reaches the soil, reducing the amount of erosion that would be caused.

Borough of Madison's Steep Slope Protection ordinances (Article VI § 195-41) considers slopes from 15% (~8.5°) to 24.99% (~14°) as "moderate" and greater than 25% (~14°) as "critical". Per Article VI § 195-41 B(2) "areas of moderate slopes shall require detailed site grading and architectural plans which focus on minimizing development activity in these areas." Per Article VI § 195-41 B(3), "areas of critical slopes are restricted from development unless the disturbance is for roadway or utility crossings...". Therefore, some sections of the Preserve would be too steep for development to be permitted in the Borough. Additionally, trees are not allowed to be removed from steep slopes (or wetlands/wetland transition areas) according to the Borough of Madison's Tree Protection Ordinance (Borough of Madison, Part II General Legislation, Chapter 178 Tree Protection).

Air Quality and Health Benefits

Forests filter and block noise and provide escape from the commotion of urbanized areas. They additionally help reduce the "heat island effect", whereby [pavement and] structures absorb and re-emit more of the sun's heat than do natural landscapes, further warming the area (USEPA, 2022). With a warming planet, forests and trees become even more important to maintaining a better quality of life for the residents. Cooler temperatures in forests thus reduce ground-level ozone levels. Other air quality benefits from forests include the ability of leaf surfaces to intercept and hold small particles of dust, ash or pollen on their surfaces, while also absorbing certain types of gaseous air pollution (MPCA, 2022).

Carbon Sequestration

By using carbon dioxide for photosynthesis, trees remove this greenhouse gas from the atmosphere and fix it into their tissues and structures, permanently removing it as long as the tree and forest remain. Recent studies have concluded that carbon sequestration from fully functioning forests that are allowed to grow to climax stages is far greater than for young forests or those actively managed with timber harvest and replanting (Moonmaw, et al. 2019; Stephenson, 2014). These studies stress the importance of leaving mature healthy forests intact to reap the greatest carbon sequestration benefits.

Forest Fragmentation

Forest fragmentation occurs when a large contiguous forest area is divided into smaller parts thus creating more "edge" habitat, which has differing temperature, moisture, light and wind conditions than forest interiors. This has an impact on biological diversity as it affects the availability of habitat for certain plant and/or wildlife species (Ritters, 2007). Therefore, to maintain the greatest biological integrity, the largest possible tracts of forest should be preserved, especially in disturbed landscapes where there is already limited habitat for those more selective species. Connectivity and continuity are important considerations in managing forests at a landscape scale (NJDEP, 2020). The Preserve's location with Great Swamp National Wildlife Refuge, Loantaka Brook Reservation and Giralda Farms to the west place it in a valuable (though incomplete) position of connectivity with smaller, municipal and county open space parcels located to the north and east (Figure 3).

Community Value

The Preserve provides significant Community Value

Forest Restoration

Significant time, effort and money has been dedicated to restoring the habitat within the Preserve. Prior to these restoration efforts, it was succumbing to overgrazing by deer and being overrun by the invasive shrubs and vines that have few to no natural competitors in the landscape of the northeastern United States (USFWS Correspondence, Appendix D). The native vegetation had disappeared and large healthy trees were being choked out by the invasive species, as is the case with many wild forests in northeastern New Jersey. Not only are these degraded forests unpleasant to look at or recreate in, but they are also ecologically unhealthy and do not support the breadth of wild insects and fauna that a healthy ecosystem would. Restoration efforts have been made possible in part by grants and partnerships with the United States Fish and Wildlife Service (USFWS Correspondence, Appendix D), the Garden Club of Madison, the New Jersey Committee of Garden Clubs of America, the NJ Audubon Stewardship Programs, the Ken Martin and Chris Hepburn Foundation and a local native plant landscaper, along with larger-scale university grants from the Andrew Mellon Foundation and NASA. Restoration efforts began in 2008 and fencing to exclude deer was installed in 2012 around 22+ acres. Invasive species have been removed from the fenced areas and these areas have been replanted with over 2000 native tree seedlings, 750+ native shrub seedlings, native vines, and 87 different native species of herbaceous plants. Additional restoration has taken place throughout the Preserve, outside the deer-fenced areas as well, with removal of invasive Norway maple trees, vines and other harmful vegetation. The Preserve is now a thriving mature native forest with additional natural regeneration. The Preserve received the Governor’s Award for Healthy Ecosystems in 2013 for this success (Drew, 2022).

Big and Heritage Trees

Numerous large trees are present throughout the Preserve, many of which have circumferences that appear to range from approximately 8 to 13 feet. These large species include tulip poplar (*Liriodendron tulipifera*), American beech (*Fagus grandifolia*), sugar maple (*Acer saccharum*) and black oak (*Quercus velutina*). These individuals are all large enough that they would bear a “signature” status if reported to the New Jersey Department of Environmental Protection Big and Heritage Tree Registry. Similarly, the Borough of Madison recognizes “Landmark Trees” (Chapter 45 § 45-11), which include trees that are more than 100 years of age, have an outstanding trunk diameter, or the “location...aesthetic features or scenic enhancement...is of special importance to the Borough”, et al. Many of the large trees in the Preserve would likely meet these criteria. Additionally, the Borough of Madison’s Tree Protection Ordinance (Borough of Madison, Part II General Legislation, Chapter 178 Tree Protection) requires that “all efforts be made to preserve landmark trees and significant trees”, as well as “clusters of trees in a natural state as they provide a greater ecosystem service than the sum of their individual components”. The ordinance provides protection for all native tree species greater than 6” diameter at breast height (DBH). Tree removal requires a permit, as well as equivalent replacement and or monetary compensation to the Tree Fund (\$400 per tree) in accordance with the Ordinance.



Photo 5 (above): A large sugar maple with exfoliating bark that contains roosting habitat for federally listed bat species.



Photo 6 (right): A large black oak within the Preserve. Trees of this size were not uncommon.

Per the New Jersey Forest Service, who has been overseeing the Big Tree Conservation Program and keeping record of large trees since the 1930s, “big trees” provide up to 600 times the environmental benefits of typical trees in terms of their ability to remove pollution from the air, remove carbon dioxide, provide shade, prevent water runoff, reduce erosion and pollution, filter groundwater, provide wildlife habitat, increase property values, slow evaporation, and create natural sound barriers, et al. (NJFS, 2022).

University and Public Value

As a result of the restoration activities that have taken place within the Preserve, biodiversity has been significantly improved. It is an extraordinary resource for the University Community and the public, who have free access to the woods, which contains benches, picnic tables, self-guided nature trails, professionally designed native wildflower and pollinator gardens, along with wetlands, and ponds. Great measures have been taken to add metal labels next to plant and tree species along the trails, providing added value for botanical and nature education. Numerous University classes utilize the Preserve including courses on Ecology, Ornithology, Geology, Nature Writing, Photography, and animal behavior and biology labs, among many others. The entire Preserve, not just the fenced portions, acts as a natural laboratory for student and Professors’ research on ecological restoration, invasive species, wildlife, and botany. The University additionally offers “Forest Therapy” classes and weekly “Walk and Wander in the Forest” organized hikes within the Preserve (Drew, 2022).

Projects that require the displacement of existing recreational uses are considered on the Preliminary Environmental Checklist C (Borough of Madison, 2021) which trigger the need for an (EIS) to evaluate significant environmental impact during municipal project review.

Summary of Environmental Constraints

Based on the aforementioned discussion of the location of wetlands and their transition areas, wetland permitting for future development could be very difficult to achieve. The Preserve is additionally constrained by slopes greater than 15% (Figure 10). The entire 53 acres are mapped as habitat for the Federally endangered Indiana bat, and USFWS project review would be required for future development. Areas within Zuck Arboretum and Hepburn Woods have undergone significant ecological improvements as a result of Federal, non-profit and private donor support that would only retain its value if the land is preserved in perpetuity as a natural forest ecosystem. The forest also provides stormwater management treatment, and recharge to a Sole Source Aquifer.

Conclusions and Recommendations

The Preserve has limited development potential but extremely high value as a preserved open space

In summary, the Drew University Forest Preserve provides many benefits, including but not limited to:

- High recharge areas for the Buried Valley Aquifer, an important regional drinking water source;
- Providing stormwater treatment for water quality, quantity, and groundwater recharge;
- Important habitat for forest fauna, aquatic wildlife and federally listed threatened and endangered species within a landscape where habitat is otherwise lacking;
- An important buffer from human induced disturbances such as noise, soil erosion, air pollution, modulation of heat extremes and carbon sequestration.
- Easily accessible public open space for nature recreation and observation in an otherwise highly developed landscape; and
- Use as an essential research forest facility for students and Professors at the University.

Based on review of the aforementioned documentation, the Preserve has limited development potential but extremely high value as a preserved open space where it can continue in its current capacity. Development of the property would eliminate a significant source of groundwater recharge to the Buried Valley Sole Source Aquifer. It would also disrupt ongoing public and student use of the land and long-term research projects that are being carried out there. It would remove identified habitat for the federally endangered Indiana bat and many irreplaceable large trees. It would undermine 14 years of restoration work with University partners including students, community volunteers, and donors whose goal was to improve the Preserve in perpetuity as a healthy forest ecosystem. As was noted by one of the largest financial donors, the USFWS, “although our 10-year contract with the University had ended, it was the understanding that the funds were only being provided to restore the forest for the long-term” (Appendix D). It would be inappropriate to sell this land for development rights after the significant effort that has been made to restore it as a rare remnant of the forests that once covered most of northern New Jersey.

FODF may consider the following studies to provide additional depth and scientific backup to the statements discussed in this report:

1. Conduct a stormwater management engineering analysis to determine how addition of impervious surfaces and disruption to the existing stormwater management system that lies within the Preserve would be affected if it were to be developed.
2. Conduct a bat assessment in accordance with USFWS survey protocols to determine to what degree the federally listed Indiana and northern-long eared bat utilize the Preserve;
3. Conduct a Vernal Habitat Survey on all wetlands identified within the Preserve;
4. Request an LOI and FHA Verification from NJDEP to confirm the extent of regulated features onsite.
5. Conduct a full tree inventory of the Preserve in accordance with the Tree Ordinance and document the notable specimen “big” and “landmark” trees of the Preserve;

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FIGURES



Legend

-  Drew Forest Boundary
-  Zuck Arboretum
-  Hepburn Woods

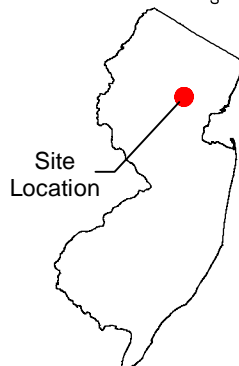
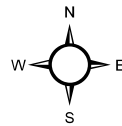
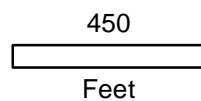


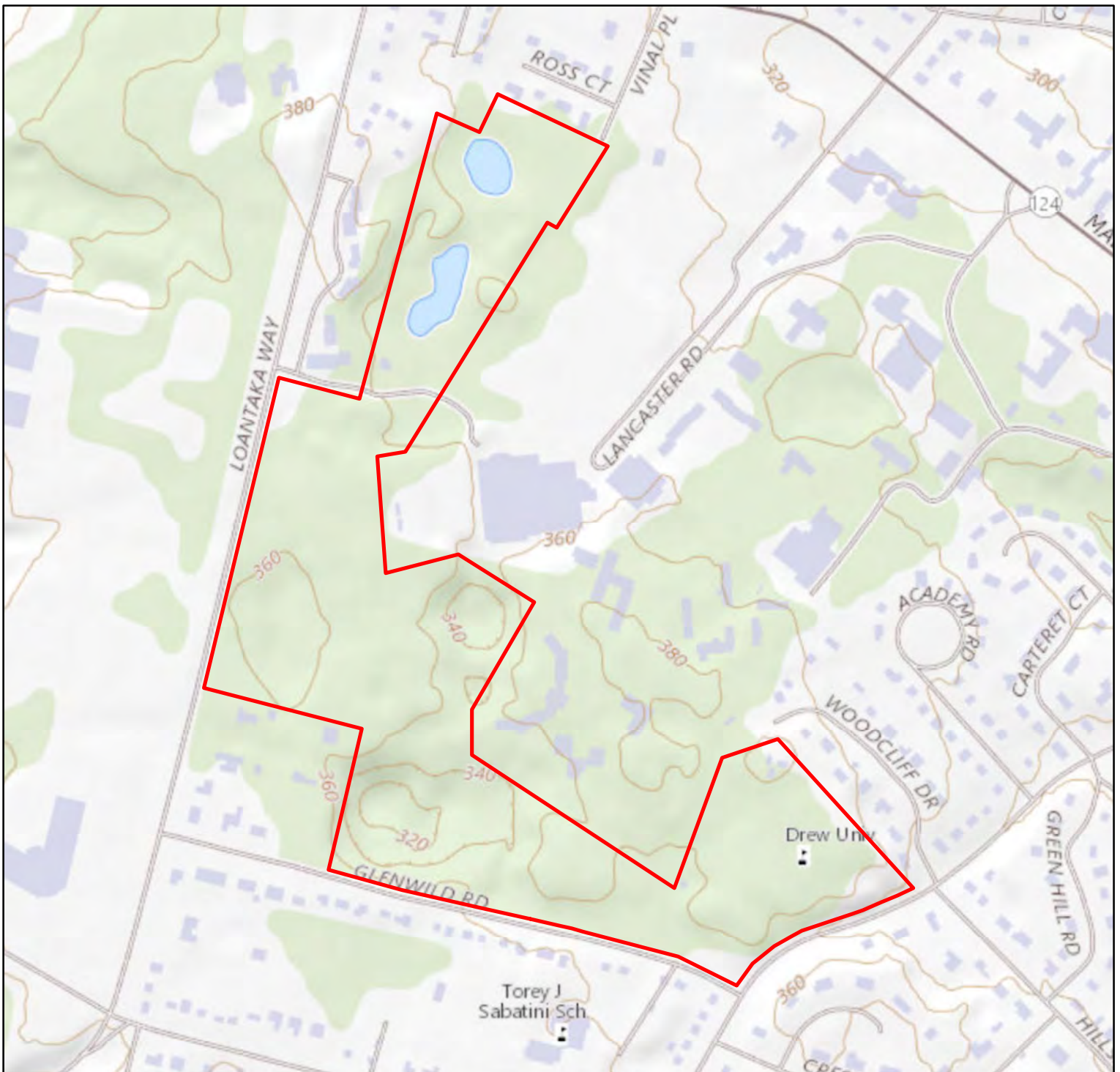
Figure 1
Drew Forest Preserve Map

Drew Forest
portion of Block 3001; Lot 1
Madison Borough
Morris County, New Jersey

DRGNJ Project # 4830



Source:
New Jersey 2020 High Resolution Orthophotography, NAD83 NJ State Plane Feet, MrSID MG3 Tiles, State of New Jersey Office of Information Technology, Office of Geographic Information Systems (NJOGIS), Trenton, NJ, April 2021.



Legend

 Drew Forest Boundary

New Jersey State Plane Coordinates in NAD83 for the approximate center of site -
 North: 701,509.44' // East: 511,536.96'

Latitude and Longitude Coordinates in NAD83 for the approximate center of site -
 N: 40° 45' 33.416" / W: 74° 25' 47.722"

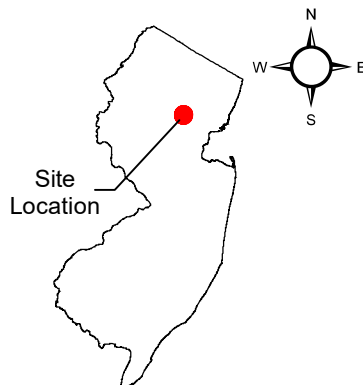
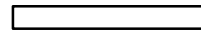


Figure 2
USGS Topographic Map

Drew Forest
 portion of Block 3001; Lot 1
 Madison Borough
 Morris County, New Jersey

DRGNJ Project # 4830

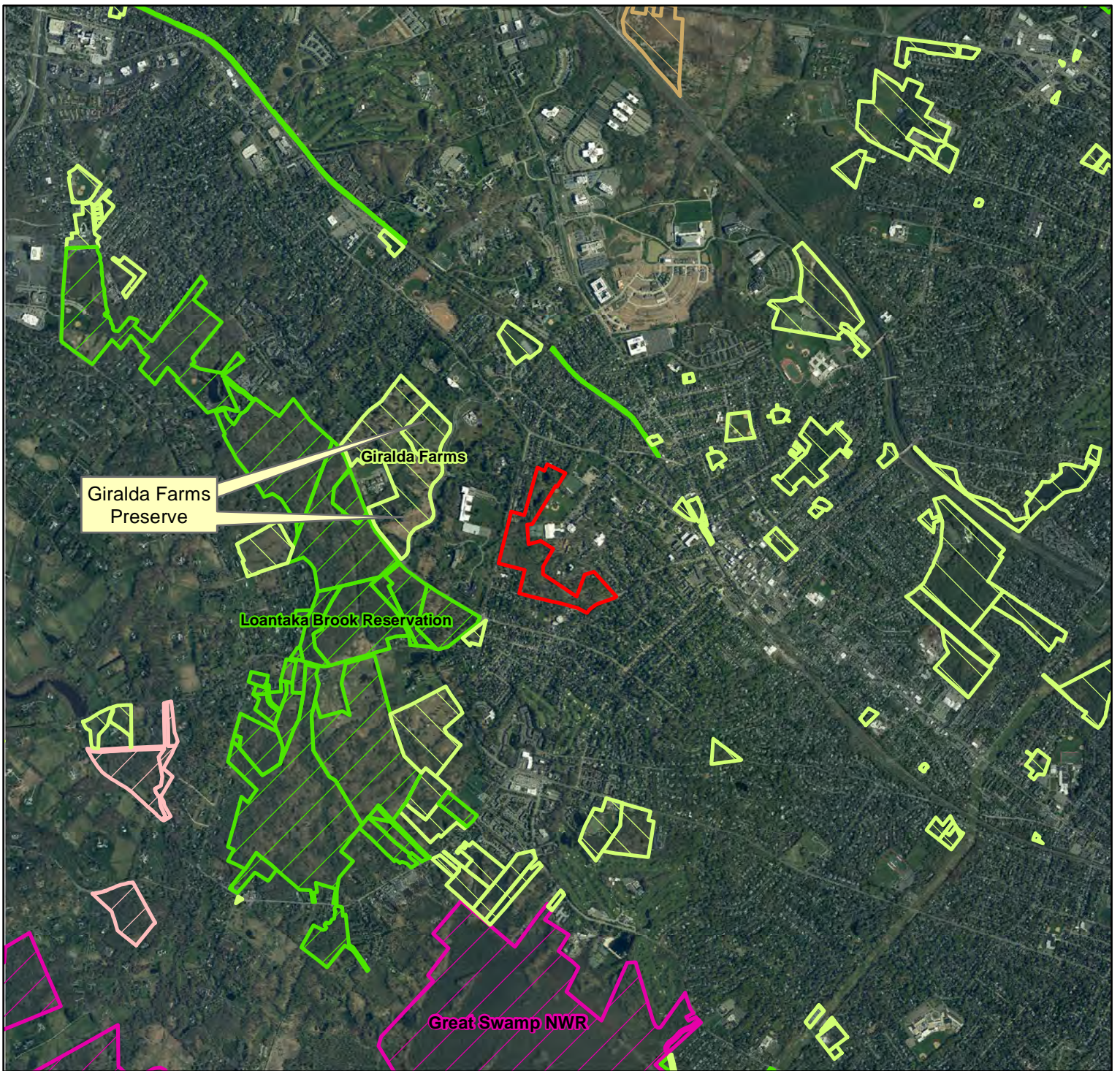
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Feet



Sources:
 USGS The National Map: National Boundaries Dataset, 3DEP Elevation Program, Geographic Names Information System, National Hydrography Dataset, National Land Cover Database, National Structures Dataset; USGS Global Ecosystems U.S. Census Bureau TIGER/Line data; USFS Road Data; Natural Earth Data; U.S. Department of State Humanitarian Information Unit; and NOAA National Centers for Environmental Information, U.S. Coastal Relief Model. Data refreshed May, 2020.



Legend

-  Drew Forest Boundary
-  Federal Open Space
-  State Open Space
-  County Open Space
-  Municipal Open Space
-  Private/Non-profit Open Space

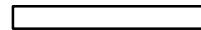
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Figure 3
Parks and Open Space Map

Drew Forest
 portion of Block 3001; Lot 1
 Madison Borough
 Morris County, New Jersey

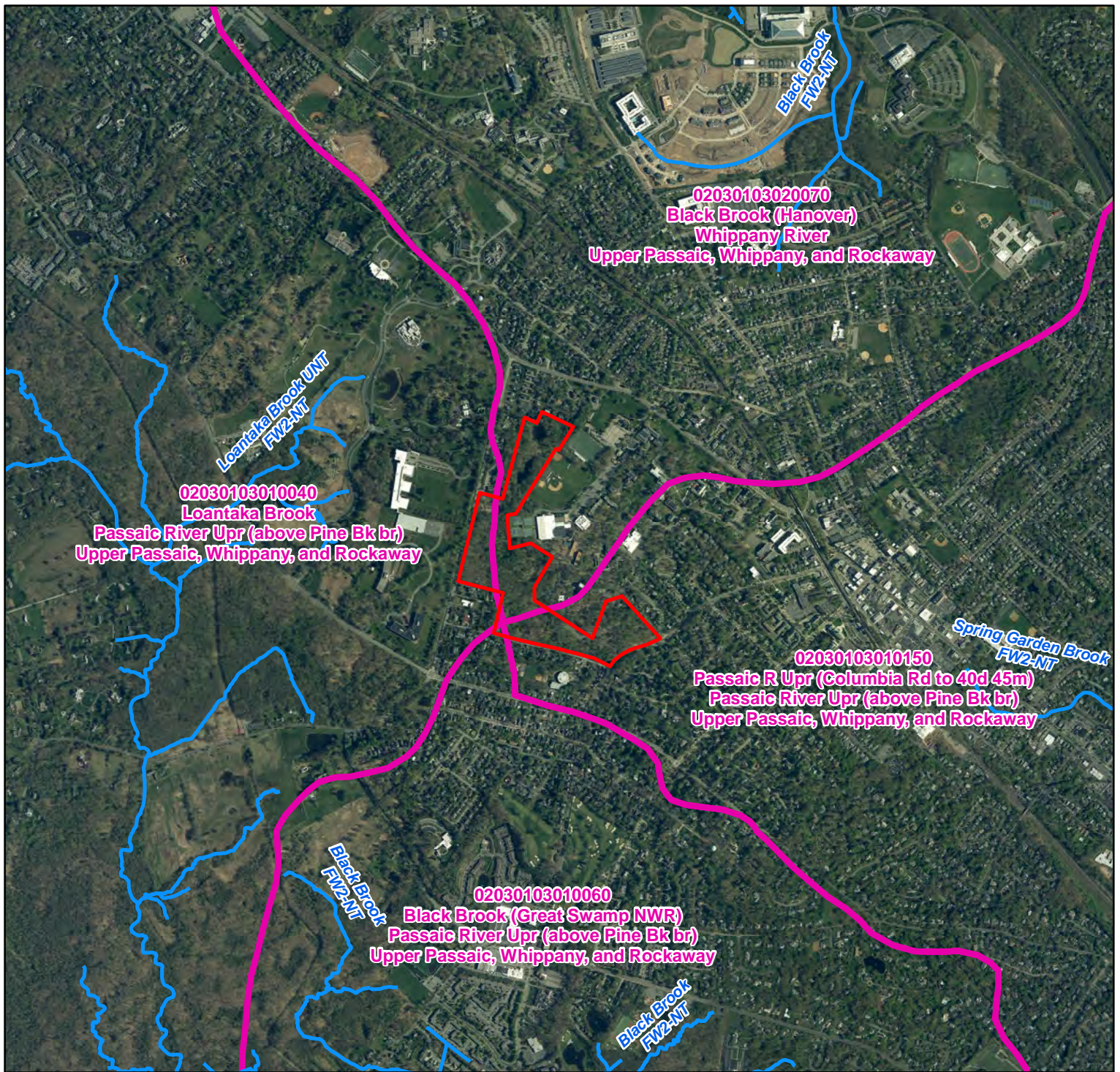
DRGNJ Project # 4830

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Feet





Legend

-  Drew Forest Boundary
-  Streams with Water Quality
-  HUC 14 Boundaries

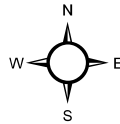
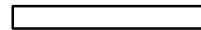


Figure 4
Watershed Map

Drew Forest
portion of Block 3001; Lot 1
Madison Borough
Morris County, New Jersey

DRGNJ Project # 4830

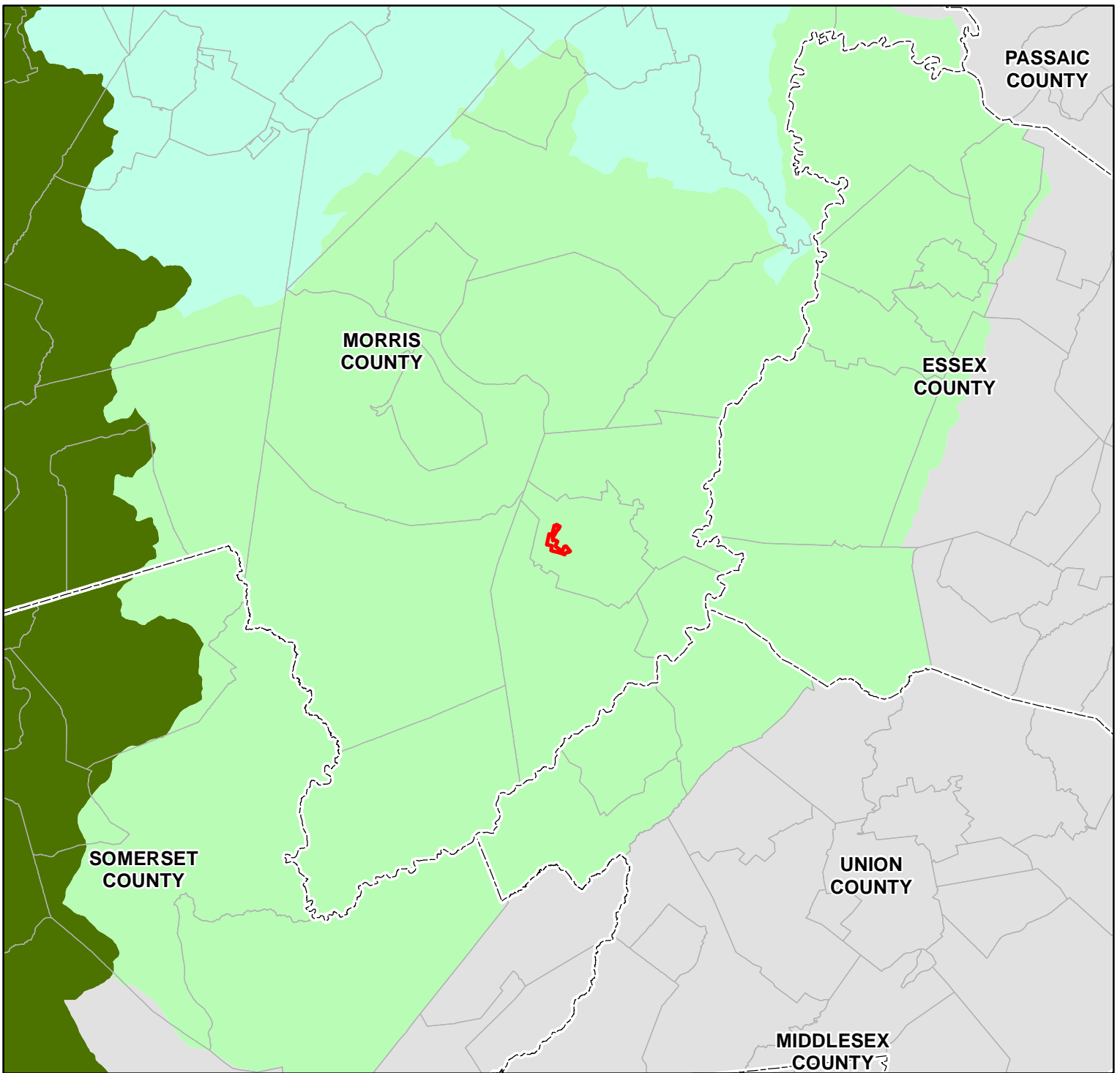
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



Feet



Sources:
NJDEP 14 Digit Hydrologic Unit Code Delineations for New Jersey, Edition 20160309, New Jersey Department of Environmental Protection (NJDEP), NJ Geological Survey (NJGS), Trenton, NJ, March 2016.
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Legend

-  Drew Forest Boundary
-  County Boundary
-  Municipal Boundary
- Sole Source Aquifers:
 -  Buried Valley
 -  Northwest New Jersey
 -  Rockaway
 -  Not a SSA

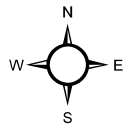
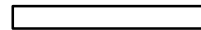


Figure 5
Sole Source Aquifer Map

Drew Forest
portion of Block 3001; Lot 1
Madison Borough
Morris County, New Jersey

DRGNJ Project # 4830

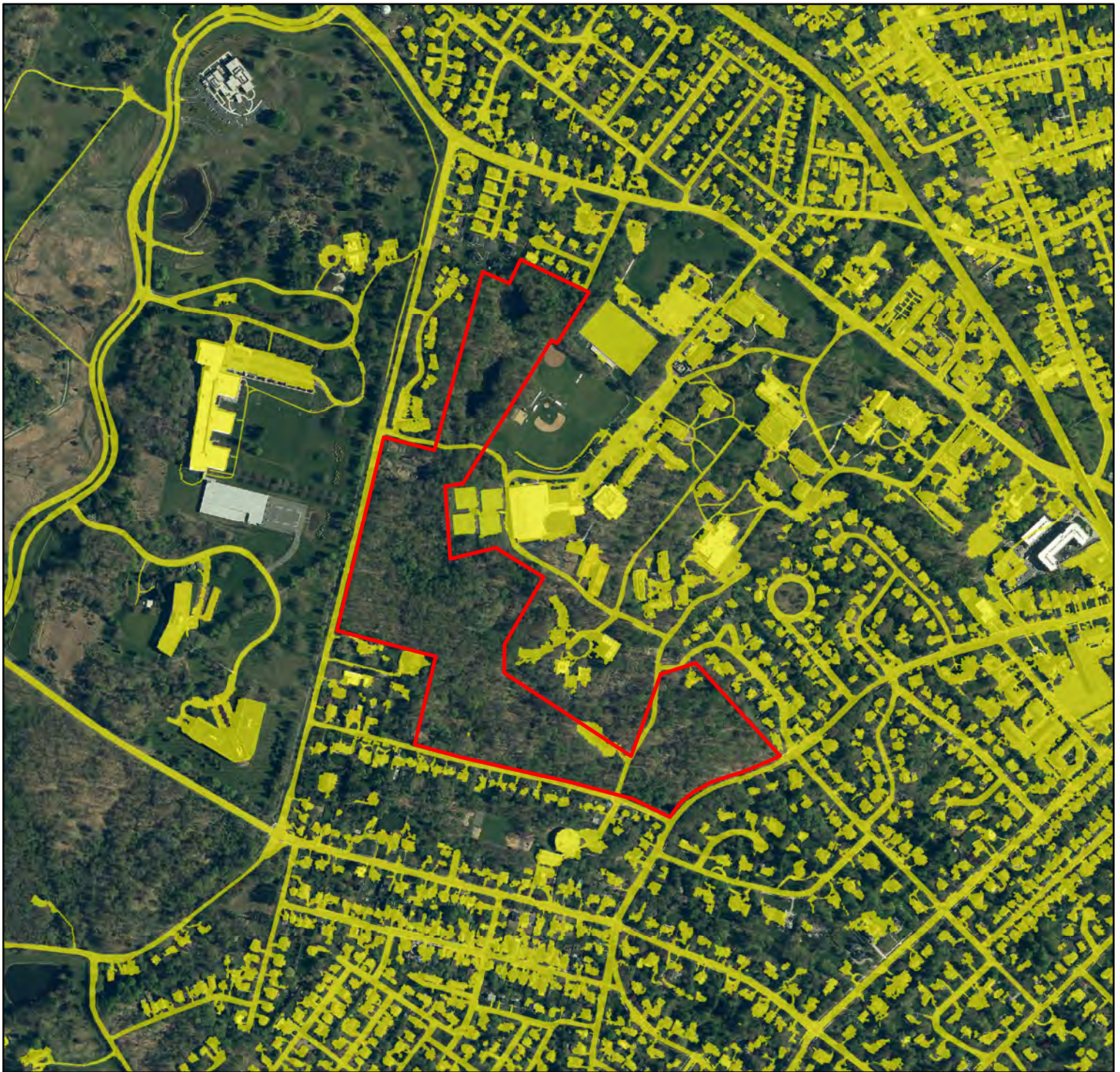
15,000





Feet



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Legend

-  Drew Forest Boundary
-  Impervious Surfaces

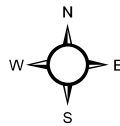
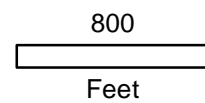


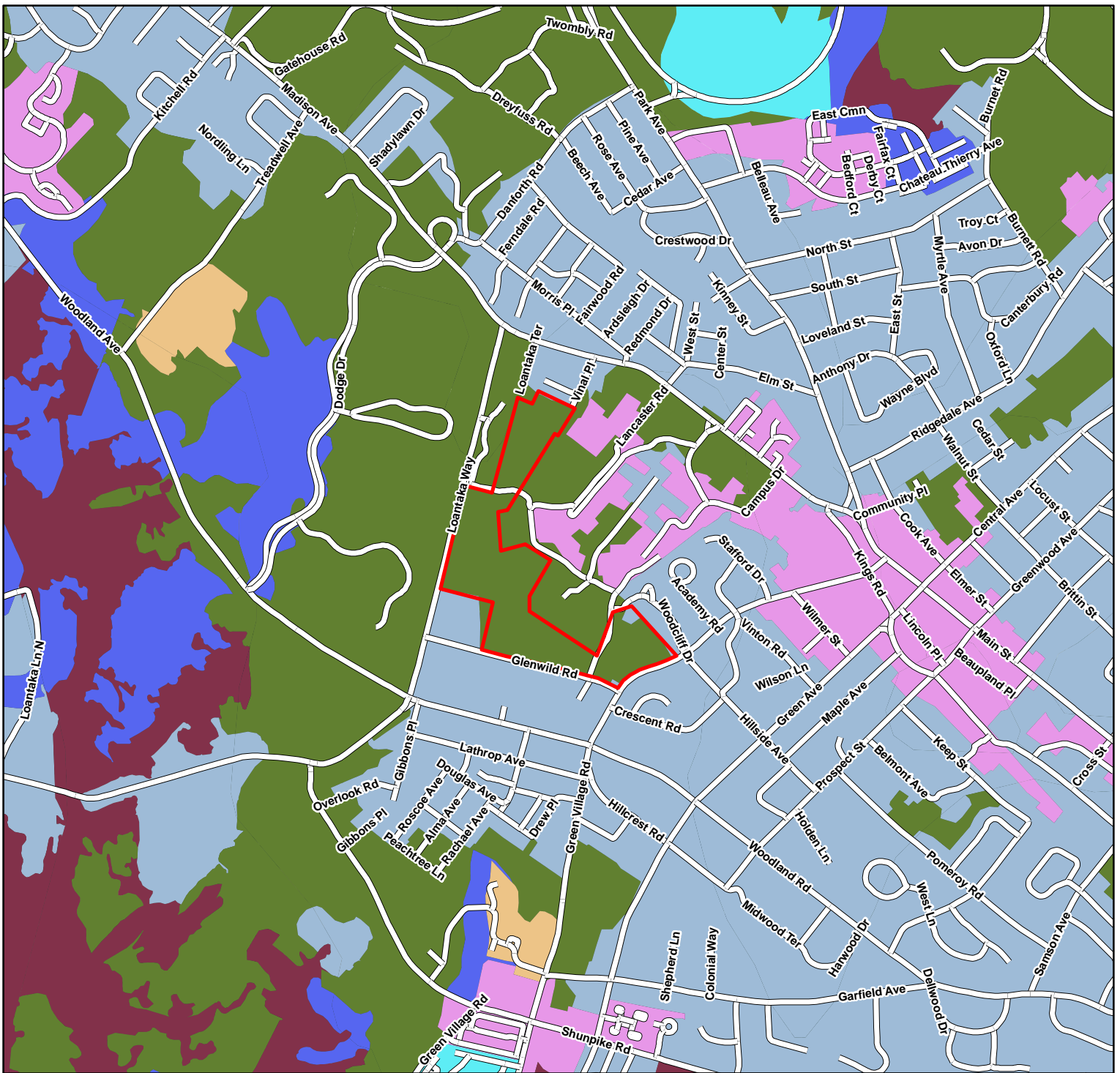
Figure 6
Impervious Surfaces Map

Drew Forest
portion of Block 3001; Lot 1
Madison Borough
Morris County, New Jersey

DRGNJ Project # 4830



Sources:
Impervious Surfaces of New Jersey, Edition 20180930 (Rast_impervious_surface), Applied Geographics,
New Jersey Department of Environmental Protection, Division of Information Technology, Bureau of
Geographic Information Systems, NJ Office of Information Technology (NJGIT), September 2018.
New Jersey 2020 High Resolution Orthophotography, NAD83 NJ State Plane Feet, MrSID MG3 Tiles, State of New
Jersey Office of Information Technology, Office of Geographic Information Systems (NJOGIS), Trenton, NJ, April 2021.



Legend

- Drew Forest Boundary
- A: 20 to 23 in/yr
- B: 15 to 19 in/yr
- C: 10 to 14 in/yr
- D: 1 to 9 in/yr
- E: 0 in/yr
- L: hydric soils
- W: wetlands and open water
- W: no recharge calculated

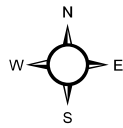
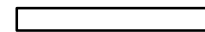


Figure 7
Groundwater Recharge Map

Drew Forest
portion of Block 3001; Lot 1
Madison Borough
Morris County, New Jersey

DRGNJ Project # 4830

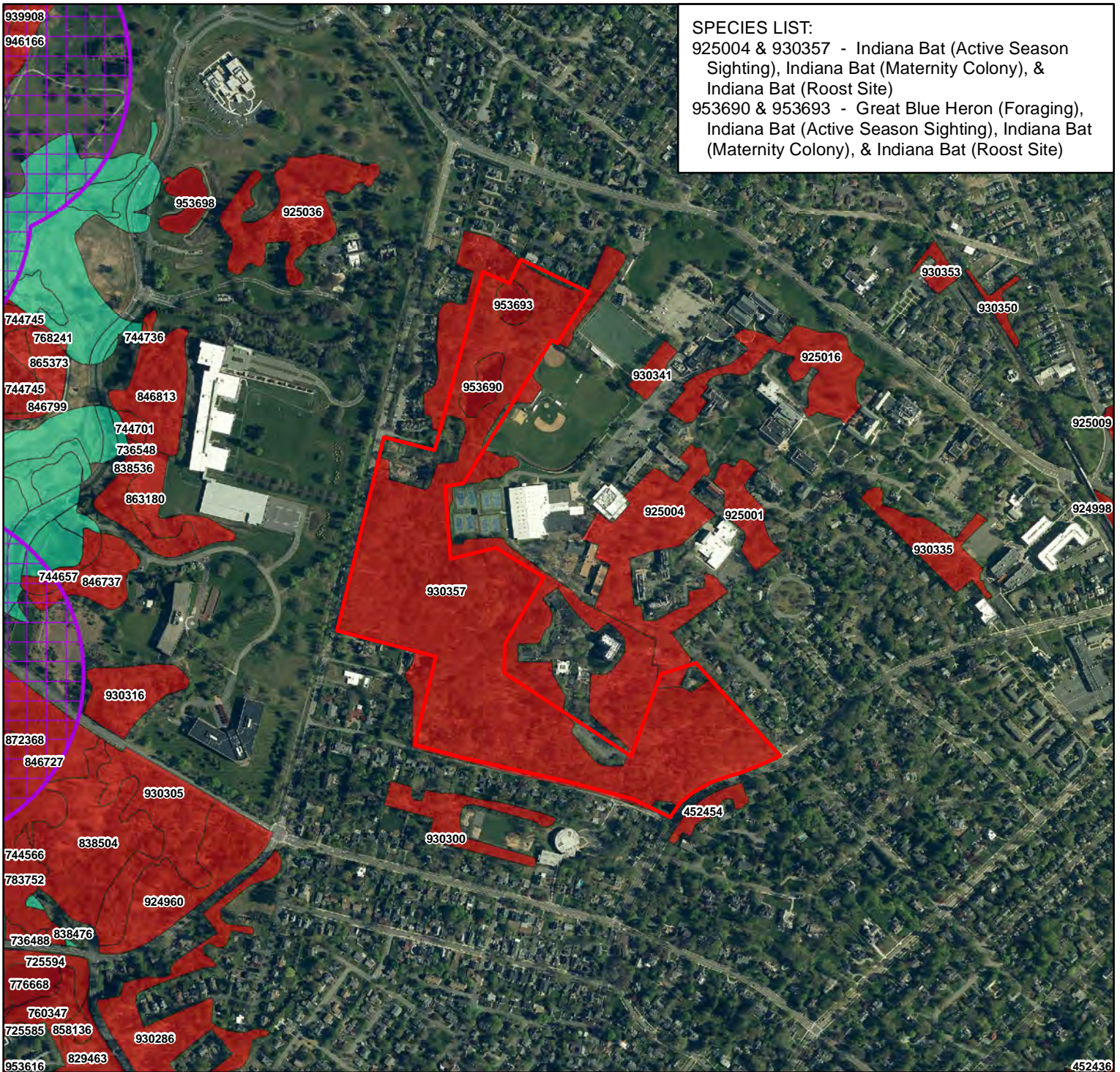
1,500



Feet










Sources:
Ground-water Recharge Areas for Morris County, NJ Department of Environmental Protection (NJDEP), NJ Geological Survey (NJGS), Bureau of Water Resources (BWR), Trenton, NJ, January 2005.
Road Centerlines of New Jersey, New Jersey Department of Transportation (NJDOT), NJ Office of Information Technology, Office of GIS (NJOGIS), January 2017.



SPECIES LIST:
 925004 & 930357 - Indiana Bat (Active Season Sighting), Indiana Bat (Maternity Colony), & Indiana Bat (Roost Site)
 953690 & 953693 - Great Blue Heron (Foraging), Indiana Bat (Active Season Sighting), Indiana Bat (Maternity Colony), & Indiana Bat (Roost Site)

Legend

-  Drew Forest Boundary
-  Rank 1 - Suitable Habitat
-  Rank 2 - Special Concern Species Habitat
-  Rank 3 - State Threatened Species Habitat
-  Rank 4 - State Endangered Species Habitat
-  Rank 5 - Federal Endangered and Threatened Species Habitat
-  Vernal habitat area

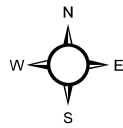
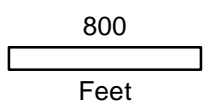


Figure 8
NJDEP Landscape Project Map

Drew Forest
 portion of Block 3001; Lot 1
 Madison Borough
 Morris County, New Jersey






DRGNJ Project # 4830

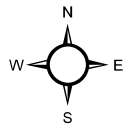


Sources:
 NJDEP Species Based Habitat by Landscape Region and Vernal Habitat (Version 3.3), New Jersey Department of Environmental Protection, Division of Fish and Wildlife, Endangered Non-Game Species Program, vector digital data, Division of Information Technology, Bureau of Geographic Information Systems, Trenton, NJ, May 2017.
 New Jersey 2020 High Resolution Orthophotography, NAD83 NJ State Plane Feet, MrSID MG3 Tiles, State of New Jersey Office of Information Technology, Office of Geographic Information Systems (NJOGIS), Trenton, NJ, April 2021.



Legend

-  Drew Forest Boundary
-  100-year FEMA Floodplain
-  Floodway
-  Base Flood Elevation
-  Cross Section Elevation

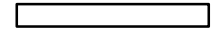


**Figure 9
FEMA Flood Map**

Drew Forest
portion of Block 3001; Lot 1
Madison Borough
Morris County, New Jersey

DRGNJ Project # 4830

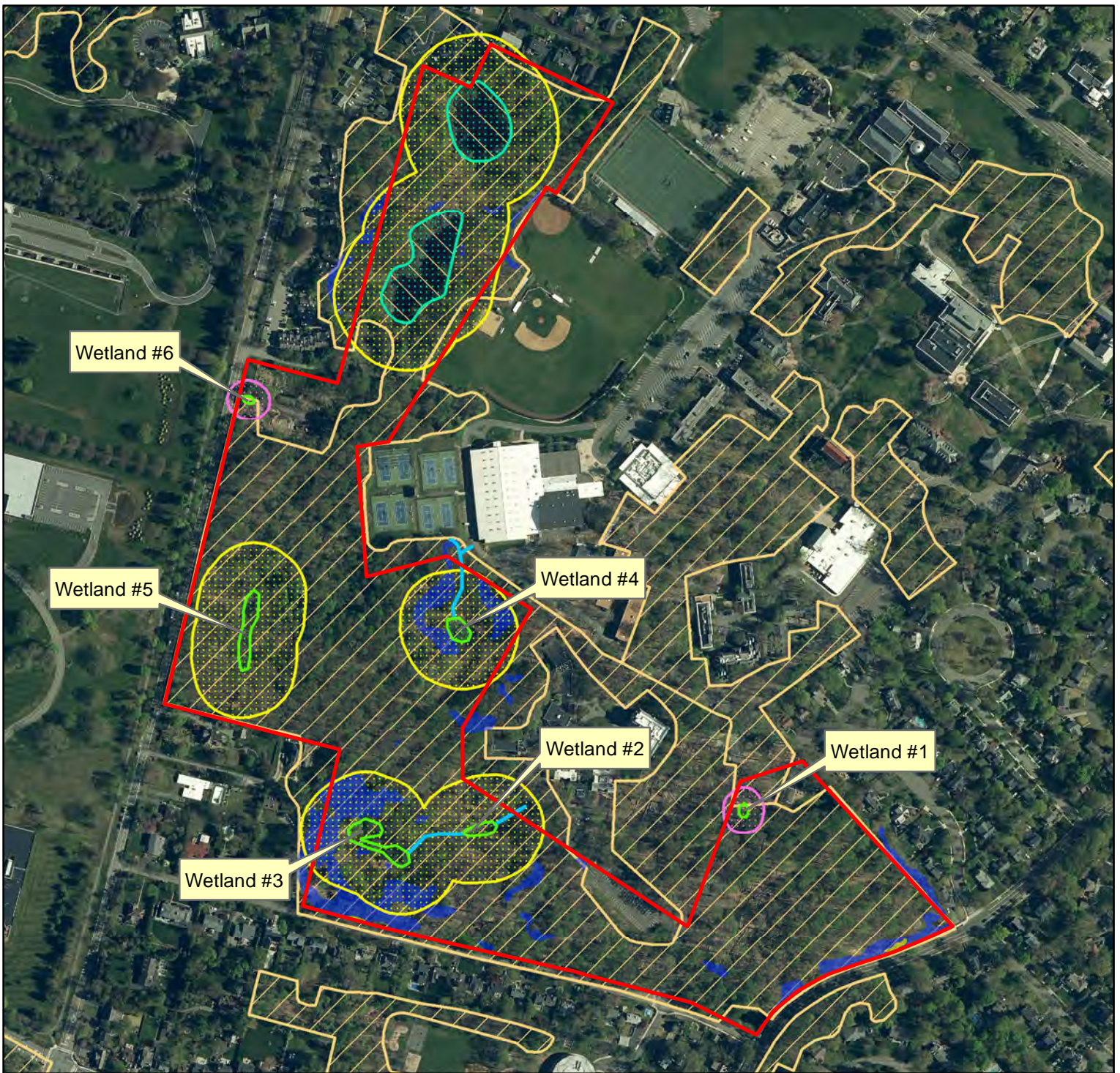
1,500



Feet



Sources:
Preliminary Digital Flood Insurance Rate Map (DFIRM) Database, Morris County, New Jersey, Federal Emergency Management Agency, vector digital data, Federal Insurance and Mitigation Administration, Washington, DC, August 2017.
New Jersey 2020 High Resolution Orthophotography, NAD83 NJ State Plane Feet, MrSID MG3 Tiles, State of New Jersey Office of Information Technology, Office of Geographic Information Systems (NJOGIS), Trenton, NJ, April 2021.



Legend

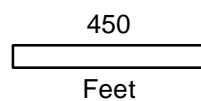
- | | |
|----------------------------------|--------------------------------|
| Drew Forest Boundary | Areas with Steep Slopes |
| Wetland | 15° to 30° slope |
| Pond with wetland fringe | 30° to 45° slope |
| Erosion Channel | Rank 5 Habitat by species |
| 150-foot Wetland Transition Area | Indiana Bat |
| 50-foot Wetland Transition Area | Indiana Bat & Great Blue Heron |

Sources:
 Wetlands and Erosion Channels, extracted from Wetlands Approximation figure prepared by EcoSciences, Inc, January 2021.
 Steep Slopes extracted from Selected Drew Forest Regions of Ecological Significance figure, created by Friends of Drew Forest.
 NJDEP Species Based Habitat by Landscape Region and Vernal Habitat (Version 3.3), New Jersey Department of Environmental Protection, Division of Fish and Wildlife, Endangered Non-Game Species Program, vector digital data, Division of Information Technology, Bureau of Geographic Information Systems, Trenton, NJ, May 2017.
 New Jersey 2020 High Resolution Orthophotography, NAD83 NJ State Plane Feet, MrSID MG3 Tiles, State of New Jersey Office of Information Technology, Office of Geographic Information Systems (NJOGIS), Trenton, NJ, April 2021.

Figure 10
Environmental Constraints Map

Drew Forest
 portion of Block 3001; Lot 1
 Madison Borough
 Morris County, New Jersey

DRGNJ Project # 4830



APPENDIX A

US Fish and Wildlife Service's Information for Planning and Consulting (iPAC) Report



United States Department of the Interior



FISH AND WILDLIFE SERVICE
New Jersey Ecological Services Field Office
4 E. Jimmie Leeds Road, Suite 4
Galloway, NJ 08205
Phone: (609) 646-9310 Fax: (609) 646-0352

In Reply Refer To:
Project Code: 2022-0068815
Project Name: DRGNJ 4830 - Drew Forest

July 28, 2022

Subject: List of threatened and endangered species that may occur in your proposed project location or may be affected by your proposed project

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, proposed and candidate species, as well as proposed and final designated critical habitat, that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

If the enclosed list indicates that any listed species may be present in your action area, please visit the New Jersey Field Office consultation web page as the next step in evaluating potential project impacts: <http://www.fws.gov/northeast/njfieldoffice/Endangered/consultation.html>

On the New Jersey Field Office consultation web page you will find:

- habitat descriptions, survey protocols, and recommended best management practices for listed species;
- recommended procedures for submitting information to this office; and
- links to other Federal and State agencies, the Section 7 Consultation Handbook, the Service's wind energy guidelines, communication tower recommendations, the National Bald Eagle Management Guidelines, and other resources and recommendations for protecting wildlife resources.

The enclosed list may change as new information about listed species becomes available. As per Federal regulations at 50 CFR 402.12(e), the enclosed list is only valid for 90 days. Please return to the ECOS-IPaC website at regular intervals during project planning and implementation to obtain an updated species list. When using ECOS-IPaC, be careful about drawing the boundary of your Project Location. Remember that your action area under the ESA is not limited to just the footprint of the project. The action area also includes all areas that may be indirectly affected through impacts such as noise, visual disturbance, erosion, sedimentation, hydrologic

change, chemical exposure, reduced availability or access to food resources, barriers to movement, increased human intrusions or access, and all areas affected by reasonably foreseeable future that would not occur without ("but for") the project that is currently being proposed.

Additionally, please note that on March 23, 2022, the Service published a proposal to reclassify the northern long-eared bat (NLEB) as endangered under the Endangered Species Act. The U.S. District Court for the District of Columbia has ordered the Service to complete a new final listing determination for the NLEB by November 2022 (Case 1:15-cv-00477, March 1, 2021). The bat, currently listed as threatened, faces extinction due to the range-wide impacts of white-nose syndrome (WNS), a deadly fungal disease affecting cave-dwelling bats across the continent. The proposed reclassification, if finalized, would remove the current 4(d) rule for the NLEB, as these rules may be applied only to threatened species. Depending on the type of effects a project has on NLEB, the change in the species' status may trigger the need to re-initiate consultation for any actions that are not completed and for which the Federal action agency retains discretion once the new listing determination becomes effective (anticipated to occur by December 30, 2022). If your project may result in incidental take of NLEB after the new listing goes into effect this will first need to be addressed in an updated consultation that includes an Incidental Take Statement. If your project may require re-initiation of consultation, please contact our office for additional guidance.

We appreciate your concern for threatened and endangered species. The Service encourages Federal and non-Federal project proponents to consider listed, proposed, and candidate species early in the planning process. Feel free to contact this office if you would like more information or assistance evaluating potential project impacts to federally listed species or other wildlife resources. Please include the Consultation Tracking Number in the header of this letter with any correspondence about your project.

Attachment(s):

- Official Species List
 - USFWS National Wildlife Refuges and Fish Hatcheries
 - Migratory Birds
 - Wetlands
-

Official Species List

This list is provided pursuant to Section 7 of the Endangered Species Act, and fulfills the requirement for Federal agencies to "request of the Secretary of the Interior information whether any species which is listed or proposed to be listed may be present in the area of a proposed action".

This species list is provided by:

New Jersey Ecological Services Field Office

4 E. Jimmie Leeds Road, Suite 4

Galloway, NJ 08205

(609) 646-9310

Project Summary

Project Code: 2022-0068815
Project Name: DRGNJ 4830 - Drew Forest
Project Type: Restoration / Enhancement - Forest
Project Description: land preservation
Project Location:

Approximate location of the project can be viewed in Google Maps: <https://www.google.com/maps/@40.760124149999996,-74.43214476869093,14z>



Counties: Morris County, New Jersey

Endangered Species Act Species

There is a total of 4 threatened, endangered, or candidate species on this species list.

Species on this list should be considered in an effects analysis for your project and could include species that exist in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Note that 2 of these species should be considered only under certain conditions.

IPaC does not display listed species or critical habitats under the sole jurisdiction of NOAA Fisheries¹, as USFWS does not have the authority to speak on behalf of NOAA and the Department of Commerce.

See the "Critical habitats" section below for those critical habitats that lie wholly or partially within your project area under this office's jurisdiction. Please contact the designated FWS office if you have questions.

-
1. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

Mammals

| NAME | STATUS |
|--|------------|
| Indiana Bat <i>Myotis sodalis</i> There is final critical habitat for this species. The location of the critical habitat is not available. Species profile: https://ecos.fws.gov/ecp/species/5949 | Endangered |
| Northern Long-eared Bat <i>Myotis septentrionalis</i> No critical habitat has been designated for this species. This species only needs to be considered under the following conditions: <ul style="list-style-type: none"> ▪ The specified area occurs within the range of the northern long-eared bat. Species profile: https://ecos.fws.gov/ecp/species/9045 | Threatened |

Reptiles

| NAME | STATUS |
|--|------------|
| Bog Turtle <i>Glyptemys muhlenbergii</i> Population: Wherever found, except GA, NC, SC, TN, VA No critical habitat has been designated for this species. Species profile: https://ecos.fws.gov/ecp/species/6962 | Threatened |

Insects

| NAME | STATUS |
|---|------------------|
| Monarch Butterfly <i>Danaus plexippus</i> | Candidate |
| No critical habitat has been designated for this species. | |
| This species only needs to be considered under the following conditions: | |
| <ul style="list-style-type: none">▪ The monarch is a candidate species and not yet listed or proposed for listing. There are generally no section 7 requirements for candidate species (FAQ found here: https://www.fws.gov/savethemonarch/FAQ-Section7.html). | |
| Species profile: https://ecos.fws.gov/ecp/species/9743 | |

Critical habitats

THERE ARE NO CRITICAL HABITATS WITHIN YOUR PROJECT AREA UNDER THIS OFFICE'S JURISDICTION.

USFWS National Wildlife Refuge Lands And Fish Hatcheries

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS OR FISH HATCHERIES WITHIN YOUR PROJECT AREA.

Migratory Birds

Certain birds are protected under the Migratory Bird Treaty Act¹ and the Bald and Golden Eagle Protection Act².

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

-
1. The [Migratory Birds Treaty Act](#) of 1918.
 2. The [Bald and Golden Eagle Protection Act](#) of 1940.
 3. 50 C.F.R. Sec. 10.12 and 16 U.S.C. Sec. 668(a)

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern \(BCC\) list](#) or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

| NAME | BREEDING SEASON |
|--|-------------------------|
| Bald Eagle <i>Haliaeetus leucocephalus</i> This is not a Bird of Conservation Concern (BCC) in this area, but warrants attention because of the Eagle Act or for potential susceptibilities in offshore areas from certain types of development or activities. https://ecos.fws.gov/ecp/species/1626 | Breeds Sep 1 to Jul 31 |
| Black-billed Cuckoo <i>Coccyzus erythrophthalmus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. https://ecos.fws.gov/ecp/species/9399 | Breeds May 15 to Oct 10 |

| NAME | BREEDING SEASON |
|---|-------------------------|
| Chimney Swift <i>Chaetura pelagica</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds Mar 15 to Aug 25 |
| Kentucky Warbler <i>Oporornis formosus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds Apr 20 to Aug 20 |
| Prairie Warbler <i>Dendroica discolor</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds May 1 to Jul 31 |
| Prothonotary Warbler <i>Protonotaria citrea</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds Apr 1 to Jul 31 |
| Red-headed Woodpecker <i>Melanerpes erythrocephalus</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds May 10 to Sep 10 |
| Rusty Blackbird <i>Euphagus carolinus</i> This is a Bird of Conservation Concern (BCC) only in particular Bird Conservation Regions (BCRs) in the continental USA | Breeds elsewhere |
| Wood Thrush <i>Hylocichla mustelina</i> This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska. | Breeds May 10 to Aug 31 |

Probability Of Presence Summary

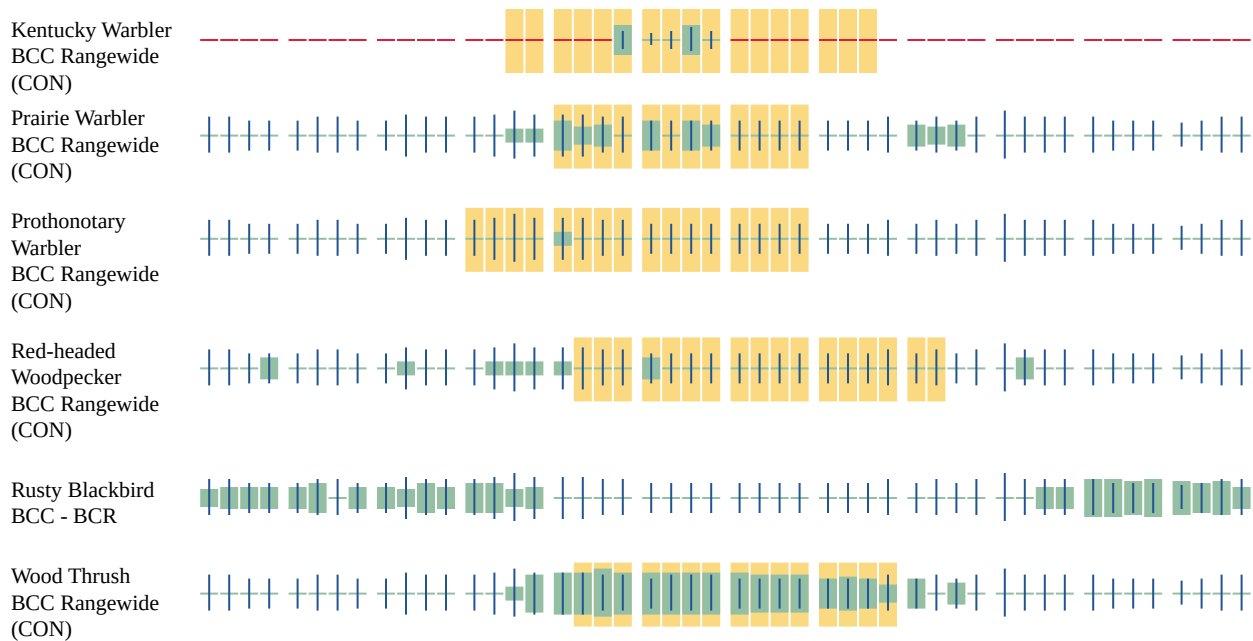
The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee



Additional information can be found using the following links:

- Birds of Conservation Concern <https://www.fws.gov/program/migratory-birds/species>
- Measures for avoiding and minimizing impacts to birds <https://www.fws.gov/library/collections/avoiding-and-minimizing-incident-take-migratory-birds>
- Nationwide conservation measures for birds <https://www.fws.gov/sites/default/files/documents/nationwide-standard-conservation-measures.pdf>

Migratory Birds FAQ

Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

What does IPaC use to generate the list of migratory birds that potentially occur in my specified location?

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [Rapid Avian Information Locator \(RAIL\) Tool](#).

What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

How do I know if a bird is breeding, wintering or migrating in my area?

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may query your location using the [RAIL Tool](#) and look at the range maps provided for birds in your area at the bottom of the profiles provided for each bird in your results. If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

What are the levels of concern for migratory birds?

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
 2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
 3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).
-

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

Details about birds that are potentially affected by offshore projects

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

Wetlands

Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

Please note that the NWI data being shown may be out of date. We are currently working to update our NWI data set. We recommend you verify these results with a site visit to determine the actual extent of wetlands on site.

WETLAND INFORMATION WAS NOT AVAILABLE WHEN THIS SPECIES LIST WAS GENERATED.
PLEASE VISIT [HTTPS://WWW.FWS.GOV/WETLANDS/DATA/MAPPER.HTML](https://www.fws.gov/wetlands/data/mapper.html) OR CONTACT THE FIELD OFFICE FOR FURTHER INFORMATION.

IPaC User Contact Information

Agency: Davey Resource Group, Inc.
Name: John Pabish
Address: Davey Resource Group, Inc.
Address Line 2: 4 Walter E. Foran Blvd, Suite 209
City: Flemington
State: NJ
Zip: 08822
Email: jpabish@amygreene.com
Phone: 9087889676

APPENDIX B

EcolSciences Wetland Delineation Report, December 15, 2020



EcolSciences, Inc.

Environmental Management & Regulatory Compliance

January 13, 2021

Mr. Greg Smith
Assistant Vice President for Facilities and Campus Operations
Facilities | Drew University
Division of Finance and Administration
36 Madison Avenue
Madison, New Jersey 07940

Via Email (gsmith2@drew.edu)

Re: Preliminary Wetlands Investigation
Drew University Undeveloped Lands
±35-acre Part of Block 3001, Lot 1
Borough of Madison, Morris County, New Jersey

Dear Mr. Smith:

In accordance with your authorization, EcolSciences, Inc. performed a preliminary wetlands investigation on the approximately 35-acre site referenced above located along Loantaka Way, Glenwild Road, and Green Village Road in Madison. The site consists of undeveloped portions of the Drew University campus that the University is considering for development. Accordingly, the University requested that EcolSciences determine the approximate location of wetlands and associated regulated areas on the site. In addition, based on our initial review of the site, the New Jersey Department of Environmental Protection (NJDEP) has mapped habitat for the endangered Indiana bat on the site. Because the presence of this habitat may result in additional regulatory considerations regarding development of the site, EcolSciences also evaluated the implications of this mapping. The following is a summary of EcolSciences' investigation.

Freshwater Wetlands

EcolSciences conducted a field investigation of the site on December 15, 2020 to determine the presence of areas most likely to be considered wetlands and open waters by the State of New Jersey pursuant to the Freshwater Wetlands Protection Act (FWWPA). Wetlands were identified utilizing the three-parameter approach as set forth in the Federal Manual for Identifying and Delineating Jurisdictional Wetlands, in which those areas containing hydric soils, positive hydrologic indicators and a prevalence of hydrophytic vegetation are generally classified as wetlands. The identification of wetlands is somewhat subjective and can be dependent upon individual interpretation of field conditions.

The site is predominantly covered by mature upland forest, dominated by oaks, tulip poplar, and sugar maple in the canopy. There is a significant number of fallen large trees throughout the site. The portion of the site between the tennis courts and Loantaka Way is covered by successional woodlands with less mature trees. There is a construction yard located off Loantaka Way which contains dumpsters, soil piles, and other debris, and which is lightly vegetated. The site has varied topography,

ranging from gently to steeply sloping. EcolSciences identified six discrete wetland areas within the site as shown on the attached Wetlands Approximation figure. Five of the six wetland areas (Wetlands #1, #2, #3, #4, and #5 on the Wetland Approximation figure) occur within valleys and bowls formed by the sloping land and are characterized as red maple forested wetlands. Wetland #6 is an emergent wetland pocket containing cattail, soft rush, and common reed that formed in the disturbed construction yard. The identified wetlands are all isolated, which has regulatory implications as described below. A brief description of each wetland area follows.

Wetland #1 – This isolated wetland is located just outside of the site, but whose associated transition area would extend onto the site.

Wetland #2 – This wetland receives stormwater from an outfall along an internal circulation road behind Foster Residence Hall. An erosional gully, underlain by cobbles and broken asphalt extends from the outfall to the wetlands, which likely formed on a flat as the stormwater slowed down and deposited sediment. As the slope steepens, the erosional gully, again partly underlain by asphalt, continues and extends to Wetland #2. Although the gully likely formed due to the stormwater discharge, the NJDEP could choose to regulate it as State open waters because it is larger than the less than two feet wide by six inches deep gullies that are excluded as waters by the FWWPA Rules (N.J.A.C. 7:7A).

Wetland #3 – This wetland formed at the bottom of a topographic bowl and receives stormwater from the previously described erosional gully. There is no outlet from this bowl such that this wetland is isolated.

Wetland #4 – This wetland also occurs at the bottom of a topographic bowl and receives stormwater through an erosional gully generated off the road behind the athletic center and off the tennis courts. It is isolated as there is no outlet from the bowl. As with the prior erosional gully, the NJDEP could choose to regulate it as State open waters because parts of the gully are more than two feet wide and six inches deep.

Wetland #5 – This wetland is located along a shallow valley and does not have an outlet and so is isolated. It does not receive stormwaters as the previously described wetlands do. At the time of the field investigation, it was holding some surface water. There is a potential for this wetland to be classified as a vernal pool, which is an isolated surface pool that is used for breeding by various frogs and other amphibians. Vernal pools have regulatory implications as described below.

Wetland #6 – This isolated wetland appears to have developed due to soil compaction and surface drainage being disrupted by soil piles and other disturbance within the construction yard.

Transition Areas

The FWWPA also regulates transition areas, which are buffers provided to wetlands. Transition areas range in width between 0, 50, and 150 feet depending on the resource value classification of the wetlands. Wetlands that drain to trout production waters or are mapped as threatened and

endangered species habitat are classified as exceptional resource value with a standard 150-foot transition area. Ditches and swales are usually classified as ordinary resource value with no associated transition area. All other wetlands are classified as intermediate resource value with a standard 50-foot transition area.

The identified wetlands are isolated and therefore do not drain to trout production waters. However, the site has been mapped as habitat for the Federally/State-endangered Indiana bat. Accordingly, the NJDEP could classify the on-site wetlands as exceptional resource value with a standard 150-foot transition area.

Regulated Waters

Waters and associated flood hazard areas and riparian zones within New Jersey are regulated pursuant to the Flood Hazard Area Control Act (FHACA). In general, waters must be naturally-occurring or be man-made and drain 50 acres or more to be regulated. Regulated waters that drain 50 acres or more have an associated flood hazard area. Regulated waters also have an associated riparian zone (aka buffer) which can be 50, 150, or 300 feet in width depending on the classification of the waters. According to NJDEP GeoWeb mapping, no waters are present within the site. During EcolSciences field investigation, no naturally flowing streams were identified on or abutting the site. EcolSciences did identify several erosional gullies which could be classified as regulated waters if they have drainage areas of 50 acres or greater. However, based on EcolSciences' rough estimates, it is doubtful that these erosional gullies drain 50 acres or more.

Threatened and Endangered Species

According to the Landscape Project (Version 3.3) mapping prepared by the NJDEP, virtually the entire site contains documented habitat for the Federally/State-endangered Indiana bat (*Myotis sodalis*) (see attached Landscape Project Mapping figure). Also, based on the U.S. Fish and Wildlife Service's (USFWS's) list of New Jersey Municipalities, maternity occurrences of Indiana bat and the Federally-threatened northern long-eared bat (*Myotis septentrionalis*) are present in Madison Borough. Based on EcolSciences' field investigation, the site does contain suitable habitat for these species, with the possible exception of the construction yard off Loantaka Way and the successional woodland between the tennis courts and Loantaka Way.

The presence of the mapped Indiana bat habitat may cause the NJDEP to classify the on-site wetlands as exceptional resource value with a standard 150-foot transition area. In addition, because the bats are Federally-listed, consultation may be required with the USFWS if more than one acre of trees are proposed to be cleared or if tree clearing is to be conducted during the recommended seasonal tree-clearing restriction period for Indiana bat of April 1–September 30. As part of consultation, the USFWS may require site-specific surveys for the bats. Furthermore, the NJDEP may initiate consultation with the USFWS should they receive freshwater wetlands permit applications for the site.

Regulatory Assessment

Based on EcolSciences' investigation, wetlands are present on the site in the approximate locations and extents as shown on the attached Wetlands Approximation figure. The wetlands could be classified as exceptional resource value with a standard 150-foot transition area due to the mapping of documented Indiana bat habitat by the Landscape Project. The erosional gullies could be classified as State open waters due to their widths and depths. In addition, Wetland #5 could be classified as a vernal pool. Accordingly, EcolSciences recommends that these features be formally delineated and verified through a Letter of Interpretation application to the NJDEP.

If the NJDEP verifies that the wetlands are isolated, are not habitat for the Indiana bat, and are not vernal pools, up to one acre of these wetlands could be filled using General Permit 6. However, if these wetlands are determined to be "waters of the United States," only 0.5 acre can be filled and mitigation needs to be performed for fills over 0.1 acre. In addition, General Permit 6A could be used to fill up to 0.5 acre of transition area associated with isolated wetlands. There are other available General Permits for specific activities such as the installation of stormwater outfalls (GP11) and minor road crossings (GP10A). The total amount of wetland fills using applicable General Permits cannot exceed one acre. Other conditions are placed on each of the general permits. Transition area waivers are available to reduce or modify the standard transition area through averaging. The transition area cannot be reduced through averaging on slopes greater than 25 percent.

It is likely that the on-site erosional gullies would not be classified as regulated waters because they are man-made (i.e., stormwater discharges) and do not appear to drain 50 acres or more. Therefore, flood hazard areas and riparian zones would also not occur on-site. A Flood Hazard Area Applicability Determination should be obtained to confirm that there are no regulated waters, flood hazard areas and riparian zones on the site.

I trust that the above information suits your needs. Please do not hesitate to contact me if you have any questions.

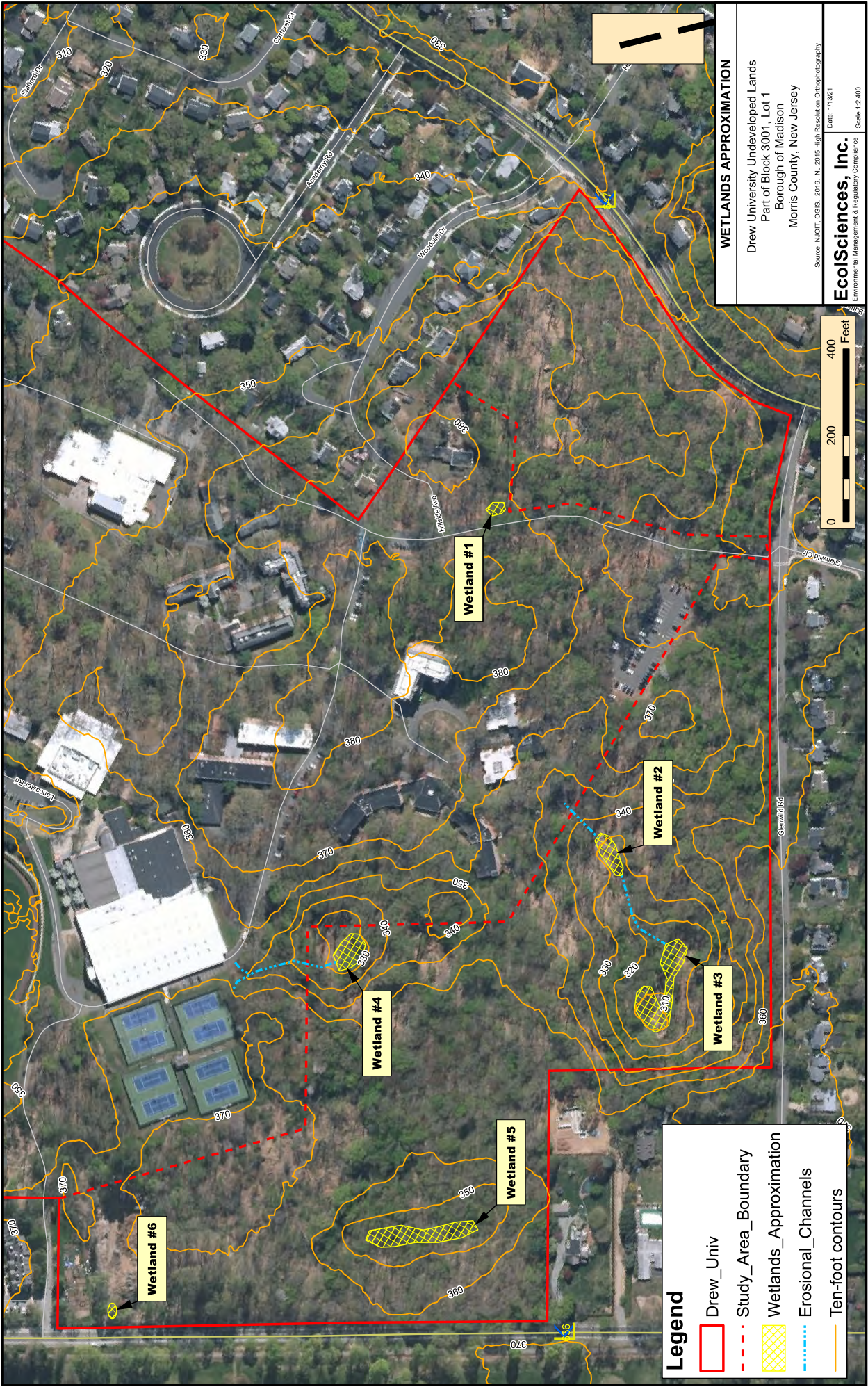
Very truly yours,

EcolSciences, Inc.

Michael Kovacs

Michael Kovacs, PWS
Senior Vice President

MK/bms
enclosures



WETLANDS APPROXIMATION

Draw University Undeveloped Lands
 Part of Block 3001, Lot 1
 Borough of Madison
 Morris County, New Jersey

Source: NJOIT, OGIS, 2018, NJ 2015 High Resolution Orthophotography.
 Date: 1/13/21

EcolSciences, Inc.
 Environmental Management & Regulatory Compliance

Scale: 1:2,400

F:\Jobs\2020\EN20-095\GIS\Wetland_NJ_11x17_Landscape.mxd

Legend

- Draw_Univ
- Study_Area_Boundary
- Wetlands_Approximation
- Erosional_Channels
- Ten-foot contours



Wetland #1

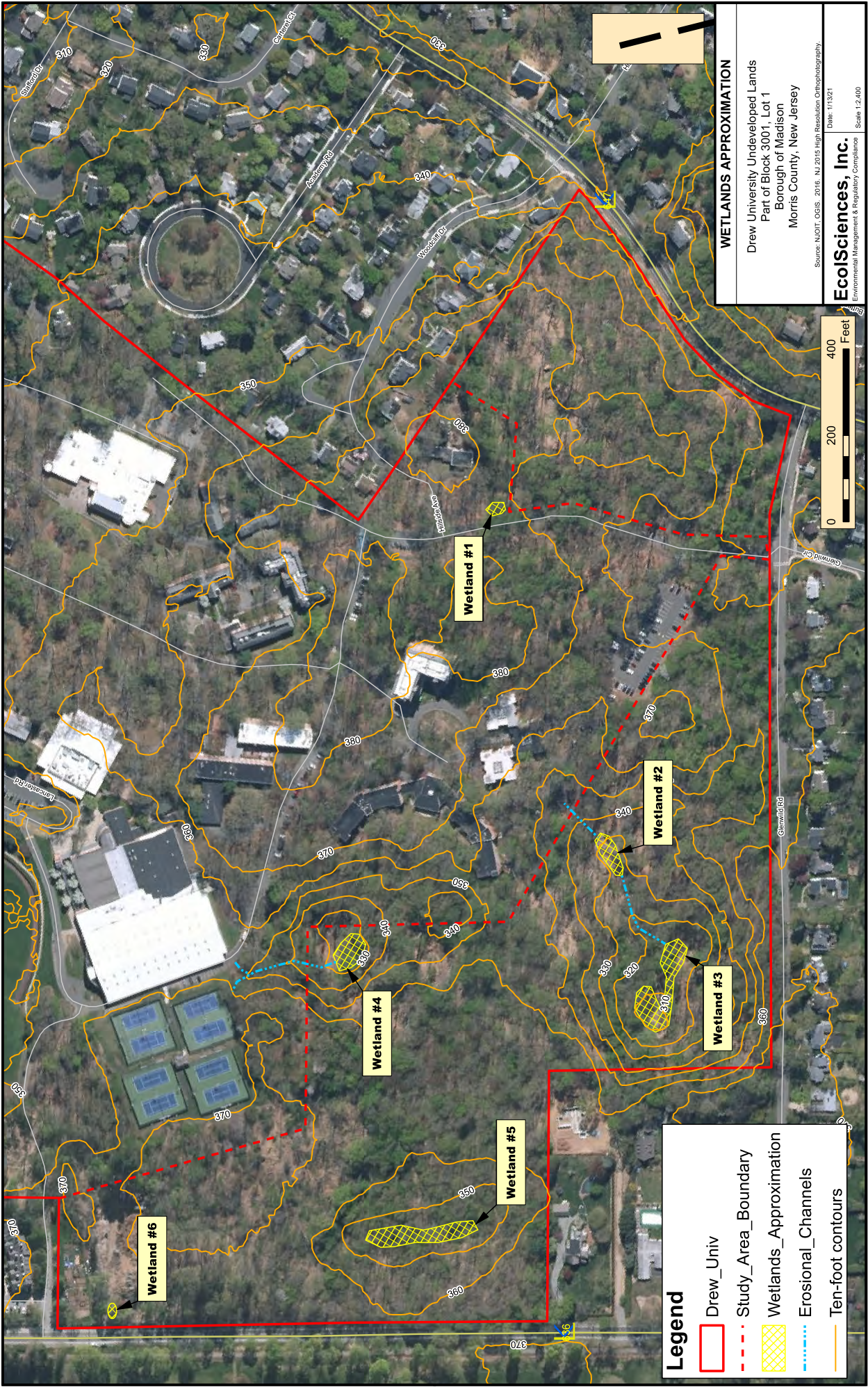
Wetland #2

Wetland #3


Wetland #4

Wetland #5

Wetland #6










 Approximate site boundary



Species-Based Habitat

RANK



-  Rank 1 - Habitat specific requirements
-  Rank 2 - Special Concern
-  Rank 3 - State Threatened
-  Rank 4 - State Endangered
-  Rank 5 - Federal Listed

Vernal Pools/Habitat

VERNAL POOL STATUS


-  Vernal pool location
-  Potential vernal pool location

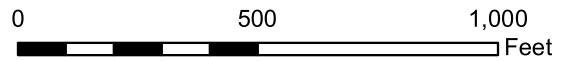
VERNAL HABITAT TYPE

-  Potential vernal habitat area
-  Vernal habitat area

Freshwater Mussel Habitat

RANK

-  Rank 2 - Special Concern
-  Rank 3 - State Threatened
-  Rank 4 - State Endangered
-  Rank 5 - Federal Listed



LANDSCAPE PROJECT MAPPING

Drew University Undeveloped Lands
Part of Block 3001, Lot 1
Borough of Madison
Morris County, New Jersey

Sources:
NJDEP, DFW, ENSP. 2017. New Jersey's Landscape Project (Version 3.3).
NJOIT, OGIS. 2016. NJ 2015 High Resolution Orthophotography.

EcolSciences, Inc.
Environmental Management & Regulatory Compliance

Date: 1/13/2021

Scale 1:4,800

APPENDIX C

USGS StreamStats Report

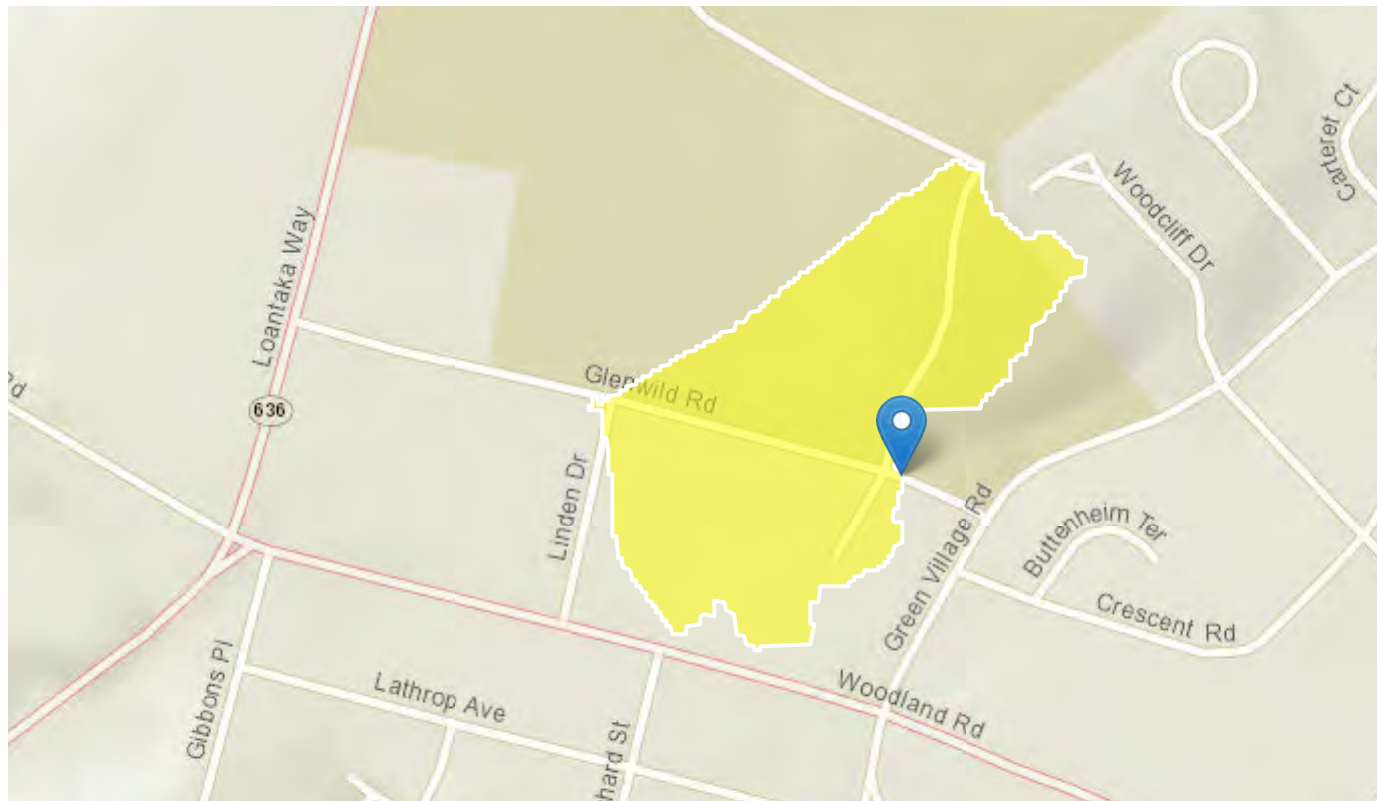
StreamStats Report

Region ID: NJ

Workspace ID: NJ20220802001105979000

Clicked Point (Latitude, Longitude): 40.75597, -74.42758

Time: 2022-08-01 20:11:19 -0400



Drew Forest Southern section

[+ Collapse All](#)

Basin Characteristics

| Parameter Code | Parameter Description | Value | Unit |
|----------------|---|-------|--------------|
| DRNAREA | Area that drains to a point on a stream | 0.037 | square miles |
| STORAGE | Percentage of area of storage (lakes ponds reservoirs wetlands) | 0 | percent |

USGS Data Disclaimer: Unless otherwise stated, all data, metadata and related materials are considered to satisfy the quality standards relative to the purpose for which the data were collected. Although these data and associated metadata have been reviewed for accuracy and completeness and approved for release by the U.S. Geological Survey (USGS), no warranty expressed or implied is made regarding the display or utility of the data for other purposes, nor on all computer systems, nor shall the act of distribution constitute any such warranty.

USGS Software Disclaimer: This software has been approved for release by the U.S. Geological Survey (USGS). Although the software has been subjected to rigorous review, the USGS reserves the right to update the software as needed pursuant to further analysis and review. No warranty, expressed or implied, is made by the USGS or the U.S. Government as to the functionality of the software and related material nor shall the fact of release constitute any such warranty. Furthermore, the software is released on condition that neither the USGS nor the U.S. Government shall be held liable for any damages resulting from its authorized or unauthorized use.

USGS Product Names Disclaimer: Any use of trade, firm, or product names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Application Version: 4.10.1

StreamStats Services Version: 1.2.22

NSS Services Version: 2.2.1

APPENDIX D

US Fish and Wildlife Service Correspondence



United States Department of the Interior



FISH AND WILDLIFE SERVICE
New Jersey Field Office
4 E. Jimmie Leeds Road, Suite 4
Galloway, New Jersey 08205
Tel: 609/646 9310
www.fws.gov/northeast/njfieldoffice/

April 28, 2021

Thomas Schwarz, Interim President
president@drew.edu
Drew University
36 Madison Avenue
Madison New Jersey, 07940

Dear President and Chair of the Board:

The U.S. Fish and Wildlife Service (Service) New Jersey Field Office is writing to express our concern that the University may consider selling forested land, including the Zuck Arboretum and Hepburn Woods, which were restored using Federal funds via the Partners for Fish and Wildlife (Partners) program.

In November of 2008, the University entered into an agreement with the Service's Partners program to restore forested land on campus by planting trees and controlling invasive plants. The Service provided nearly 2,000 trees and shrubs (1,157 in 2011, 722 in 2012, and 514 in 2013). We also provided many staff days towards managing invasive plant species in the forest and assisted with tree planting days. Although our 10-year agreement with the University has expired, we understood the intent and commitment demonstrated in the signed agreement was to restore the forested area for the long-term.

By the early 2000's, the forest habitat value and school community value had been degraded by excessive deer browse removing understory vegetation and aggressive invasive plant species making areas inaccessible or unappealing both to people and wildlife. However, through the tireless effort of Dr. Sara Webb and other University staff, the student body, conservation organizations, and private donors, the Zuck Arboretum and Hepburn Woods were restored with our help. The area was fenced to deter deer and years of effort was put into removing invasive plant cover and replacing it with native trees, shrubs, and wildflowers beneficial to wildlife. Throughout the years, classes and student volunteers have worked hard to remove invasive plants and have taken part in plantings; individual donors have contributed generously towards fencing all of the Zuck Arboretum and Hepburn Woods; and nonprofit organizations, such as New Jersey Audubon and the Madison Garden Club, have freely committed resources, staff time, and assistance securing grants. Restoring a forest from nonnative invasive plants and enhancing understory habitat consisting of native vegetation beneficial to wildlife is a very challenging task in northeastern New Jersey. For the University to have had success at this endeavor is commendable.

Part of the University's forested area lies in the Great Swamp watershed one mile upstream of Great Swamp National Wildlife Refuge. However, in contrast to the refuge, the majority of land use cover in Madison is urban and impervious surfaces. Much of the campus is also impervious except for the forested areas. Impervious cover contributes to reduced water quality and increased storm water flows downstream entering the refuge.

Fiscal constraints are understandable on a college campus but losing this part of the campus would discount the extensive time and commitment that has been made to improve the forest and more importantly discount the future value in perpetuity of the forest to campus life, student health and learning opportunities, habitat to wildlife, benefits to the watershed, and benefits to the surrounding community.

The University community, conservation organizations, government partners, community members, and students made a long-term commitment through their sustained effort and contributions to pursue this restoration. We hope that you consider the importance of this forested portion of the campus especially the Zuck Arboretum and Hepburns Woods. If the University moves forward with this sale, the Service encourages you to work with the Borough to find a way to ensure these forested areas remain in their natural state.

If you have any questions about the Partners program or how the Service could assist potential future landowners to conserve the forest, please contact our Partners Coordinator at Elizabeth_Freiday@fws.gov or 609-742-8830.

Sincerely,

Eric
Schrading

Digitally signed by Eric
Schrading
Date: 2021.04.29
11:04:55 -04'00'

Eric Schrading
Field Supervisor

Cc: Chair of the Board of Trustees
Sara Web, Drew University



FISH AND WILDLIFE SERVICE



In Reply Refer to:

HR-08/70

New Jersey Field Office
Ecological Services
927 North Main Street, Building D
Pleasantville, New Jersey 08232
Tel: 609/646 9310
Fax: 609/646 0352
<http://www.fws.gov/northeast/njfieldoffice>

Sara Webb
Professor of Biology
Drew University
36 Madison Avenue
Madison, New Jersey 07940

AUG 18 2008

Dear Dr. Webb:

Thank you for showing an interest in working with the U.S. Fish and Wildlife Service (Service) *Partners for Fish and Wildlife* (Partners) program. Restoration work at Drew University will help restore native vegetation to approximately 20 acres of forested and riparian area.

Based on our August 4, 2008 site visit and discussions with you and John Parke from the New Jersey Audubon Society, we have drafted the enclosed documents: Please review the enclosed Fish and Wildlife Habitat Restoration Agreement (Agreement) (Enclosure 1), appendices (Enclosure 2), and Habitat Restoration Site Plan Forms (Enclosure 3). If you agree to the proposed project, please sign the Agreement on Page Two above the heading "Cooperator." After the requested information is completed, please return the original to our office.

On Page One of the Fish and Wildlife Habitat Restoration Agreement and on Page One of the Restoration Plan, please provide the number of years that you agree to maintain the area in its restored condition. As you are aware, one of the requirements of the *Partners* program is that a landowner must sign an agreement to maintain restoration measures for at least ten years. While the Service only requires a ten-year commitment, we are interested in establishing longer term agreements. Such an agreement does not necessarily imply that all project components will be maintained for that length of time, but rather the area will not be changed from its relatively natural, restored state.

Partners cannot assist with the proposed restoration work until the Agreement is signed. If you have any questions, concerns, or modifications to the enclosed documents, please contact Brian Marsh at (609) 383-3938, extension 22.

Sincerely,

J. Eric Davis Jr.
Supervisor

Enclosures

FWS Agreement No: 1448-0000-_____
DCN: _____
Charge Code: _____
Amount Obligated: \$ _____

WILDLIFE COOPERATIVE EXTENSION AGREEMENT

This cooperative agreement between Drew University ("the Cooperator(s)"), and the U.S. Fish and Wildlife Service ("the Service") is authorized by the Fish and Wildlife Coordination Act, 16 U.S.C. Sections 661-666c and the Fish and Wildlife Act of 1956, 16 U.S.C. 742a-j. The Service and the Cooperator(s) agree to carry out certain wildlife management practices and habitat developments on approximately 20 acres of land owned by the Cooperator(s) as described in the Project Plan and on the map and/or legal description, attached.

The Service agrees to provide at least partial payment (or reimbursement) of the actual costs, and/or technical and material assistance, as detailed in the Project Plan. In return, the Cooperator(s) agree:

1. To perform the work in accordance with the Project Plan if the Cooperator(s) do the work themselves or through their contractors. After partial or final completion to the satisfaction of the Service, Cooperator(s) may submit a bill (with receipts attached) to the Service and be reimbursed for actual and reasonable costs not exceeding the Amount Obligated shown above.
2. To assume responsibility for securing any permits needed to carry out this project.
3. To allow the habitat developments as described in the Project Plan to remain in place without interference for a period of _____ years from the date of the last signature on this agreement.
4. To allow the Service or its representatives reasonable access to the described property for the period of this agreement in order to make the agreed developments or to make periodic inspections of the developments.
5. To notify the Service's Project Manager in writing at least 30 days before closing of any planned sale or other change in the ownership of the described property.
6. To sign the standard certifications (DI-2010) and assurances (SF-424B or SF-424D) attached as exhibits B and C.

The Service assumes no authority over the described property for purposes of controlling trespass, for controlling noxious weeds, for identifying or removing pre-existing hazards including waste materials, for granting rights of way, or for any other incidents of ownership. The Service also assumes no liability for property damage or injuries to people not caused by its own negligence, and any claims shall be processed in accordance with the Federal Tort Claims Act. Cooperator(s) shall own all of the completed or installed developments and shall be solely responsible for paying all taxes and assessments on the described property.

This agreement may be modified at any time by mutual written consent of the parties. It may be terminated by either party upon 30 days advance written notice to the other party(ies). However, if the Cooperator(s) terminates the agreement before its expiration, or if the Cooperator(s) should materially default on these commitments, then Cooperator(s) agrees to reimburse the U.S. Fish and Wildlife Service

prior to final termination for the prorated costs of all habitat developments placed on the land through this agreement. For these purposes, the total cost of the developments to the United States are agreed to be \$ 3,290.

The relevant portions of title 43, subpart 12 of the Code of Federal Regulations (Including subparts D and E for individual Cooperators) are incorporated by this reference. The full text of these regulations will be made available upon request. It is also understood that this agreement does not create the kind of legal partnership or joint venture which would allow any one party to speak or act for or to obligate any other party on this or other matters.

Buy American notice: It is the sense of the Congress that recipients of federal assistance should give preference to domestic equipment and products when buying such items with federal funds.

COOPERATOR(S)

U.S. FISH AND WILDLIFE SERVICE

1. _____
(Signature) Owner

J. Eric Davis Jr.
(Signature)

(Name)

J. Eric Davis Jr.
(Typed Name) Project Manager

(Address)

18 Aug, 2008

Tel. (609) 646-9310

_____, 20__

-----[Regional Option]-----

2. _____
(Signature) Owner

(Signature)

(Typed Name)

Warrant # _____

(Typed Name) Contracting Officer

(Address)

Tel. () _____

_____, 20__

SERVICE AND PARTNER CONTRIBUTIONS AND SPECIAL PROVISIONS

Service

The Service will provide 1,000 trees and shrubs, herbicide, technical advice, and limited assistance with herbicide application. Estimated cost to the Service is \$4,790 (includes in-kind services), which is equivalent to a 39% cost-share.

Cooperator

The Cooperator will continue to implement physical and chemical control of invasive plant populations, plant the shrubs and trees, and work to reduce deer herbivory at the University. Estimated cost to the Cooperator is \$7,000 (includes in-kind services), which is equivalent to a 57% cost share.

New Jersey Audubon Society

NJAS will assist with coordinating and monitoring the project as needed. Estimated cost to NJAS is \$500 (includes in-kind services), which is equivalent to a 4% percent cost share.

SPECIAL PROVISIONS

The Cooperator will notify the Service and other partners if project plans significantly change from those outlined above. Significant changes will require written modification to this Agreement. Supplemental Agreements and / or modifications will be made for additional phases of implementation in subsequent years as funding is available.

**PARTNERS FOR FISH AND WILDLIFE
HABITAT RESTORATION PROJECT COSTS**

| | |
|----------------------------------|-----------------------------------|
| Cooperators / Landowners: | Drew University |
| Partner: | New Jersey Audubon Society (NJAS) |
| County: | Morris |
| Watershed: | Loantaka Brook |

COST ESTIMATES

| | | |
|--|---------------------------|--------|
| Technical and field assistance | (In-kind) Service = \$ | 1,500 |
| Technical and field assistance | (In-kind) NJAS = \$ | 500 |
| Trees and shrubs | (Cash) Service = \$ | 3,000 |
| University and volunteer time planting, invasive plant removal, deer fence installation and maintenance, <i>etc.</i> | (In-kind) Cooperator = \$ | 6,000 |
| Supplies | (Cash) Cooperator = \$ | 1,000 |
| Herbicide | (Cash) Service = \$ | 200 |
| Nest boxes | (Cash) Service = \$ | 90 |
| Totals: | (Cash) Service = \$ | 3,290 |
| | (In-kind) Service = \$ | 1,500 |
| | (Cash) Cooperator = \$ | 1,000 |
| | (In-kind) Cooperator = \$ | 6,000 |
| | (In-kind) NJAS = \$ | 500 |
| TOTAL PROJECT COST: | \$ | 12,290 |

PROJECT PLAN

Drew University in the Borough of Madison, Morris County, New Jersey lies in the Great Swamp watershed approximately one mile upstream from Great Swamp National Wildlife Refuge and lies in the Partners Passaic/Hackensack Rivers Focus Area. The 186-acre campus is mostly wooded. The arboretum and other wooded areas at the University provide habitat to migratory passerine birds. The habitat value of the forested areas at the University is seriously degraded by excessive deer browse, invasive plant species, and low native plant recruitment. The arboretum includes two shallow ponds with approximately 0.25 miles of riparian area. The University is working to restore wildlife habitat on the campus by planting native vegetation, installing deer fencing, considering deer culls, and removing invasive plants by physical and chemical means.

Chinese wisteria (*Wisteria sinensis*), garlic mustard (*Alliaria petiolata*), bittersweet (*Celastrus orbiculatus*), Norway maple (*Acer platanoides*), tree-of-heaven (*Ailanthus altissima*), and Japanese stiltgrass (*Microstegium vimineum*) are the most problematic invasive plants needing control at the University. Successfully controlling invasive plant species generally requires both physical means and use of herbicide. The Service recommends a mix of foliar herbicide (e.g., Garlon 3A and Rodeo) and cut and stump and basal bark application of herbicide (e.g., Garlon 4A and Pathfinder II). Appendix C lists some specific control measures for the species listed. Due to established seed banks, control measures will be required for several years before invasive plant populations may be significantly reduced.

Invasive species are generally opportunistic and need disturbed areas to become established. Therefore, supplementing and maintaining a healthy native plant community will reduce the opportunities for invasive plants to (re)establish. The Service can provide 500 small containerized and 500 bare-root trees and shrubs for planting around the ponds and throughout the natural areas of the campus. The plantings will increase plant diversity immediately and provide future seed sources for natural recolonization.

The table below lists examples of the types of species the Service may be able to provide dependent on availability. The University and its volunteers can plant the shrubs and trees in suitable locations based on their shade and hydrology requirements. Species, such as buttonbush and spicebush, are somewhat resistant to deer browse, but most of the plants will need to be planted within deer fenced areas or otherwise protected.

| Species | common name | wetland indicator status | shade tolerance |
|----------------------------------|-------------------|--------------------------|-----------------|
| <i>Amelanchier canadensis</i> | serviceberry | FAC | yes |
| <i>Cephalanthus occidentalis</i> | buttonbush | OBL | yes |
| <i>Cornus amomum</i> | silky dogwood | FACW | somewhat |
| <i>Fraxinus pennsylvanica</i> | green ash | FACW | yes |
| <i>Lindera benzoin</i> | spicebush | FACW | yes |
| <i>Pinus strobus</i> | white pine | FACU | yes |
| <i>Platanus occidentalis</i> | American sycamore | FACW- | no |
| <i>Quercus alba</i> | white oak | FACU- | somewhat |
| <i>Quercus palustris</i> | pin oak | FACW | somewhat |
| <i>Quercus phellos</i> | willow oak | FAC | somewhat |

| Species | common name | wetland indicator status | shade tolerance |
|----------------------------|--------------------|---------------------------------|------------------------|
| <i>Quercus prinus</i> | chestnut oak | UPL | somewhat |
| <i>Quercus rubra</i> | northern red oak | FACU- | somewhat |
| <i>Sambucus canadensis</i> | elderberry | FACW- | somewhat |

The Service will also provide six small nest boxes to be installed in the arboretum for species such as nuthatches (*Sitta* spp.). The boxes should be put up by midwinter.