GODDARD CONSULTING
Strategic Ecological Consulting

Wildlife Habitat Evaluation & Vernal Pool Migration Study Report

for

250 Turnpike Road
(Map: 27, Lots: 46 & 2A)
Southborough, MA 01772

DATE:
May 15, 2025

ADDRESSED TO:
Southborough Zoning Board of Appeals
9 Cordaville Road
Southborough, MA 01772

PREPARED BY:
Goddard Consulting LLC
291 Main Street, Suite 8
Northborough, MA 01532

PREPARED FOR:
Ferris Development Group LLC & FD 250 Turnpike, LLC
118 Turnpike Road, Suite 300
Southborough, MA 01772

Table of Contents

Vernal Pool Migration Study

Wildlife Habitat Evaluation

VERNAL POOL MIGRATION STUDY REPORT

1.0 INTRODUCTION

A Vernal Pool Migration Study was conducted to evaluate the ecological function and significance of a man-made stormwater detention basin located adjacent to a proposed development site in Southborough, Massachusetts. The basin, constructed in 1989, has recently been identified as a Bordering Vegetated Wetland by the local Conservation Commission and exhibits some characteristics consistent with vernal pool habitat. This study aims to document amphibian use, migratory routes, and breeding activity within the pool to assess potential impacts of the proposed roadway and development. The pool is artificial, highly degraded, and hydrologically manipulated with limited observations of amphibian activity.

To evaluate the ecological value of the potential vernal pool, a 21-day drift fence and pitfall trap study was conducted during peak amphibian migration season in Spring 2025. A silt fence and pitfall trap array was installed around the western stormwater detention basin and along the proposed access roadway. The pitfall traps were inspected daily by a qualified wildlife biologist to identify the captured species and count individuals. The results were used to assess habitat quality, species presence, and potential migratory movements within the proposed development.

2.0 RESULTS

2.1 EVALUATION OF POTENTIAL VERNAL POOL HABITAT

The potential vernal pool is delineated with flag series A1 to A11. This feature is a man-made detention basin associated with the building & parking lot just north of the flagged pool. The detention basin was constructed in 1989 under DEP File #290-112. In September 2022, the Southborough Conservation Commission determined the basin qualified as a jurisdictional Bordering Vegetated Wetland.

According to the Guidelines for the Certification of Vernal Pool Habitat prepared by the Natural Heritage & Endangered Species Program, a potential vernal pool must meet both the biological and physical criteria to qualify as jurisdictional vernal pool habitat. Biologically, the potential vernal pool does support both obligate and facultative species (Reference Section 2.2). Physically, the pool does not have a permanently flowing outlet and there is no established, reproducing fish population (Reference Photo 1). There are various attachment sites for egg masses, including woody debris and vegetation. The average depth of the pool is approximately 10-12 inches with a maximum depth of approximately 16 inches. There is an outlet located at the northeastern edge of the pool. The water within the basin discharges into the adjacent wetland, potentially limiting the depth of the pool.

Photo 1. View of potential vernal pool (facing north) on March 21st, 2025.

2.2 PRESENCE & ABSENCE OF VERNAL POOL SPECIES

The Natural Heritage & Endangered Species Program characterizes 'Vernal Pool Habitat' based on the presence and absence of six obligate species and four facultative species. Obligate species consist of "vertebrate and invertebrate species that require vernal pools for all or a portion of their life cycle and are unable to successfully complete their life cycle without vernal pools". Facultative species are "vertebrate species that frequently use vernal pools for all or a portion of their life cycle but are able to successfully complete their life cycle in other types of wetlands". Two obligate species and two facultative species were observed during the study (Reference Table 1).

Table 1. Obligate & Facultative Species observed during the vernal pool migration study.

Obligate Species	**Present or Absent**
Wood Frog (*Lithobates sylvaticus*)	**Present**
Spotted Salamander (*Ambystoma maculatum*)	**Present**
Blue-spotted Salamander (*Ambystoma laterale*)*	Absent
Jefferson Salamander (*Ambystoma jeffersonianum*)*	Absent
Marbled Salamander (*Ambystoma opacum*)*	Absent
Fairy Shrimp (*Anostraca: Eubranchipus)*	Absent

Facultative Species	**Present or Absent**
Spring Peeper (*Pseudacris crucifer*)	**Present**
Gray Treefrog (*Hyla versicolor*)	Absent
American Toad (*Anaxyrus americanus*)	**Present**
Fowler's Toad (*Anaxyrus fowleri*)	Absent

* State-listed Species under Massachusetts Endangered Species Act.

2.3 ORIGIN OF MIGRATORY MOVEMENT

Each recorded amphibian observation corresponds to a specific pitfall trap. The pitfall traps were installed on the perimeter of the potential vernal pool and adjacent to the proposed roadway. The amount of amphibian observations recorded in each pitfall trap corresponds to the amount of migratory movement from a particular direction. The amphibian observations were divided into three categories: Wood Frog, Spotted Salamander, and Other Amphibians. Other Amphibians includes all amphibian species regardless of their recognition as obligate or facultative species by the Natural Heritage & Endangered Species Program. The only amphibian species excluded from the results was the Red-backed Salamander. Red-backed Salamander lay their eggs on land and do not utilize vernal pools for their life cycle.

2.3.1 Wood Frog (*Lithobates sylvaticus*)

In total, forty-five wood frog observations (not forty-five individual wood frogs, as noted below) were reported during the duration of the study. Twenty-three of the observations were females, and twenty-two observations were males. Please note these observations do not correspond to individual amphibians. The same individual may have been observed both entering and exiting the potential vernal pool. **Based on the individuals observed entering the vernal pool, there are likely between 20 to 23 individuals.** Reference Figures 1 – 5 below to visualize the approximate movement of individuals during vernal pool migration.

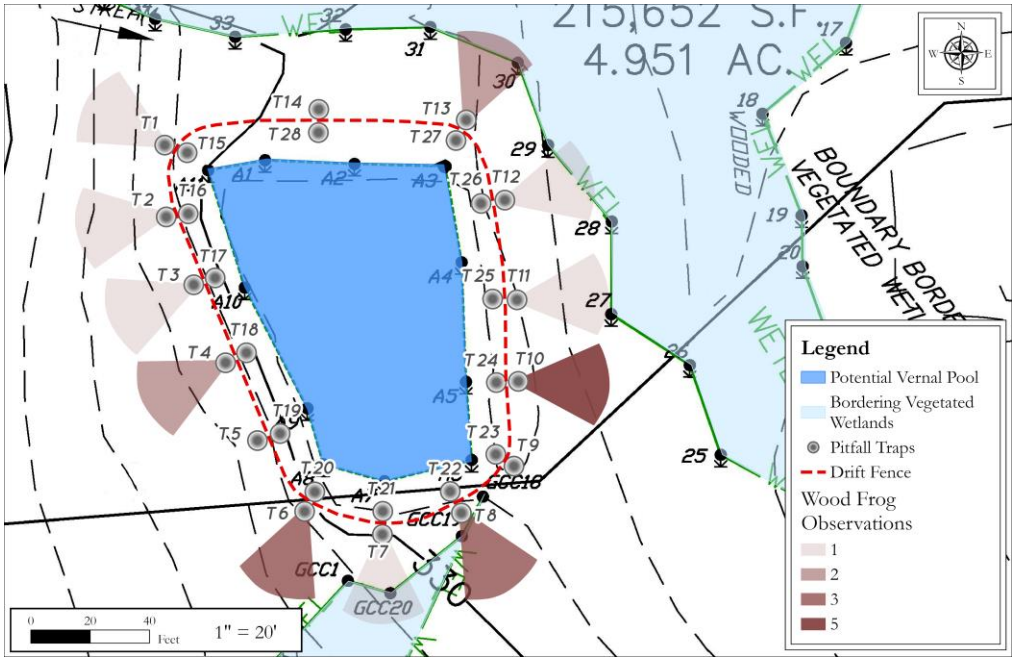


Figure 1. This graphic displays twenty-eight pitfall traps adjacent to the potential vernal pool. Each triangle corresponds to the approximate direction of wood frog migratory movement *entering* the vernal pool.

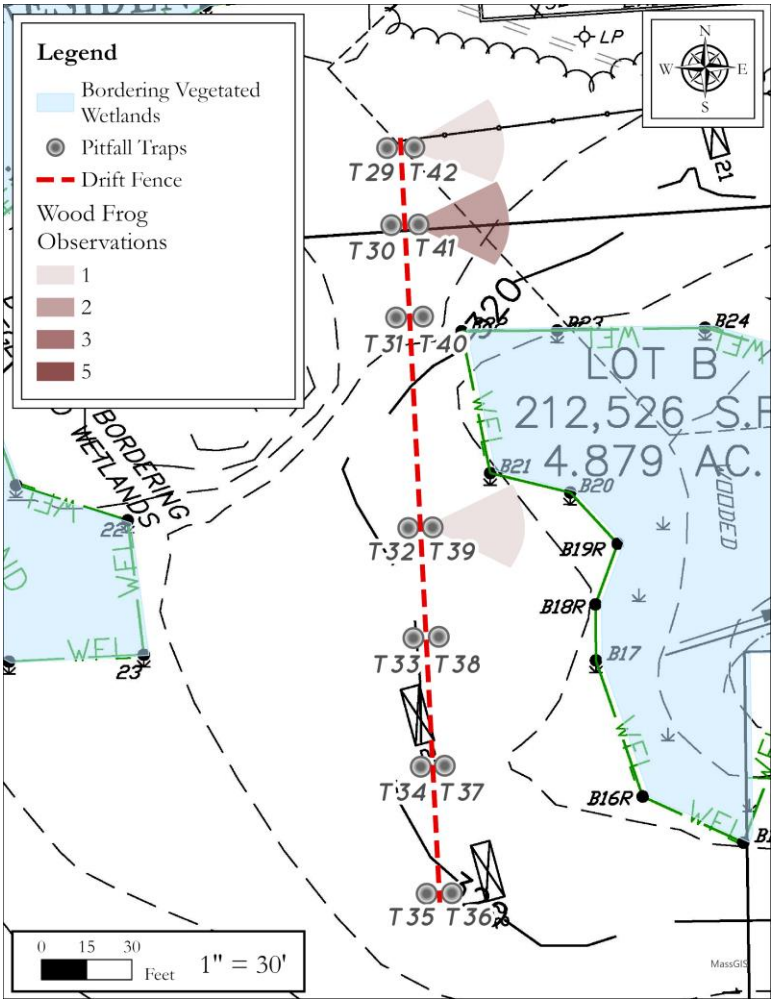


Figure 2. This graphic displays all fourteen pitfall traps adjacent to the location of the proposed roadway. Each triangle corresponds to the approximate direction of wood frog migratory movement across both sides of the proposed roadway. No individuals were observed traveling east across the proposed roadway.

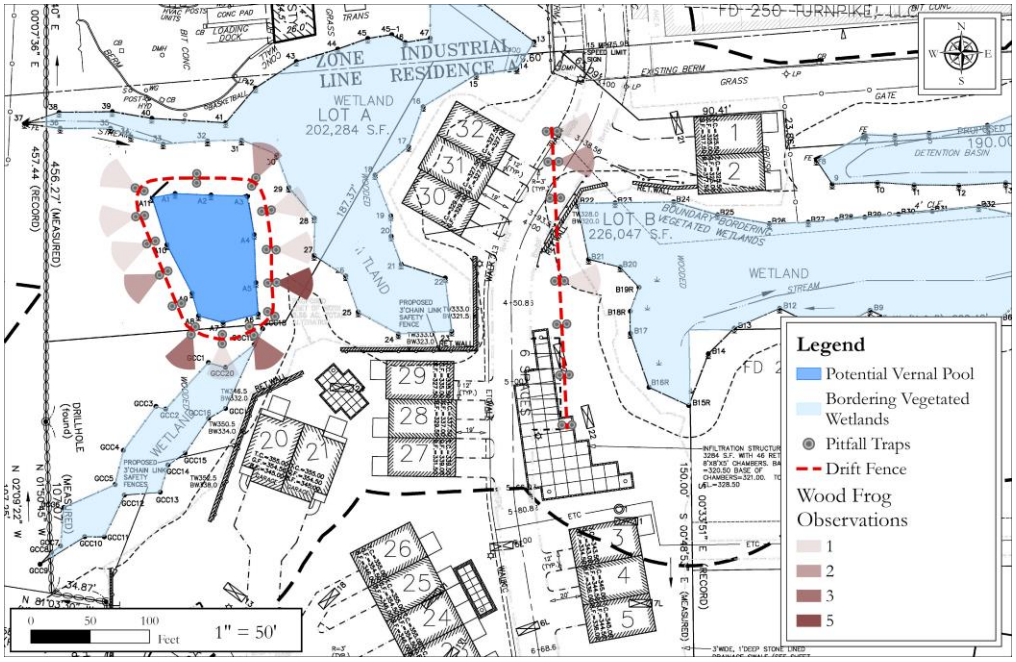


Figure 3. This graphic displays all forty-two pitfall traps adjacent to the potential vernal pool and the proposed roadway. Each triangle corresponds to the approximate direction of wood frog migratory movement *entering* the vernal pool. The migratory movement is shown on the proposed site plan to demonstrate the potential impacts to wood frog migration toward the potential vernal pool.

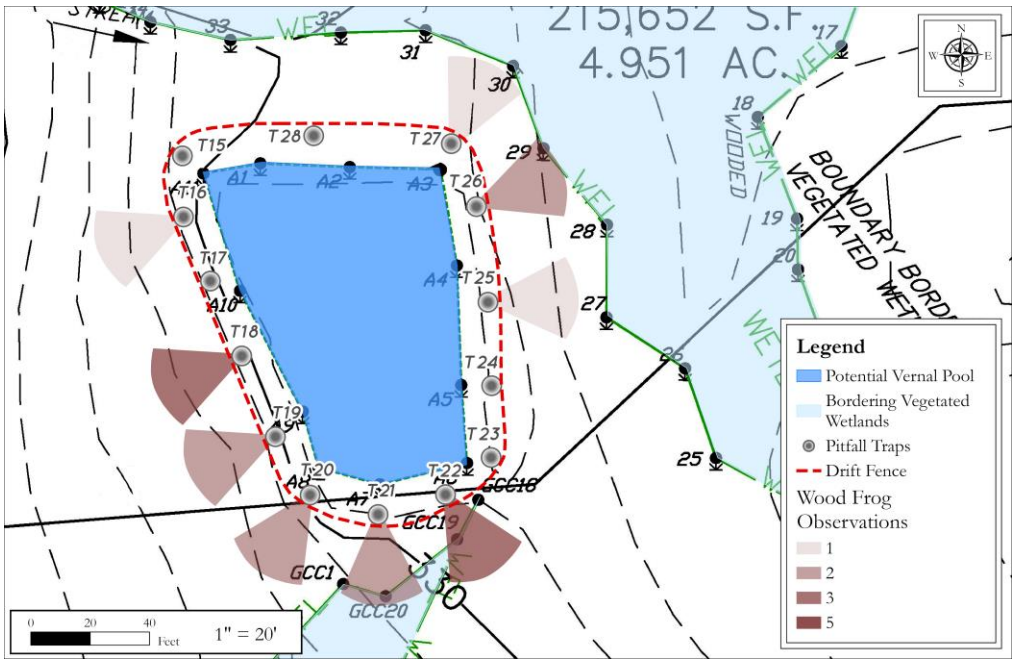


Figure 4. This graphic displays twenty-eight pitfall traps adjacent to the potential vernal pool. Each triangle corresponds to the approximate direction of wood frog migratory movement *exiting* the vernal pool.

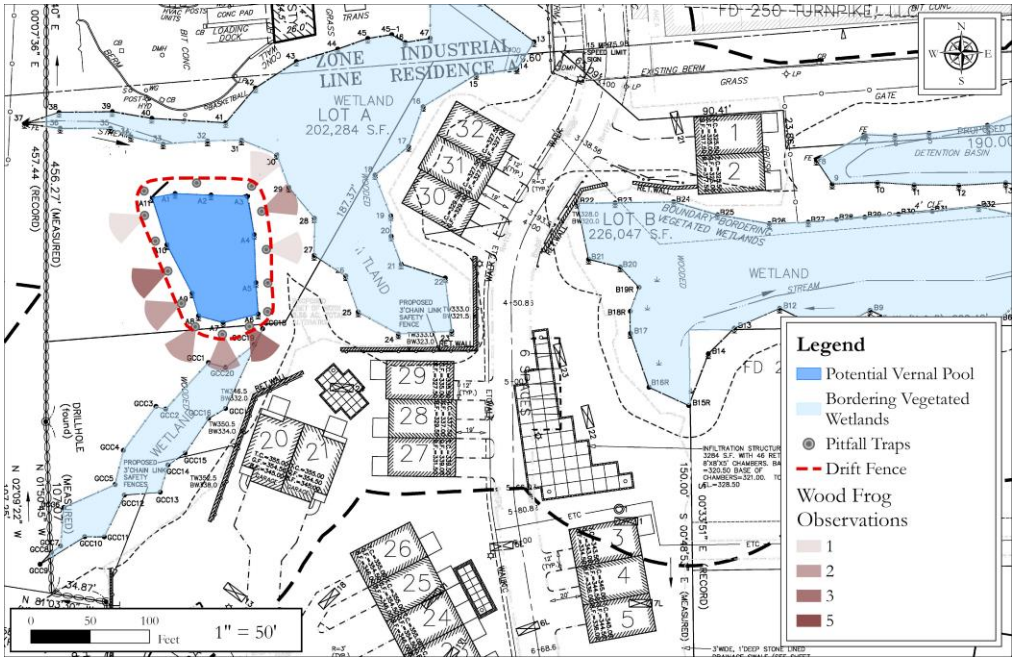


Figure 5. This graphic displays the twenty-eight pitfall traps adjacent to the potential vernal pool. Each triangle corresponds to the approximate direction of wood frog migratory movement *exiting* the vernal pool. The migratory movement is shown on the proposed site plan to demonstrate the potential impacts to wood frog migration away from the potential vernal pool.

2.3.2 Spotted Salamander (*Ambystoma maculatum*)

In total, twenty-seven spotted salamander observations (not twenty-seven individual salamanders, as noted below) were reported during the duration of the study. Sixteen of the observations were females, and eleven observations were males. Please note these observations do not correspond to individual amphibians. The same individual may have been observed both entering and exiting the potential vernal pool. **Based on the individuals observed entering the vernal pool, there are likely between 13 to 18 individuals.** Reference Figures 6 – 10 below to visualize the approximate movement of individuals during vernal pool migration.

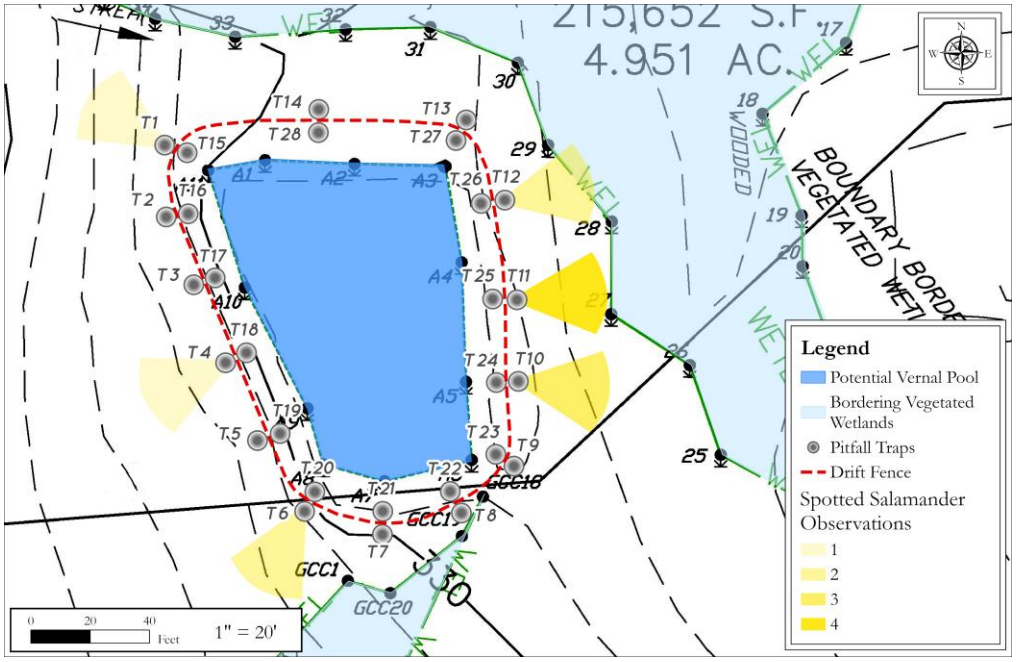


Figure 6. This graphic displays twenty-eight pitfall traps adjacent to the potential vernal pool. Each triangle corresponds to the approximate direction of spotted salamander migratory movement *entering* the vernal pool.

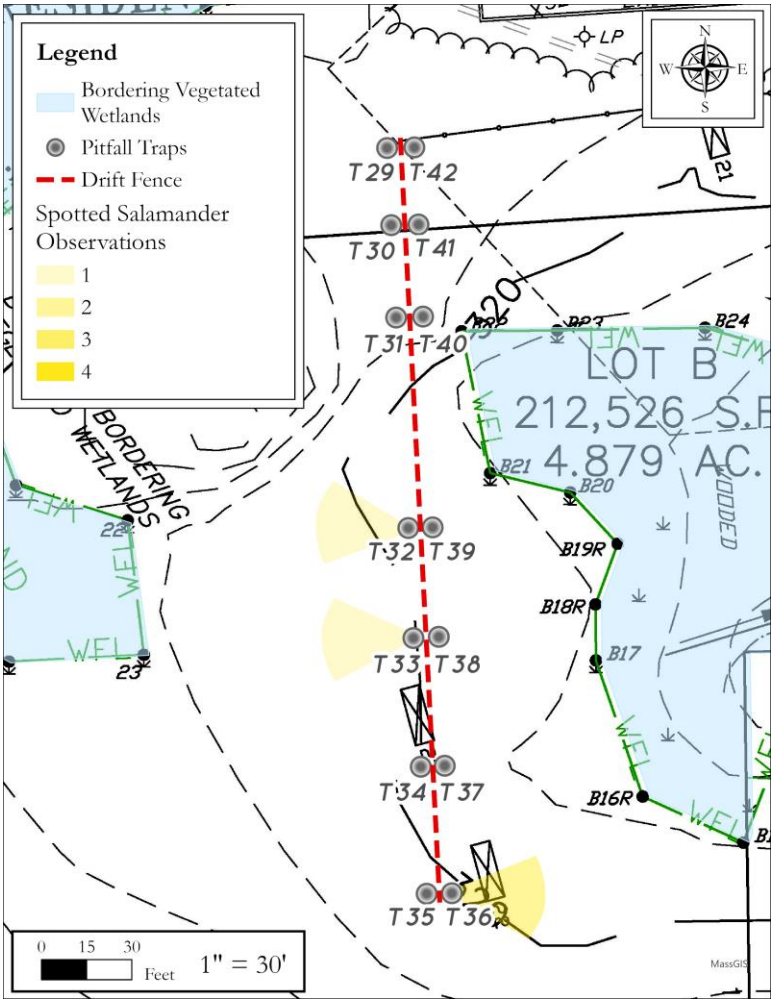


Figure 7. This graphic displays all fourteen pitfall traps adjacent to the location of the proposed roadway. Each triangle corresponds to the approximate direction of spotted salamander migratory movement across both sides of the proposed roadway.

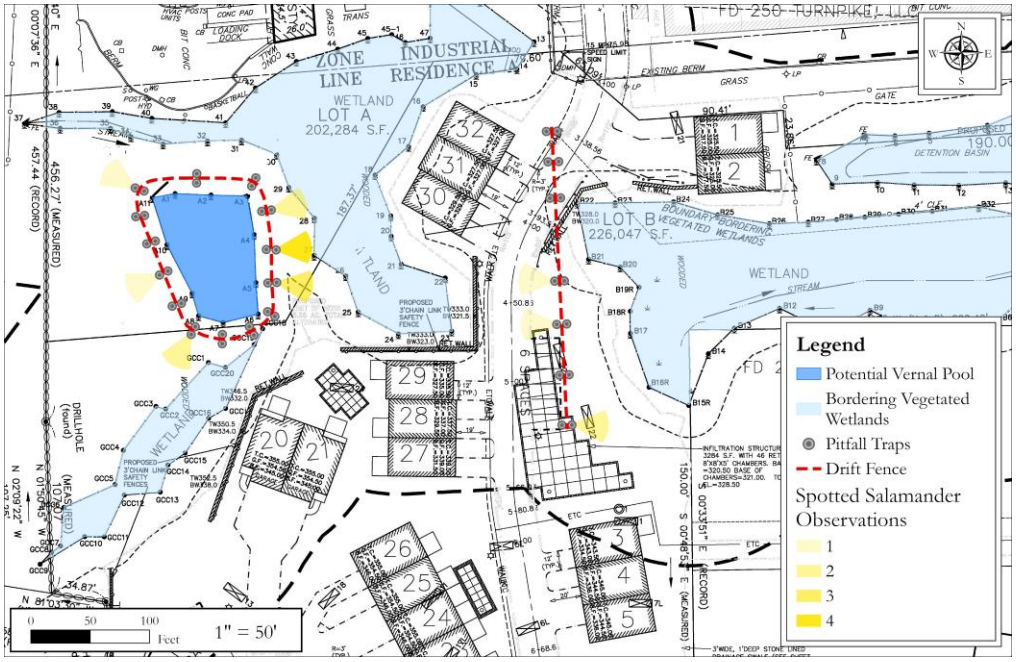


Figure 8. This graphic displays all forty-two pitfall traps adjacent to the potential vernal pool and the proposed roadway. Each triangle corresponds to the approximate direction of spotted salamander migratory movement *entering* the vernal pool. The migratory movement is shown on the proposed site plan to demonstrate the potential impacts to spotted salamander migration toward the potential vernal pool.

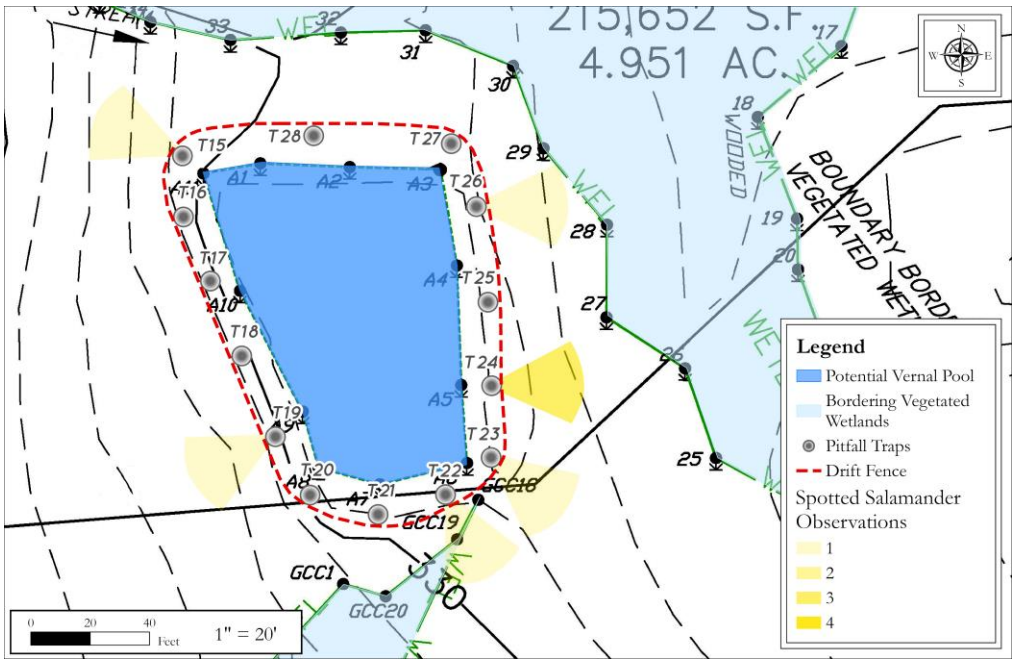


Figure 9. This graphic displays twenty-eight pitfall traps adjacent to the potential vernal pool. Each triangle corresponds to the approximate direction of spotted salamander migratory movement *exiting* the vernal pool.

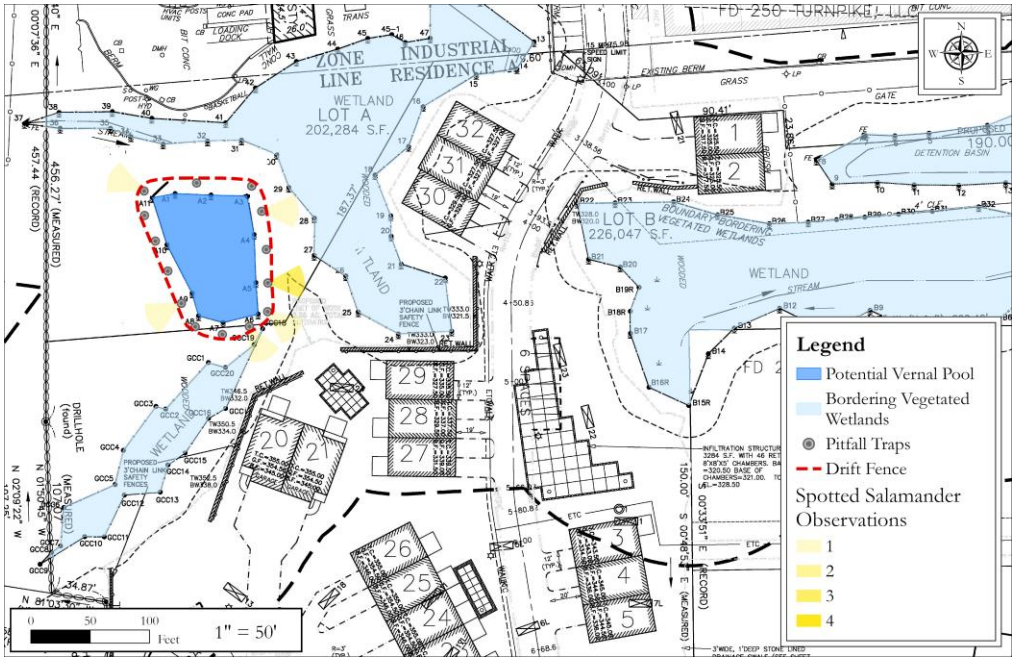


Figure 10. This graphic displays the twenty-eight pitfall traps adjacent to the potential vernal pool. Each triangle corresponds to the approximate direction of spotted salamander migratory movement *exiting* the vernal pool. The migratory movement is shown on the proposed site plan to demonstrate the potential impacts to spotted salamander migration away from the potential vernal pool.

2.3.3 Other Amphibians

In total, forty-three non-obligate amphibian observations (not forty-three individual non-obligates, as noted below) were reported during the duration of the study. The non-obligate species observed were Spring Peeper, Pickerel Frog, Green Frog, and American Toad. Please note these observations do not correspond to individual amphibians. The same individual may have been observed both entering and exiting the potential vernal pool. Reference Table 2 below for the total number of observations for each species. Reference Figures 11 – 13 below to visualize the approximate movement of individuals during vernal pool migration.

Table 2. Total Non-Obligate Species observed during the vernal pool migration study.

Non-Obligate Amphibian Species	Total Observations
Spring Peeper (*Pseudacris crucifer*)	1
Pickerel Frog (*Lithobates palustris*)	7
Green Frog (*Rana clamitans*)	34
American Toad (*Anaxyrus americanus*)	1

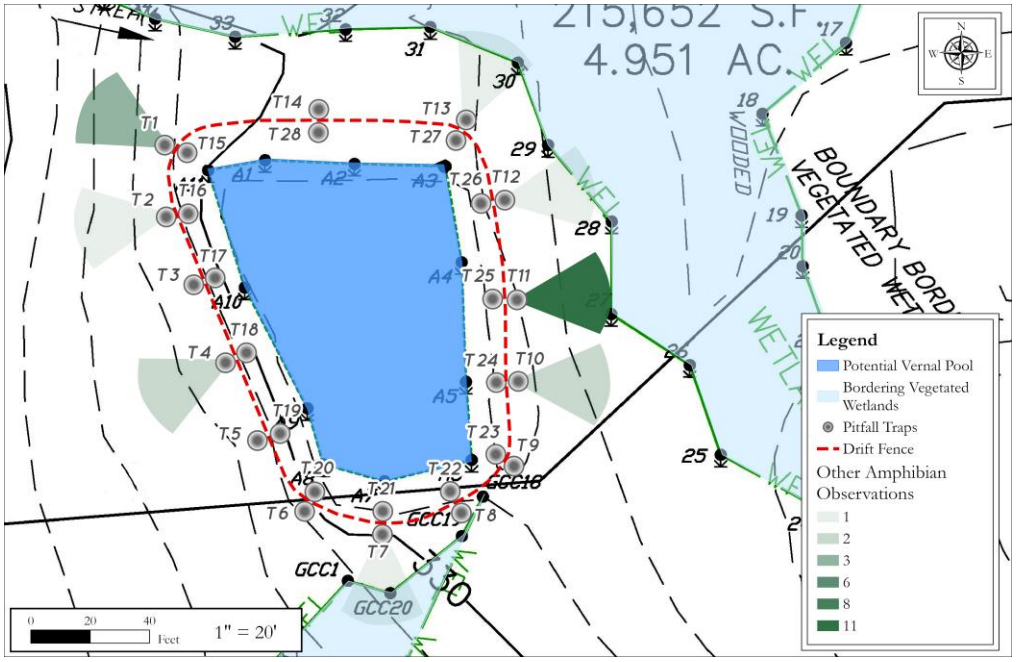


Figure 11. This graphic displays twenty-eight pitfall traps adjacent to the potential vernal pool. Each triangle corresponds to the approximate direction of non-obligate migratory movement *entering* the vernal pool.

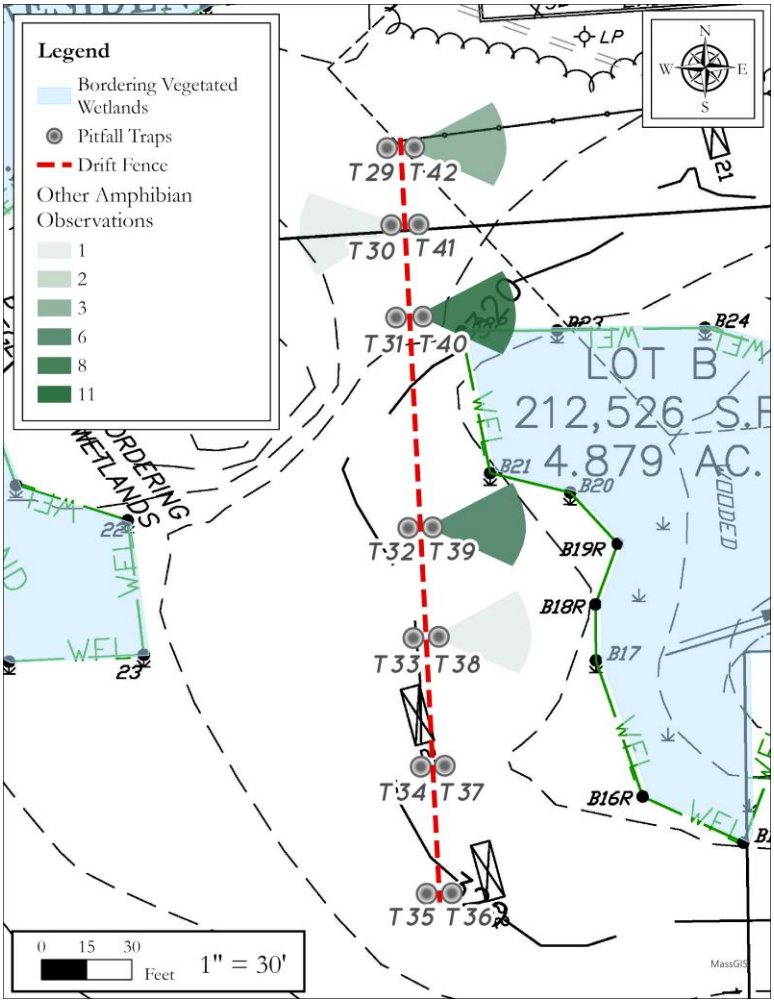


Figure 12. This graphic displays all fourteen pitfall traps adjacent to the location of the proposed roadway. Each triangle corresponds to the approximate direction of non-obligate migratory movement across both sides of the proposed roadway.

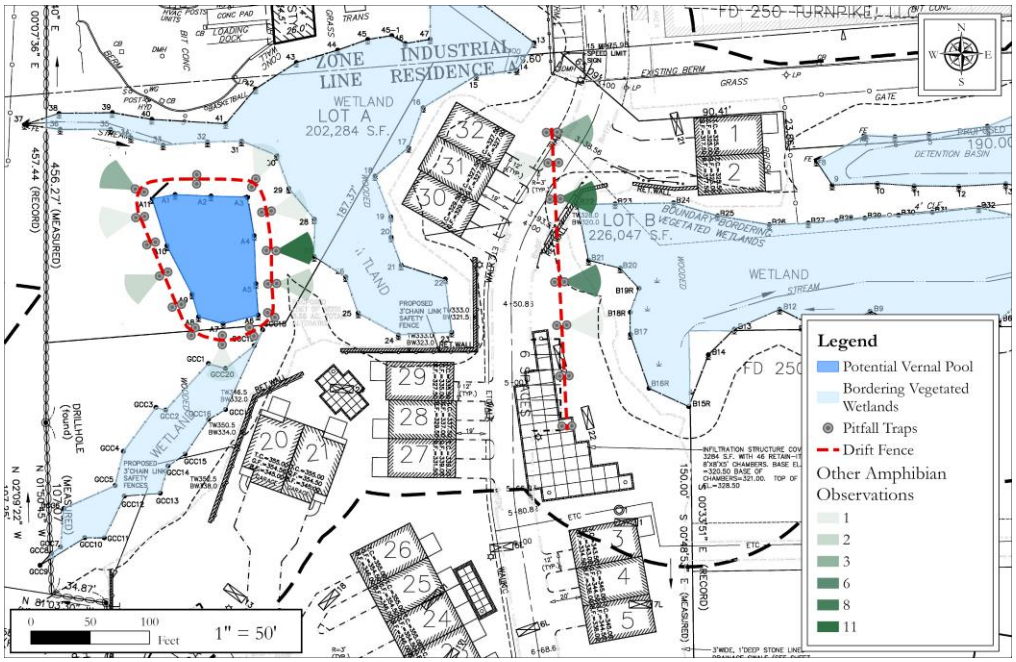


Figure 13. This graphic displays all forty-two pitfall traps adjacent to the potential vernal pool and the proposed roadway. Each triangle corresponds to the approximate direction of non-obligate migratory movement *entering* the vernal pool. The migratory movement is shown on the proposed site plan to demonstrate the potential impacts to non-obligate amphibian migration toward the potential vernal pool.

2.4 BREEDING ACTIVITY WITHIN POTENTIAL VERNAL POOL

During the duration of the study, the potential vernal pool was assessed for evidence of breeding activity including wood frogs in amplexus, salamander spermatophores, wood frog chorus, and egg masses. Many wood frogs within the pitfall traps were observed and released into the vernal pool in amplexus (Reference Photo 2). No salamander spermatophores were observed within the potential vernal pool. No wood frog chorus was observed during the day. A total of nineteen egg masses were observed within the potential vernal pool at the conclusion of the study (Reference Table 3). Egg masses were present from both of the obligate vernal pool species observed within the pitfall traps.

Photo 2. Pair of wood frogs observed in amplexus during the vernal pool migration study.

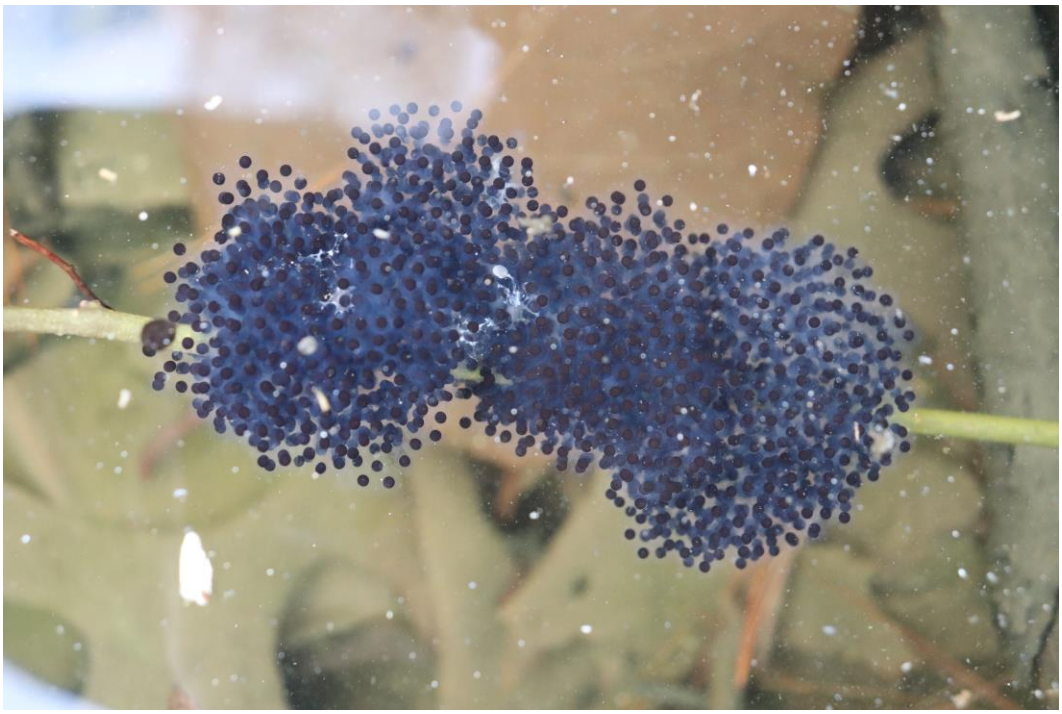


Photo 3. Wood frog egg masses observed within the potential vernal pool.

Table 3. Total amount of egg masses observed within the potential vernal pool.

Obligate Amphibian Species	**Egg Mass Observations**
Wood Frog (*Lithobates sylvaticus*)	12
Spotted Salamander (*Ambystoma maculatum*)	7
Total Egg Mass Observations	**19**

3.0 DISCUSSION

3.1 VERNAL POOLS IN DEVELOPED AREAS

Vernal pool breeding amphibians depend on both aquatic and terrestrial habitats for their life cycle. Many amphibians exhibit high breeding site fidelity, or a strong tendency to return to the same vernal pool to breed each year. Most vernal pool breeding amphibians spend less than a month in breeding pools and spend the rest of their life cycle in adjacent uplands and wetlands. Both juveniles and adults require a shaded substrate with deep organic litter and coarse woody debris. These characteristics allow for high quality forage, cover, and hibernation habitat.

The potential vernal pool of interest is a man-made stormwater feature created over thirty years ago. The stormwater detention basin collects water associated with the adjacent development. This stormwater runoff may cause many contaminants to enter the pool. According to the Best Development Practices for Conserving Pool-Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States, "stormwater detention basins and biofiltration ponds can serve as decoy wetlands, intercepting breeding amphibians moving toward vernal pools. If amphibians deposit their eggs in these artificial wetlands, they rarely survive due to the sediment and pollutant loads, as well as fluctuations in water quality, quantity, and temperature." The salamanders and frogs observed during our study likely incidentally intercepted the stormwater basin during their migration to natural vernal pools. The water quality and inconsistent nature of the pool make it unsuitable for high breeding site fidelity.

Based on the Best Development Practices for Conserving Pool-Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States, vernal pools and the surrounding "vernal pool envelope" and "critical terrestrial habitat" are all crucial to vernal pool amphibians' survival. The vernal pool envelope is defined as land within 100 feet of the vernal pool's edge and critical terrestrial habitat is defined as the land from 100 to 750 feet from the vernal pool's edge. The biological value of vernal pool must be assessed based on the ecological state of the pool and the previously defined buffers. Both spotted salamanders and wood frogs have been observed traveling from large distances to a breeding pool. Adult spotted salamanders will migrate an average of 386 feet from a vernal pool. Wood frog juveniles will disperse an average distance of 1,550 feet from their breeding pool. Adult wood frogs will migrate a maximum distance of 3,835 feet to a vernal pool. To assess the current quality of the area adjacent to the pool, a 100-foot and 750-foot buffer was added to the edge of the basin. Within the buffers, the undeveloped land was identified and compared to the total area of each buffer (Reference Figure 14). "Undeveloped" is characterized as open land largely free of roads, structures, and other infrastructure. Undeveloped land can be forested, partially forested, or open agricultural land. The area designated as the vernal pool envelope (100 foot from pool) overlaps with the existing parking lot north of the western stormwater detention basin. The adjacent building and parking lot were considered developed. Based on the vernal pool assessment guidelines outlined in the Best

Development Practices, a vernal pool envelope in good condition must consist of at least 75% of undeveloped land. Based on aerial photography, approximately 89% of the vernal pool envelope is undeveloped. However, this value is likely an overestimate considering the entirety of the potential vernal pool is a man-made stormwater feature and is highly degraded with invasive vegetation. In contrast, the critical terrestrial habitat (100-750 feet) consists of only 16 acres of undeveloped land of the total 44 acres. In other words, approximately 36% of the critical terrestrial habitat is currently undeveloped. According to the guidelines, the critical terrestrial habitat must consist of at least 50% of undeveloped land to support an ecologically significant vernal pool population.

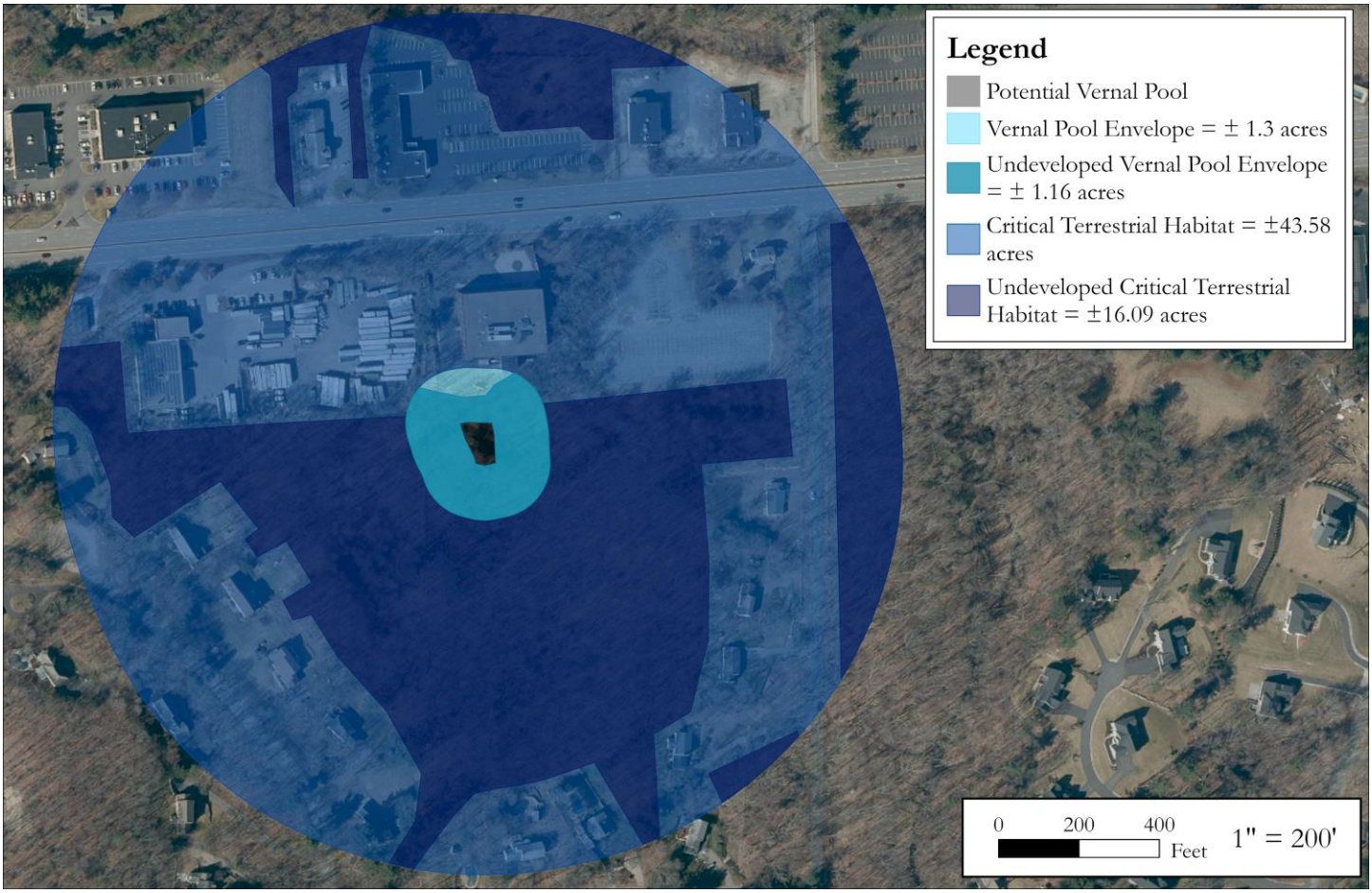


Figure 14. View of the undeveloped area near the potential vernal pool and within the vernal pool envelope (100 feet from pool) and the critical terrestrial habitat (100 to 750 from pool).

Additionally, the biological value of the pool may be assessed based on the presence of state-listed species, vernal pool indicator species, and large quantities of egg masses (25 or more). The potential vernal pool was thoroughly surveyed throughout peak breeding season and assessed for egg masses at the conclusion of the breeding season. The pool does not support any state-listed species but does support at least two or more vernal pool indicator species. However, at the conclusion of the breeding season, only 19 egg masses were observed within the pool. Based on this information, the pool does support a small population of vernal pool breeding amphibians; however, the surrounding habitat is already highly fragmented and degraded due to existing development. There are only approximately 33 to 41 obligate breeding amphibians possibly utilizing the vernal pool, and 19 of those individuals chose to deposit egg

masses. Given the artificial nature of the basin, its degraded water quality, and the limited availability of quality surrounding habitat, the site offers minimal ecological capacity for the long-term viability of obligative vernal pool amphibian populations. Although the pool shares some characteristics of vernal pool habitat, its degraded condition and lack of sufficient upland habitat likely constrain its ability to support a healthy amphibian population.

3.2 POTENTIAL IMPACTS TO VERNAL POOL SPECIES

Vernal pool species are vulnerable to a variety of anthropogenic factors, especially in developed or developing landscapes. For this particular project, several components may have adverse effects on the population of amphibians that may breed in the western stormwater detention basin.

Roadway as a Barrier: The proposed roadway may limit amphibian migration, which is crucial for reproduction and dispersal. While species like wood frogs and spotted salamanders typically travel between breeding pools and upland habitats, the small population size and poor quality of the pool and surrounding habitat suggest that the roadway's impact on migration is likely minimal and unlikely to significantly affect the species' long-term stability.

Loss of Forest Cover: The removal of forest cover near the vernal pool may impact amphibian populations due to their dependence on nearby upland habitats for shelter, foraging, and migration. While the small population and poor quality of the pool reduce the overall impact, habitat fragmentation may still limit amphibian movement and survival. The loss of vegetative cover may also reduce moisture retention, increasing stress on amphibians during dry periods.

Implications of Stormwater Basin Maintenance: The continued maintenance of the stormwater detention basin may cause threats to the potential vernal pool habitat. Regular vegetation removal around and possibly within the basin could disrupt critical habitat features for amphibians. Vegetation plays a key role in maintaining water quality, providing shelter, and supporting food sources. If vegetation is removed or degraded, the pool may no longer support viable breeding habitat.

3.3 POTENTIAL MITIGATION

Several mitigation strategies may be considered to address the potential impacts to vernal pool species and promote long-term viability of the vernal pool habitat. These measures aim to reduce or eliminate barriers to migration, restore suitable upland habitats, and maintain the ecological function of the stormwater basin.

Cape Cod Berms for the Entire Development: The project should utilize Cape Cod Berms throughout the entire development to further reduce the risk during migration events. Typically, traditional curbs may trap amphibians on roadways, increasing their exposure to vehicle mortality. These berms allow amphibians to safely navigate roadways by preventing them from getting stranded by large curbs.

Habitat Management for the Stormwater Basin: Targeted habitat management is required to ensure the stormwater basin continues to function as viable vernal pool habitat. The introduction of woody debris, such as downed logs and branches, could provide critical breeding sites for amphibians like spotted salamanders and wood frogs. Additionally, ongoing management of invasive species may help improve the quality of the vegetated buffer.
Wildlife Crossing and Fencing: One of the most effective strategies for mitigating the impact of a roadway can be the installation of a wildlife crossing under a road, coupled with permanent wildlife fencing. A crossing would allow amphibians to safely pass beneath a road during their migration periods, reducing the risk of road mortality and enabling them to access suitable breeding and upland habitats. The fencing would funnel the amphibians toward the underpass, ensuring they do not wander onto the roadway. The crossing would need to be strategically designed and located based on the estimated migration routes.

The implementation of these mitigation strategies may improve the long-term viability of the vernal pool species population and help conserve the site's ecological value for amphibians and other wildlife.

4.0 CONCLUSION

Overall, the potential vernal pool supports a relatively small number of obligate and facultative amphibian species. The pool's artificial origin, degraded water quality, and fragmented surrounding habitat substantially limits its ecological value. The presence of only 19 egg masses and fewer than 45 observed breeding amphibians indicates minimal reproductive activity, far below thresholds typically associated with ecologically significant vernal pool systems. Additionally, the critical terrestrial habitat surrounding the pool is largely developed and fails to meet state-recommended thresholds for undeveloped support area. These factors collectively suggest that the basin offers little habitat value, likely acting as a secondary or opportunistic breeding site. Therefore, large-scale mitigation strategies, such as wildlife underpasses, are not warranted due to the limited ecological value or conservation benefit they would provide for this site.

WILDLIFE HABITAT EVALUATION

5.0 INTRODUCTION

As part of the Comprehensive Permit application for this project, Goddard Consulting, LLC (Goddard) conducted a Wildlife Habitat Evaluation (WHE) as supplemental information to the permit application for the proposed work that would alter the 100-foot Buffer Zone to Bordering Vegetated Wetlands (BVW) at the above referenced site in Southborough, MA. This evaluation has been developed in response to 310 CMR 10.60 and the Southborough Wetlands Protection By-Law, primarily evaluating impacts to Buffer Zone.

The purpose of this document is to evaluate the potential for adverse effects to the wildlife habitat functions within the Resource areas and Buffer Zone associated with the proposed project and to determine what wildlife habitat functions will be lost, and if so to what degree, through the implementation of the proposed work.

6.0 METHODOLOGY

In accordance with 310 CMR 10.60 (2) (a) regarding "Wildlife Habitat Characteristics of Inland Resource Areas", study areas within the subject parcel were evaluated (topography, wildlife usage, soil structure, plant community composition and wetland structure) for their ability to provide important wildlife habitat function and value.

This evaluation was conducted following the guidelines established in the March 2006 DEP document *Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands*. Additionally, data was gathered on the plant community structure, habitat features and wildlife within the buffer zone within areas of proposed impact.

Though Buffer Zone is not defined as a wildlife habitat resource area in 310 CMR 10.60, we have conducted a habitat assessment of this resource in a similar manner as we would have for other wetland resource areas.

7.0 QUALIFICATIONS OF PREPARER

As required by 310 CMR 10.60, a qualified biologist from Goddard was on-site on April 29, 2025, to conduct this WHE, with supplemental data gathered from published soils maps and available GIS data.

The wildlife habitat assessment was conducted by Mr. Steven Riberdy, Principal Ecologist, assisted by Lead Wildlife Biologist Mr. Ryan Roseen. Mr. Riberdy is the Principal Ecologist at Goddard and has 24 years of experience in wildlife ecology, rare species assessment and study, botany, and wetland ecology/restoration. He is a Certified Wildlife Biologist ("CWB"), Professional Wetland Scientist ("PWS"), Certified Ecologist ("CE") and Certified Ecological Restoration Practitioner ("CERP"). He has extensive experience conducting wildlife habitat assessments as well as rare species studies, permitting and habitat management/conservation plans.

8.0 STUDY AREA DESCRIPTION

The proposed limit of work is located within the southern portion of a ±9.83-acre parcel of land situated on Turnpike Road in Southborough, MA. The site is primarily undeveloped and consists of a mixed deciduous dominant forest and forested wetland. The northern portion of the parcel contains two stormwater basins associated with existing buildings and parking lots. The adjacent forest area surrounding these basins is heavily degraded due to invasive vegetation. In contrast, the southern portion of the forest remains free of invasive species, maintaining more natural vegetation. The proposed development includes an access drive and thirty-two townhouse-style rental units.

According to the Massachusetts Natural Heritage and Endangered Species Program (MA NHESP), no portion of the proposed work area falls within mapped Priority or Estimated Habitat for Rare Species. The two stormwater basins located on-site may provide potential vernal pool habitat, as they exhibit the key physical and biological characteristics of vernal pools. The site is located within two Public Water Supply Watersheds, the Sudbury Reservoir and Reservoir No. 3 (Framingham), but is not mapped within a FEMA Flood Zone or Area of Critical Environmental Concern.

9.0 NATURAL COMMUNITIES

Goddard surveyed and developed a natural community assessment and identified two main natural community types across the study area, including:

- Mixed Deciduous Dominant Upland Forest (5.21-acres)
- Forested Wetland (1.55-acres)

9.1 Mixed Deciduous Dominant Upland Forest

The mixed deciduous dominant upland forest community represents the largest natural community on the site, primarily covering the southern and central portions of the site. This forest is characterized by a closed (approximately 70% cover) canopy with a relatively sparse herbaceous understory. The tree ages vary widely within this community, with most individuals ranging from small sapling to mature trees, with a diameter at breast height (DBH) between 4 and 20 inches.

The vegetative composition of the forest community is similar throughout the site. The canopy is dominated by a mix of deciduous hardwood species, including Red Maple (*Acer rubrum*), Sugar Maple (*Acer saccharum*), Scarlet Oak (*Quercus coccinea*), Northern Red Oak (*Quercus rubra*), Northern White Oak (*Quercus alba*), Shagbark Hickory (*Carya ovata*), and American Beech (*Fagus grandifolia*). The understory is sparsely vegetated, particularly in the undisturbed southern portion, where species such as Lowbush Blueberry (*Vaccinium angustifolium*) and American Witch-hazel (*Hamamelis virginiana*) are common. Herbaceous species observed in this community include Canada Mayflower (*Maianthemum canadense*), Pennsylvania Sedge (*Carex pensylvanica*), Eastern Poison Ivy (*Toxicodendron radicans*), and various lawn grasses typically found in disturbed areas. Young Eastern White Pine (*Pinus strobus*) are occasionally present in the understory but remain sparse throughout the southern portion of the site.

The northern portion of the site, particularly near the existing development and adjacent detention basins, is heavily impacted by invasive species, including Morrow's Honeysuckle (*Lonicera morrowii*), Japanese Barberry (*Berberis thunbergii*), Winged Euonymus (*Euonymus alatus*), Japanese Knotweed (*Reynoutria japonica*), Asiatic Bittersweet (*Celastrus orbiculatus*), Jetbead (*Rhodotypos scandens*), Multiflora Rose (*Rosa multiflora*), and Garlic Mustard (*Alliaria petiolata*). These invasive species contribute to a reduction in native plant diversity and disrupt natural forest succession processes, further affecting the quality of wildlife habitat within the forest.

Within the forested area, a limited number of small standing dead trees (4-10 inches DBH) are present, particularly adjacent to the western stormwater detention basin. These snags offer potential wildlife habitat, including nesting and roosting sites for birds and small mammals. These snags will not be impacted by the proposed development. Two large snags (>30 inches DBH) were also documented on-site, both of which are located within the footprint of the proposed access road and parking areas. These large snags feature three primary branches and numerous small cavities (<4 inches in diameter), with one snag containing a larger cavity (approximately 8 inches in diameter). These snags will be removed as part of the development, although two additional large snags located just west of the property boundary will remain undisturbed. Coarse woody debris is also moderately abundant throughout the upland forest, providing microhabitats for small mammals and herpetofauna, which rely on these structures for forage and shelter.

The site is located within a predominantly developed area south of Turnpike Road (Route 9), a heavily trafficked roadway in Southborough. The undisturbed portion of the upland forest is relatively small, encompassing less than 5 acres, and is surrounded by residential development, with the exception of the area adjacent to Turnpike Road. The proposed project is situated near existing disturbances along Turnpike Road and neighboring residential areas and are not expected to significantly disrupt ecological connectivity with adjacent natural habitats. Habitat connectivity from the north is limited due to the presence of Turnpike Road and commercial development. However, moderate connectivity exists to the west, south, and east, where the site is bordered by additional forested areas and residential properties.

The proposed residential development will impact a portion of the remaining undisturbed upland forest; however, these areas are limited and already affected by surrounding development. With careful planning, including selective clearing, invasive species control, and restoration of native vegetation, the project can minimize its impact on local wildlife habitat while supporting the overall ecological health of the site.

9.2 Forested Wetland

A small network of forested wetland communities encompassing approximately 1.5 acres is present within the proposed development area. This wetland complex includes three distinct Bordering Vegetated Wetlands (BVWs) and two Isolated Vegetated Wetlands (IVWs) surrounded by previously developed and undeveloped land.

The northernmost BVW is located between two areas of existing development and is bisected by a pedestrian bridge. This wetland extends southward along the northern and eastern edges of the western stormwater detention basin. The area north of the detention basin transitions into degraded stream channel with eroded banks and minimal natural vegetation. The stream flows east into the larger wetland complex and is currently undergoing ecological restoration under the guidance of the Southborough Conservation Commission. The restoration efforts may include the removal of invasive vegetation, restoration of bank stability, and reintroduction of native plant species to enhance hydrologic function and wildlife habitat.

The second BVW is located directly south of the western detention basin, and the third BVW lies to the south of the eastern detention basin. Within the eastern BVW, an additional intermittent stream originates within the delineated wetland boundary and flows west toward Parkerville Road.

Vegetation composition within these BVWs is consistent with a disturbed forested wetland community. The canopy is moderately closed (50-60% cover) and dominated by Red Maple (*Acer rubrum*) and Black Birch (*Betula lenta*), both of which are facultative-wetland species commonly associated with mesic, seasonally saturated conditions. Native herbaceous and shrub species observed include Eastern Poison Ivy (*Toxicodendron radicans*), Jewelweed (*Impatiens capensis*), Jack-in-the-Pulpit (*Arisaema triphyllum*), Skunk Cabbage (*Symplocarpus foetidus*), Sensitive Fern (*Onoclea sensibilis*), Cinnamon Fern (*Osmundastrum cinnamomeum*), Marsh Blue Violet (*Viola cucullata*), Highbush Blueberry (*Vaccinium corymbosum*). Vines present include native grape (*Vitis* spp.) and invasive Asiatic Bittersweet (*Celastrus orbiculatus*), which wraps around and strangles native plants, often killing them and taking over the surrounding habitat. The understory and shrub layer are also heavily disturbed by invasive species associated with the adjacent existing infrastructure. Dominant invasive species include Morrow's Honeysuckle (*Lonicera morrowii*), Japanese Barberry (*Berberis thunbergii*), Winged Euonymus (*Euonymus alatus*), and Multiflora Rose (*Rosa multiflora*). These invasive species reduce native plant diversity in forested wetlands by outcompeting indigenous vegetation, disrupting natural plant communities, and altering soil chemistry. As a result, habitat quality for wildlife is diminished due to the loss of native food sources, nesting areas, and shelter, leading to declines in native fauna and overall ecosystem health.

Two isolated vegetated wetlands, currently functioning as stormwater detention basins, are located south of both parking areas. These man-made basins exhibit key physical and biological characteristics consistent with vernal pool habitat as defined by the Massachusetts Natural Heritage & Endangered Species Program. Physically, the basins are seasonally inundated, lack a natural permanent inlet or outlet, and do not support fish populations. Biologically, the basins provide breeding habitat for obligate vernal pool amphibians. Documented field observations include egg masses and larvae from Wood Frogs (*Lithobates sylvaticus*) and Spotted Salamanders (*Ambystoma maculatum*). These species rely exclusively on fishless, temporary pools to complete their life cycles, and their presence is a strong indicator of functional vernal pool ecology.

Given the current condition of the on-site forested wetlands, including the presence of invasive species, historic disturbances, and proximity to existing development, the proposed roadway and townhouse development within the Buffer Zone is not expected to result in significant additional impacts to wetland resource areas. All proposed work will occur outside the wetland boundaries, and with appropriate erosion controls, native plantings, and buffer zone management, the project can minimize impacts to the ecological function of the adjacent wetlands.

10.0 HABITAT CONTEXT

Overall, the project site is located within a predominantly developed residential area and is bordered to the north by Route 9, a heavily trafficked roadway that limits broader habitat connectivity. However, the southern, eastern, and western portions of the site have potential limited connectivity to nearby forested patches adjacent to residential areas, allowing for localized wildlife movement and seasonal dispersal. The presence of upland forest, forested wetlands, and potential vernal pools supports habitat functions for amphibians, birds, and small mammals navigating this fragmented landscape. Movement of reptiles and amphibians into the site is expected to be moderate as the permeability of the surrounding landscape is average for these taxa. Aquatic

connectivity between the site and off-site areas is low. By designing the development within previously disturbed areas and maintaining natural vegetation along site edges, the project can preserve what remains of these localized migratory pathways and ecological connections.

11.0 IMPACT ASSESSMENT

Impact Area (Buffer Zone)

The primary direct habitat impacts to buffer zone include the loss of forest cover/habitat. This would result in the local (area of cutting) loss of canopy trees and associated forage and cover for passerine birds and arboreal mammals. Some of the early successional habitat which provides cover for mammals and potential nesting and perching trees for songbirds in this forested habitat would also be lost where cutting occurs.

Overall, the impact from the removal of trees is small in the overall context of the larger area. However, these habitats and features are present throughout the wider forested habitats. No special or unique habitats or habitat features were found on or proximal to the areas of impact. It is unlikely that the location of the proposed project would adversely affect the overall migratory patterns through the site.

The following is an overview of the likely effect across the entire site on the different taxa and groups of wildlife expected.

Passerine Birds: The overall effect to this group of taxa includes a limited loss of forage, shelter, and breeding sites (mature trees) for forest and cavity nesting species. The effect on shrub nesting and edge species and foraging sources would be neutral to positive over the long term as the expansion of these edge and shrub dominant habitats would favor these individuals post cutting.

Raptors: Minimal impact due to the absence of mature forest structure; perching and hunting opportunities are abundant in the surrounding area.

Waterfowl: No impact anticipated due to a lack of suitable open water habitat within the work area.

Small Mammals: Work for this project would reduce the overall availability of cover and foraging habitat, however this would be minor in the context of the natural areas surrounding the site. The impacts may be more apparent in the buffer zone areas.

Aquatic and Semi-Aquatic Mammals: There is likely no effect to these species.

Large Mammals: Large mammal use of the site will be affected where the clearing occurs as this will reduce some areas for cover and forage. Ample areas are present on site and in the surrounding area. Nothing within the area of impact was noted to be special or unique habitat for larger mammals.

Amphibians: Overall, effects on amphibians are likely small. The site supports two stormwater basins exhibiting physical and biological characteristics of vernal pools, including confirmed breeding activity by Wood Frogs (*Lithobates sylvaticus*) and Spotted Salamanders (*Ambystoma maculatum*). These amphibians rely on nearby upland forest for most of their life cycle and migrate seasonally to breeding pools. The proposed access road could act as a minor barrier to amphibian movement between these upland areas and breeding habitat, particularly during early spring migration. However, given the limited footprint of the road and the availability of adjacent undisturbed forested corridors, the impact is expected to be minor. To further reduce risk, construction timing should avoid peak migration periods, and wildlife-friendly erosion controls (e.g., exclusion fencing) could be implemented to guide amphibians safely around the work zone. Preserving upland habitat adjacent to these basins is critical to maintaining amphibian populations and should be considered in project design and mitigation strategies.

Reptiles: Overall, reptile use of the site would be limited, particularly in the upland areas. Garter snakes and brown snakes are likely inhabitants of the site, and they will continue to inhabit the similar habitat that remains adjacent to the site. There would be no expected effect on aquatic reptiles (water snakes, turtles).

Noise would be expected due to construction activity. In this situation, the noise is temporary and persists only during working hours. Most likely, wildlife will naturally adjust to the overall disruption and migrate to the fragmented forests adjacent to the limit of work.

12.0 MITIGATION

Several enhancements or mitigation opportunities could be implemented to reduce impacts or restore affected areas more quickly and provide mitigation for the temporary change of some habitat features and increase the overall usefulness of the site for wildlife post development. These potential wildlife habitat enhancement opportunities are summarized below.

- Replanting native shrubs and trees in areas of upland forest to speed the regeneration to shrub habitats.
- Placement of nest boxes along the tree lines to provide nesting opportunities for cavity-nesting passerine birds and bats.
- Targeted removal of invasive plant species and replacement with native vegetation.
- Increasing coarse woody debris in adjacent upland and wetland resource areas to increase forest floor structural diversity and create microhabitats from ground dwelling fossorial species.

13.0 SUMMARY

Overall, wildlife habitat impacts associated with the proposed project are expected to be minor when considered in the context of the surrounding developed landscape. The loss of some upland forest cover, including mature trees and understory vegetation, will reduce local habitat quality, primarily affecting small and large mammals as well as some forest-nesting birds. The proposed access road may slightly disrupt amphibian movement between upland areas and potential vernal pool habitats, though these effects are limited in scale and can be mitigated. While the site does contribute to localized ecological connectivity, the project is not expected to significantly alter migratory patterns or the site's overall ability to support common wildlife species.

References

Calhoun, A.J.K., and M.W. Klemens. 2017. *Best Development Practices for Conserving Pool-Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States*. Maine Audubon Society/University of Maine. Available at: https://maineaudubon.org/wp-content/uploads/2017/03/Best-Development-Practices-Conserving-Pool-breeding-Amph.pdf

Conant, R., and J.T. Collins. 1998. Peterson field guides, reptiles, and amphibians of eastern and central north America. Houghton Mifflin Company. Boston.

DeGraaf, R.M. and M. Tamasaki. 2001. New England Wildlife. University Press of New England. Hanover, NH.

DeGraaf, R.M. and M. Tamasaki, W. Leak, A. Lester. 2006. Technical Guide to Forest Wildlife Habitat Management in New England. University of Vermont Press. Burlington, VT.

Ernst, E., and J. Lovich, R. Barbour. 2000. Turtles of the US and Canada. Smithsonian.

Ernst, C., and E. Ernst. 2003. Snakes of the U.S. and Canada. Smithsonian.

Kurta, A. 1995. Mammals of the Great Lakes Region. The University of Michigan Press. Ann Arbor.

MA DEP. 2006. Massachusetts Wildlife Habitat Protection Guidance for Inland Wetlands.

Petranka, J. 1998. Salamanders of the U.S. and Canada. Smithsonian.

Sorrie, B and P. Somers. 1999. The Vascular Plants of Massachusetts: A County Checklist. NHESP.

Thompson, E., and R. Sorenson. 2000. Wetland, Woodland, Wildland. The Nature Conservancy. Hanover.

Sincerely,

Steven Riberdy, MS, PWS, CWB, CE, CERP, PSS
Principal Ecologist, Regional Manager

Ryan Roseen
Lead Wildlife Biologist

Attachments
Site Locus, Natural Communities, and Plan Overlay Maps
MassDEP Wildlife Habitat Evaluation Forms

Site Photos

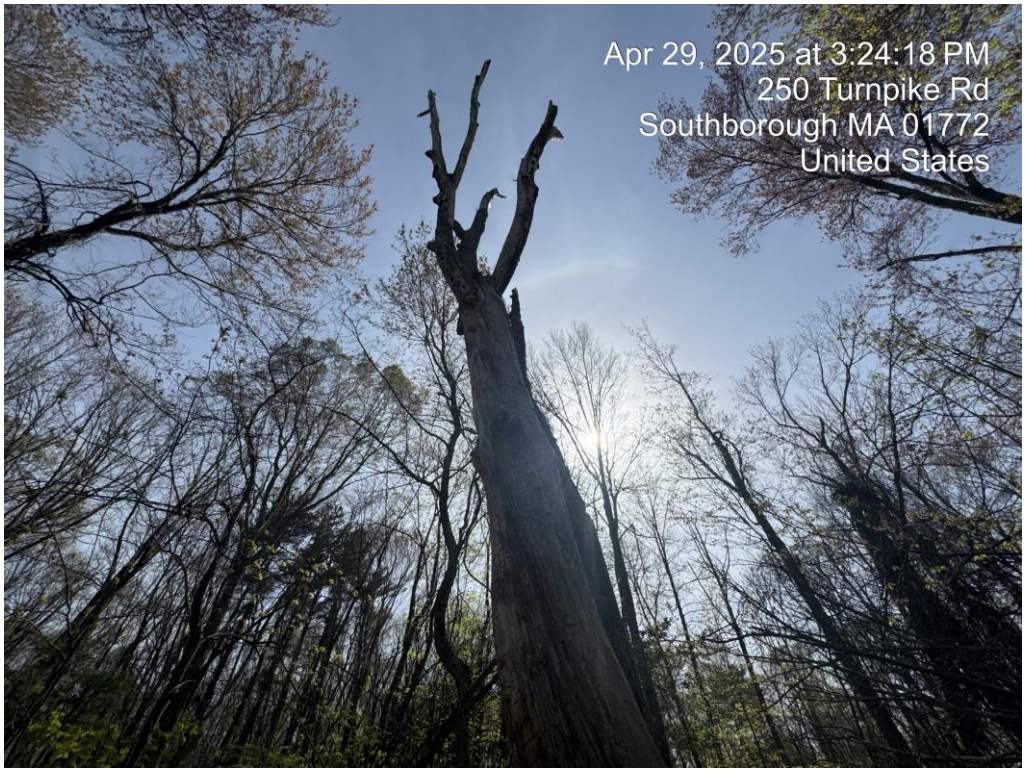
View of western stormwater detention basin, or the potential vernal pool.

View of the forested upland west of the western detention basin.

View of the forested wetland located south of the western detention basin.

View of the forested wetland located east of the western detention basin.

View of one of the large snags within the limit of work.



View of the other large snag within the limit of work.

View of the forested uplands between the wetland systems, within the area of the proposed roadway.

View of the forested wetlands south of the eastern detention basin, or east of the proposed roadway.

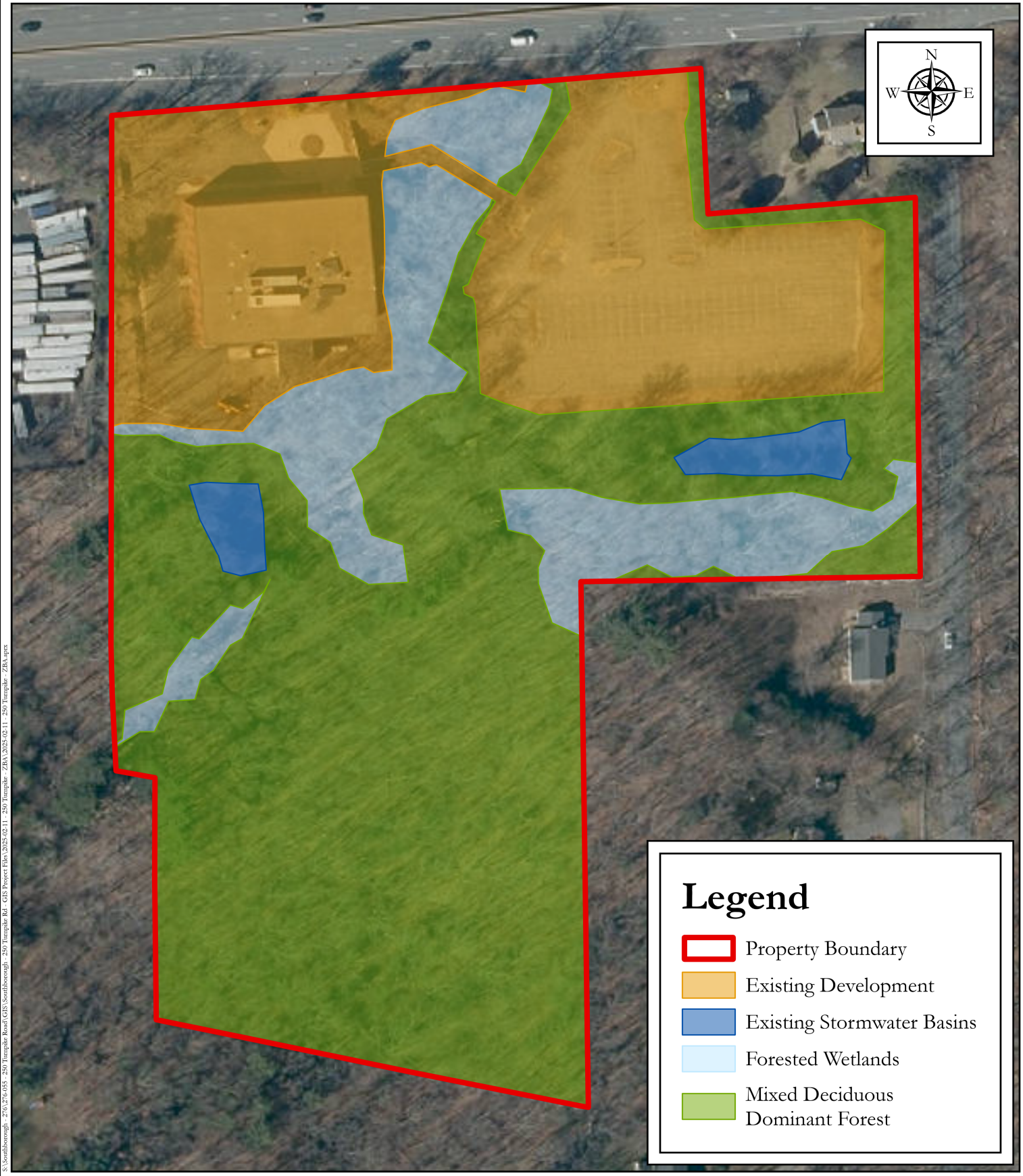
View of the forested wetland and the internal intermittent stream located on the eastern portion of the site.

View of the forested upland southwest of the eastern BVW.

View of the forested uplands south of the western BVWs.

View of the eastern stormwater detention basin.

View of the developed area north of the eastern detention basin.



S:\Southborough - 276\276-055 - 250 Turnpike Road\GIS\Southborough - 250 Turnpike Rd - GIS Project Files\2025-02-11 - 250 Turnpike - ZBA\2025-02-11 - 250 Turnpike - ZBA.aprx

GODDARD CONSULTING
Strategic Ecological Consulting

Natural Communities Map

0 75 150 Feet

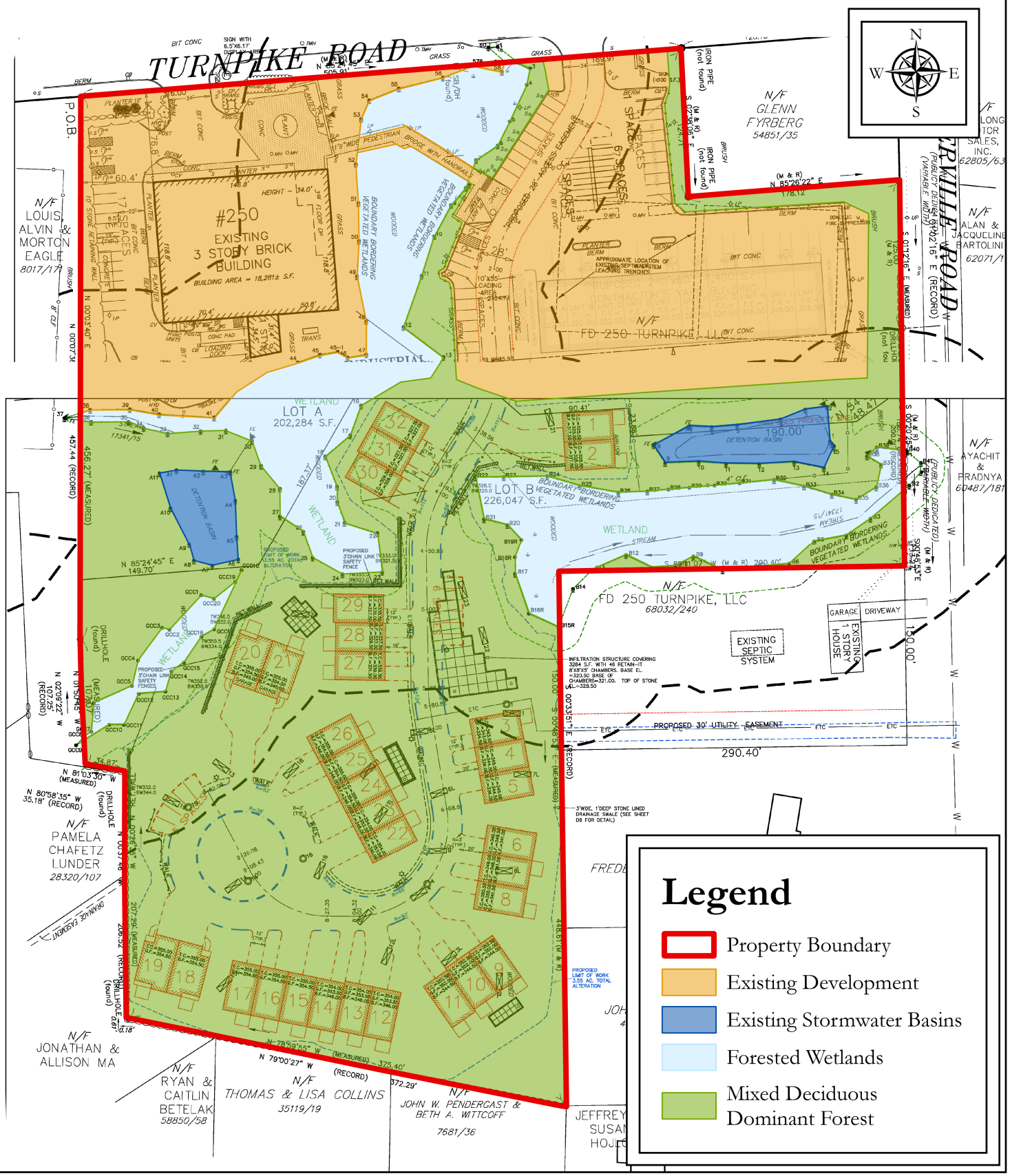
1" = 150'

71.5374406°W, 42.2894515°N

Date: 05/04/2025

250 Turnpike Road
Southborough, MA 01772

Parcel ID: 27-46, 27-2A



GODDARD CONSULTING
Strategic Ecological Consulting

Natural Communities Map with Plan

0 75 150 Feet

1" = 150'

71.5374406°W, 42.2894515°N

Date: 05/04/2025

250 Turnpike Road
Southborough, MA 01772

Parcel ID: 27-46, 27-2A

S:\Southborough - 276\276.055 - 250 Turnpike Road\GIS\Southborough - 250 Turnpike Rd - GIS Project Files\2025-02-11 - 250 Turnpike - ZBA\2025-02-11 - 250 Turnpike - ZBA.aprx

Appendix B: Detailed Wildlife Habitat Evaluation
Part 2: Field Data Form
(For each wetland or non-wetland resource area)

I. GENERAL INFORMATION

Project Location (from NOI page 1): 250 Turnpike Rd, Southborough, MA 01772

Impact Area (number/name): 100-foot Buffer Zone to Bordering Vegetated Wetlands (±61,124 SF)

Date(s) of site visit(s) and data collection: April 29, 2025

Weather conditions during site visit (if snow cover, include depth): Sunny, Clear Skies, Low 80s

Date this form was completed: April 30, 2025

Person completing form per 310 CMR 10.60(1)(b): Steven Riberdy, Ryan Roseen

The information on this data sheet is based on my observations unless otherwise indicated

Signature: 

II. SITE DESCRIPTION **(complete A or B under Classification – see instructions for full description)**

A. Classification

1. <u>For Wetland Resource Areas, complete the following</u>: *There are no proposed impacts to Wetland Resource Areas.*

System		**Subsystem**		**Class**		**Subclass**	

Hydrology/Water Regime:

☐ Permanently flooded
☐ Intermittently exposed
☐ Semi-permanently flooded
☐ Intermittently flooded (Banks)
☐ Saturated (BVW Areas)
☐ Temporarily flooded
☐ Seasonally flooded
☐ Artificially flooded

2. <u>For Riverfront or Bordering Land Subject to Flooding Resource Areas, complete the following</u>:
Use a terrestrial classification system such as one of the two listed below:

a. "Classification of the Natural Communities of Massachusetts (Draft)" by Patricia C. Swain and Jennifer B. Kearsley, MA DFW NHESP, Westborough, MA. July 2000. (www.mass.gov/dfwele/dfw/nhsep/nhclass.htm)
b. "New England Wildlife: Habitat, Natural History, and Distribution" by Richard M. DeGraaf and Deborah D. Rudis, USDA Forest Service, Northeastern Forest Experiment Station. General Technical Report NE-108. August 1992. 491 pages.

Community Name: N/A

Vegetation Description: N/A

Physical Description: N/A

B. Inventory (Plant Community)

% Cover: Trees: 68% Shrub: 20% Vine: 2% Moss: 0%

Grass: 5% **Forbs: 5%** **Sub Aquatic: 0%** **Emerg Aquatic: 0%**

Forest Age: ☐ 1-4" dbh 0% ☐ 4-10"dbh 0% ☐ 10-20" dbh 0% ☐ 20"+ dbh 0% ☒ Uneven Age

Description**:** ___One large Beech Tree, otherwise generally 4-10" dbh Maples, Oaks, & Hickory; Limited Pine___

Canopy Closure: ☐Very Open (<15%) ☐Open (15-30%) ☐Intermediate (31-70%) ☒Closed (70%+)

Litter Layer: ☐ Exposed Soil ☒Litter/Moss ☒Rocky ☐Organic

Other: _____

Plant Lists (species that comprise 10% or more of the vegetative cover in each strata; "*" designates a dominant plant species for the strata "INV" denotes invasive species "R" denotes a state/federally protected species): Strata = Trees, Shrubs, Herb, and Vines

Strata	**Plant Species**	**Strata**	**Plant Species**
Tree	Red Maple*	**Herb**	Hay-scented Fern
	Sugar Maple*		Cinnamon Fern
	Eastern White Pine		Eastern Poison Ivy*
	Northern Red Oak*		Virginia Creeper
	White Oak*		Lawn Grass
	Shagbark Hickory		Canada Mayflower*
	Black Birch		Pennsylvania Sedge
	American Beech		Garlic Mustard INV
	Scarlet Oak		
	Gray Birch		
Shrub	Morrow's Honeysuckle* INV	**Vines**	Grape sp.
	Multiflora Rose INV		Asiatic Bittersweet INV
	Highbush Blueberry		Virginia Creeper
	Lowbush Blueberry*		Eastern Poison Ivy
	American Witch-hazel*		
	Japanese Barberry* INV		
	Winged Euonymus INV		
	Japanese Knotweed* INV		
	Jetbead INV		
	Maleberry		
	Black Raspberry		

Notes: _____Invasive Species only exist in northern portion of site adjacent to existing basins. _____

C. Inventory (Soils, Topography, and Geology)

Soil Survey Unit(s):	Drainage Class:	Texture (upper):
Woodbridge fine sandy loam, 3 to 8 percent slopes (310B)	Moderately well drained	Fine sandy loam
Woodbridge fine sandy loam, 0 to 8 percent slopes, very stony	Moderately well drained	Fine sandy loam

Canton fine sandy loam, 3 to 8 percent slopes	Well drained	Fine sandy loam
Canton fine sandy loam, 8 to 15 percent slopes	Well drained	Fine sandy loam
Canton fine sandy loam, 0 to 8 percent slopes, extremely stony	Well drained	Fine sandy loam

Depth to bedrock: 0-2'
Duff/Leaf Litter Depth: 0-2"

Surface stones/boulders: Present

Hydrology: ☐ Xeric ☐ Mesic, Dry ☒ Mesic ☒ Mesic Wet
☐ Hydric ☐ Peat/Muck ☐ Inundated/Aquatic

Soil Fertility: ☐ Rich-Calcific ☐ Rich-Alluvial ☒ Circumneutral ☐ Acidic ☐ Agricultural

Average Site Elevation: ±344 feet

Slope Aspect: ☐N ☒NE ☐E ☐SE ☐ S ☐SW ☐W ☐NW ☐Flat

Slope: ☒ Flat <5% ☐ Gentle (5-10%) ☐ Average(10-20%) ☐ Rather Steep(20-30%)
☐ Steep (30-45%) ☐Very Steep (45-60%) ☐ Abrupt (>60%)

Bedrock Geology: ☒ Granite ☐ Basalt ☐ Sedimentary ☐Limestone/marble
☐Other_____

Surficial Geology:

Check all landforms that apply:

☐ Summit	☐ Upper Slope	☐ Mid Slope	☐ Lower Slope
☐ Rolling Terrain	☐ Floodplain	☒ Wetland	☐Shore/Bank
☐ Drumlin	☐Ground Moraine	☐Ridge	☐Floodplain
☐ Outwash	☐ Kame Terrace	☐Esker	☐Kettle Pond
☐Talus	☒ Till	☒ Exposed Bedrock	☐Floodplain Alluvium
☐ Sorted Outwash	☐Coarse Outwash		

III. IMPORTANT HABITAT FEATURES (complete for all resource areas)
If the following habitat characteristics are present, describe & quantify them on a separate sheet & attach.

Wildlife Food

Important Wetland/Aquatic Food Plants (smartweeds, pondweeds, wild rice, bulrush, wild celery)

☐ Abundant ☐ Present ☒ Absent

Important Upland/Wetland Food Plants (**hard mast**) – Hickory, Oaks, Beech

☒ Abundant ☐Present ☐ Absent

Important Upland/Wetland Food Plants (**fruit/berry/seed**)

☒ Abundant ☐Present ☐ Absent

Shrub thickets or streambeds with abundant earthworms (American woodcock)

☐ Present ☒ Absent

Shrub and/or herbaceous vegetation suitable for Veery nesting ☐ Present ☒ Absent

Number of trees (live or dead) > 30" DBH: 2

Number of trees (live or dead) **impacted** > 30" DBH: 2

Number (or density) of Standing Dead Trees (potential for cavities and perches):

Impacted	**Total**	
0	3	6-12" DBH
0	1	12-18" DBH
0	1	18 - 24" DBH
2	2	>24" DBH

Number of tree cavities in trunks or limbs of:

Impacted	**Total**	
1	1	6-12" diameter (e.g., tree swallow, saw whet owl, screech owl, bluebird, other songbirds)
0	0	12-18" diameter (e.g., hooded merganser, wood duck, common goldeneye, mink)
0	0	>18" diameter (e.g., hooded merganser, wood duck, common goldeneye, common merganser, barred owl, mink, raccoon, fisher)

Small mammal burrows: ☐ Abundant ☒ Present ☐ Absent

Cover/Perches/Basking/Denning/Nesting Habitat

- ☐ Dense herbaceous cover (voles, small mammals, amphibians & reptiles)
- ☒ Large woody debris on the ground (small mammals, mink, amphibians & reptiles)
- ☐ Rocks, crevices, logs, tree roots or hummocks under water's surface (turtles, snakes, frogs)
- ☒ Rocks, crevices, fallen logs, overhanging branches or hummocks at, or within 1m above the water's surface (turtles, snakes, frogs, wading birds, wood duck, mink, raccoon)
- ☐ Rock piles, crevices or hollow logs suitable for: **(_____)**
  - ☐ otter ☐ mink ☐ porcupine ☐ bear ☐ bobcat ☐ turkey vulture
- ☐ Live or dead standing vegetation overhanging water or offering good visibility of open water (e.g., osprey, kingfisher, flycatchers, cedar waxwings)

IMPORTANT HABITAT CHARACTERISTICS *(if present, describe & quantify them on a separate sheet)*

Medium to large (>6"), flat rocks within a stream (cover for stream salamanders and nesting habitat for spring & two-lined salamanders)	☐ present	☒ absent
Flat rocks and logs on banks or within exposed portions of streambeds (cover for stream salamanders and nesting habitat for dusky salamanders)	☐ present	☒ absent
Underwater banks of fine silt and/or clay (beaver, muskrat, otter)	☐ present	☒ absent
Undercut or overhanging banks (small mammals, mink, weasels)	☐ present	☒ absent
Vertical sandy banks (bank swallow, kingfisher)	☐ present	☒ absent
Areas of ice-free open water in winter	☐ present	☒ absent

Groundwater seeps/springs present ☐ present ☒ absent

Mud flats ☐ present ☒ absent

Exposed areas of well-drained, sandy soil suitable for turtle nesting ☐ present ☒ absent

Sphagnum hummocks or mats, moss covered logs or saturated logs, overhanging or directly adjacent to pools of standing water in spring (four-toed salamander): ☐ present ☒ absent

Estimated percent of viable upland habitat within 400' of nesting areas:_____%

WILDLIFE DENS/NESTS *(If present, describe & quantify them on the back of this sheet)*

Turtle nesting sites: ☐ present ☒ absent

Bank swallow colony: ☐ present ☒ absent

Nest(s) present of: ☐ Bald Eagle ☐ Osprey ☐ Great blue heron

Den(s) present of: ☐ Otter ☐ Mink ☐ Beaver

Project area is within:

- ☐ 100' of beaver, mink or otter den, bank swallow colony or turtle nesting area
- ☐ 200' of Great Blue Heron or osprey nest(s)
- ☐ 1400' of a Bald Eagle nest
- ☐ Trees suitable as Bald Eagle Habitat (~>30"DBH/supercanopy) Number:_____

EMERGENT WETLANDS *(If present, describe & quantify them on a separate sheet)*

Emergent wetland vegetation at least seasonally flooded during the growing season (wood duck, green heron, black-crowned night heron, king rail, Virginia rail, coot, etc.)

Flooded > 5 cm ☐ present ☒ absent

Flooded > 25 cm (pied-billed grebe) ☐ present ☒ absent

Persistent emergent wetland vegetation at least seasonally flooded during the growing season (mallard, American bittern, sora, common snipe, red-winged blackbird, swamp sparrow, marsh wren)

Flooded > 5 cm ☐ present ☒ absent

Flooded > 25 cm (least bittern, common moorhen) ☐ present ☒ absent

Cattail emergent vegetation at least seasonally flooded during the growing season

Flooded > 5 cm (marsh wren) ☐ present ☒ absent

Flooded > 25 cm (least bittern, common moorhen) ☐ present ☒ absent

Fine-leafed emergent wetland vegetation (grasses and sedges) at least seasonally flooded during the growing season (common snipe, spotted sandpiper, sedge wren)

Flooded > 5 cm ☐ present ☒ absent

Flooded > 25 cm (least bittern, common moorhen) ☐ present ☒ absent

Notes:

_____

_____

VERNAL POOLS *(if present, describe & quantify them on a separate sheet)*

Depressions that may serve as seasonal pools: ☒ present ☐ absent (if absent skip to next section)

Evidence of Inlet or Outlet: ☐Absent ☒Present

Evidence of Fishlessness ☐Absent ☒Present

Evidence of Breeding activity: ☐Absent ☒Present

Vernal pool part of larger complex: ☐Yes ☒No

Evidence of Pool Dry: ☒Absent ☐Present

Vertical Stratification of Pool Habitat: ☐None ☒Poor ☐Good

Adjacent hummocks, saturated/moss logs: ☐Absent ☒Present

Obligate Species Present: ☒Wood Frog ☒Spotted Salamander ☐Marbled Salamander ☐Blue-spotted Salamander ☐Jefferson Salamander ☐Eastern Spadefoot Toad ☐Fairy Shrimp

☒Egg masses present Describe:__7 Spotted Salamander, 12 Wood Frog in Western Basin___

☐Facultative Species Describe:__Spring Peeper, American Toad_____

Vernal Pool vegetation: ☐None ☐Aquatic/emergent ☒Forb ☒Shrub ☐Tree

Estimated Hydroperiod: ☐Ephemeral (<2 mo) ☒Short cycle (2-4 mo) ☐Long cycle (4-8 mo) ☐Semi-permanent pond (1-3 years) ☐Pond

Upland Habitat Viability (w/in 500' of pool): ☐ Compromised (<25% remains) ☐ Degraded (26-50% remains) ☒ Disturbed (51-75% remains) ☐ Good (76-99% remains) ☐ Undisturbed (100% remains)

Standing water present at least part of the growing season, suitable for use by:

☒ breeding amphibians ☒ non-breeding amphibians (foraging, rehydration)

☐ turtles ☒ foraging waterfowl

Notes: Mallard & Wood Ducks have been observed foraging within pool.

LACUSTRINE HABITATS *(If present, describe & quantify them on a separate sheet)*

Bank stability: ☐ Stable <5% eroded ☐ Mod. Stab. 5-30% ☐ Mod. Unstab. 30-60% ☐ Unstab >60%

Bank composition: ☐ Vegetation ____% ☐ Soil/mud ____% ☐ Rocky ____% ☐ Other ____%

Vegetative protection (bank): ☐ >90% native ☐ 70-90% native ☐ 50-70% native ☐ <50% native

Riparian zone width (natural): ☐ >60 feet ☐ 60-40 feet ☐ 40-20 feet ☐ <20 feet

Bordering habitats: ☐ Emergent wetland ☐ Forested wetland ☐ Upland forest ☐ Developed ☐ Grassland ☐ Wet meadow ☐ Early success. ☐ Other

Trophic classification: ☐ Oligotrophic ☐ Mesotrophic ☐ Eutrophic

Estimated average width of littoral zone: _____ft.

Water source: ☐ Streams ☐ Groundwater ☐ Surface runoff ☐ Artificial

Discharge: ☐ Streams ☐ Groundwater ☐ Artificial

Basin status: ☐ Water fills basin ☐ >75% full ☐ 75-25% full ☐ <25% full

Algae cover: ☐ <25% ☐ 25-50% ☐ 50-75% ☐ >75%

Emergent plant cover: ☐ <25% ☐ 25-50% ☐ 50-75% ☐ >75%

SAV cover: ☐ <25% ☐ 25-50% ☐ 50-75% ☐ >75%

Evidence of wildlife: ☐ Fish ☐ Turtles ☐ Waterfowl ☐ Mammals

Human disturbance: ☐ In-lake structures ☐ Beaches ☐ Bank disturbance ☐ Recreation

Notes:

_____

_____

_____

_____

RIVERINE HABITATS *(If present, describe & quantify them on a separate sheet)*

Duration: ☐ Perennial ☒ Intermittent

Gradient: ☒ Low ☐ Moderate ☐ High

Epifaunal substrate/cover (woody debris, undercut banks, etc.): ☐>70% ☐70-40% ☐40-20% ☒<20%

Substrate: ☒ Boulders __2__% ☒ Cobbles __4__% ☐ Gravel ___% ☐ Sand ___%

☒ Woody Deb. _4__% ☒ Organics__10_% ☐ Unnatural ___%

Embeddedness (extent to which gravel, cobbles, etc are embedded in sediment:

☒ 0-25% ☐ 25-50% ☐ 50-75% ☐ >75%

Velocity depth regime: ☐ All four present ☐ 3 present ☐ 2 present ☒ dominated by 1

In-Stream Habitats: ☐ Riffle _0___% ☐ Pool__0__% ☐ Shallow Run__0__% ☐ Deep Run __0__%

Sediment deposition: ☒ <5% ☐ 5 - 30% ☐ 30 – 50% ☐ >50%

Channel flow status: ☐ Water fills channel ☐ >75% full ☒ 75-25% full ☐ <25% full

Channel alteration: ☒ None ☐ Some (crossings) ☐ Extensive (40-80%) ☐ Majority (>80%)

Frequency of riffles: ☐ Frequent ☐ Infrequent ☐ Occasional ☒ None

Pool substrate: ☐ Mix of gravel, firm sand, roots, SAV ☐ Mix of mud, some roots & SAV ☒ All mud or sand ☐ Bedrock or clay

Pool variability: ☐ Mix of depths &sizes ☐ Large, deep ☐ Shallow ☒ Small, shallow or absent

Channel sinuosity: ☐ Bends increase stream length 3-4 times ☐ Bends increase stream length 1-2 times ☒ Channel straight

Bank stability: ☒ Stable <5% eroded ☐ Mod. Stab. 5-30% ☐ Mod. Unstab. 30-60% ☐ Unstab >60%

Vegetative protection (bank): ☐ >90% native ☒ 70-90% native ☐ 50-70% native ☐ <50% native

Riparian zone width (natural): ☒ >60 feet ☐ 60-40 feet ☐ 40-20 feet ☐ <20 feet

Notes:

_____

_____

IV. LANDSCAPE CONTEXT

A. Habitat Continuity ***(if present, describe the landscape context on a separate sheet and its importance for area-sensitive species)***

Is the impact area part of an emergent marsh at least	1.0 acre in size?	☐ yes	☒ no
(marsh and waterbirds)	2.0 acres in size?	☐ yes	☒ no
	5.0 acres in size?	☐ yes	☒ no
	10.0 acres in size?	☐ yes	☒ no
Is the impact area part of a wetland complex at least	2.5 acres in size?	☐ yes	☒ no
(turtles, frogs, waterfowl, mammals)	5.0 acres in size?	☐ yes	☒ no
	10.0 acres in size?	☐ yes	☒ no
	25.0 acres in size?	☐ yes	☒ no

For upland resource areas is the impact area part of contiguous forested habitat at least

(forest interior nesting birds, large mammals)	50 acres in size?	☐ yes	☒ no
	100 acres in size?	☐ yes	☒ no
	250 acres in size?	☐ yes	☒ no
	500 acres in size?	☐ yes	☒ no
(grassland nesting birds)	> 1 acre in size?	☐ yes	☒ no
(special habitat such as gallery floodplain forest, alder thicket, etc.)	> 1 acre in size?	☐ yes	☒ no

B. Connectivity with adjoining natural habitats

- ☐ No direct connections to adjacent areas of wildlife habitat (little connectivity function)
- ☒ Connectors numerous or impact area is embedded in a large area of natural habitat (limited connectivity function)
- ☐ Impact area contributes to a limited number of connectors to adjacent area of habitat (somewhat important for connectivity function)
- ☐ Impact area serves as *part of* a sole connector to adjacent area of habitat (important for connectivity function)
- ☐ Impact area serves as *only* connector to adjacent areas of habitat (very important for connectivity function)

V. HABITAT DEGRADATION *(Describe degradation and wildlife habitat impacts on back of the sheet)*

- ☐ Evidence of significant chemical contamination
- ☐ Evidence of significant levels of dumping
- ☐ Evidence of significant erosion or sedimentation problems
- ☒ Significant invasion of exotic plants
- ☒ Disturbance from roads or highways
- ☐ Is the site the only resource area in the vicinity of an otherwise developed area
- ☒ Other human disturbance: development in close proximity

Note: These are not the only important habitat features that may be observed on a site. If the wildlife specialist identified other features they should be noted in the application.

V. Habitat Suitability Checklist (Buffer Zone Areas)

Forage:

Reptiles	☐None	☒Poor	☐Fair	☐Good	☐Excellent
Amphibians	☐None	☐Poor	☐Fair	☒Good	☐Excellent
Avifauna	☐None	☐Poor	☐Fair	☒Good	☐Excellent
Mammals	☐None	☐Poor	☐Fair	☒Good	☐Excellent
Fish	☒None	☐Poor	☐Fair	☐Good	☐Excellent

Notes:_____

Overwintering

Reptiles	☐None	☐Poor	☒Fair	☐Good	☐Excellent
Amphibians	☐None	☐Poor	☐Fair	☒Good	☐Excellent
Avifauna	☐None	☐Poor	☐Fair	☒Good	☐Excellent
Mammals	☐None	☐Poor	☐Fair	☒Good	☐Excellent
Fish	☒None	☐Poor	☐Fair	☐Good	☐Excellent

Notes:_____

Breeding/Nesting:

Reptiles	☐None	☒Poor	☐Fair	☐Good	☐Excellent
Amphibians	☐None	☐Poor	☒Fair	☐Good	☐Excellent
Avifauna	☐None	☐Poor	☐Fair	☒Good	☐Excellent
Mammals	☐None	☐Poor	☐Fair	☒Good	☐Excellent
Fish	☒None	☐Poor	☐Fair	☐Good	☐Excellent

Notes:_____

Cover/Shelter

Reptiles	☐None	☐Poor	☒Fair	☐Good	☐Excellent
Amphibians	☐None	☐Poor	☐Fair	☒Good	☐Excellent
Avifauna	☐None	☐Poor	☒Fair	☐Good	☐Excellent
Mammals	☐None	☐Poor	☒Fair	☐Good	☐Excellent
Fish	☒None	☐Poor	☐Fair	☐Good	☐Excellent

Notes:_____

Travel/Migratory

Reptiles	☐None	☐Poor	☒Fair	☐Good	☐Excellent
Amphibians	☐None	☐Poor	☐Fair	☒Good	☐Excellent
Avifauna	☐None	☐Poor	☐Fair	☒Good	☐Excellent
Mammals	☐None	☐Poor	☐Fair	☒Good	☐Excellent
Fish	☒None	☐Poor	☐Fair	☐Good	☐Excellent

Notes:_____

Observed and Potential Wildlife

Herpetiles

☒O	☐P	Woodfrog (*Rana sylvativa*)
☒O	☐P	Spring Peeper
☒O	☐P	Green Frog
☐O	☒P	Bullfrog
☒O	☐P	Pickerel Frog
☐O	☒P	Grey Treefrog
☒O	☐P	American Toad
☒O	☐P	Mole Salamander (*Ambystoma spp.)*
☒O	☐P	Red backed Salamander
☐O	☐P	Spring Salamander
☐O	☒P	Red Spotted Newt
☐O	☐P	Dusky Salamander
☐O	☐P	Painted Turtle
☐O	☐P	Snapping Turtle
☐O	☐P	Spotted Turtle
☐O	☐P	Wood Turtle
☐O	☐P	Box Turtle
☐O	☒P	Garter Snake
☐O	☒P	Brown Snake
☐O	☒P	Milk Snake
☐O	☐P	Green Snake
☐O	☐P	Water Snake
☐O	☐P	Eastern Hognose Snake
☐O	☐P	Black Racer

Mammals

☐O	☒P	Virginia Opossum
☒O	☐P	Short Tailed Shrew
☐O	☐P	Eastern Mole
☐O	☐P	Star Nosed Mole
☐O	☐P	Little Brown Bat
☐O	☐P	Long Eared Bat
☐O	☐P	Big Brown Bat
☐O	☒P	Eastern Cottontail
☐O	☐P	Snowshoe Hare
☒O	☐P	Eastern Chipmunk
☐O	☒P	Red Squirrel
☐O	☒P	Grey Squirrel
☐O	☒P	Woodchuck
☐O	☐P	Flying Squirrel
☐O	☐P	Beaver
☐O	☐P	Deer Mouse
☐O	☐P	White Footed Mouse
☐O	☐P	Meadow Vole
☐O	☐P	Redbacked Vole
☐O	☐P	Woodland Vole
☐O	☐P	Muskrat
☐O	☐P	Meadow Jumping Mouse
☐O	☐P	Porcupine
☐O	☒P	Coyote
☐O	☒P	Red Fox
☐O	☐P	Grey Fox
☐O	☐P	Black Bear
☐O	☒P	Raccoon
☐O	☐P	Fisher
☐O	☐P	Ermine
☐O	☐P	Mink
☐O	☒P	Striped Skunk
☐O	☐P	River Otter
☐O	☒P	Bobcat
☐O	☒P	White Tailed Deer
☐O	☐P	Moose

Avifauna

☐O	☐P	Great blue heron
☐O	☒P	Turkey vulture
☐O	☐P	Canada goose
☒O	☐P	Mallard
☐O	☐P	Osprey
☐O	☐P	Bald eagle
☐O	☒P	Sharp-shinned hawk
☐O	☒P	Copper's hawk
☐O	☒P	Red-tailed hawk
☐O	☒P	Wild turkey
☐O	☐P	Killdeer
☐O	☐P	Ring-billed gull
☐O	☐P	Herring gull
☐O	☐P	Rock dove
☐O	☒P	Morning dove
☐O	☒P	Barred owl
☐O	☐P	Common nighthawk
☐O	☐P	Belted kingfisher
☒O	☐P	Red-bellied woodpecker
☒O	☐P	Downy woodpecker
☐O	☒P	Hairy Woodpecker
☐O	☒P	Northern flicker
☐O	☐P	Pileated woodpecker
☐O	☐P	Eastern wood-peewee
☐O	☒P	Eastern phoebe
☐O	☒P	Red-eyed vireo
☐O	☒P	Blue jay
☒O	☐P	American crow
☐O	☐P	Barn swallow
☐O	☐P	Tree swallow
☒O	☐P	Black-capped chickadee
☒O	☐P	Tufted titmouse
☐O	☒P	White-breasted nuthatch
☐O	☐P	House wren
☐O	☐P	Eastern bluebird
☐O	☐P	Wood thrush
☒O	☐P	American robin
☐O	☒P	Gray catbird
☐O	☒P	Northern mockingbird
☐O	☒P	European starling
☐O	☐P	Chestnut-sided warbler
☐O	☐P	Black-throated blue warbler
☐O	☒P	American redstart
☐O	☒P	Ovenbird
☐O	☒P	Song sparrow
☒O	☐P	Northern cardinal
☐O	☐P	Red-winged blackbird
☐O	☒P	Common grackle
☐O	☒P	House finch
☒O	☐P	American goldfinch
☐O	☐P	House sparrow

Other

☒O	☐P	Wood Ducks_____
☒O	☐P	Carolina Wren
☒O	☐P	Chipping Sparrow
☐O	☐P	_____
☐O	☐P	_____
☐O	☐P	_____
☐O	☐P	_____
☐O	☐P	_____
☐O	☐P	_____
☐O	☐P	_____
☐O	☐P	_____