

**INSTALLATION, MANAGEMENT, AND MONITORING
PROTOCOL FOR
UPLAND HABITAT RESTORATION AREAS
AND
WETLAND HABITAT RESTORATION**

**Commercial Campus at Fields Corner
Town of Southeast
Putnam County, New York**

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PREPARED BY:

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Introduction

To compensate for unavoidable loss of wildlife habitat and wetland area on the Commercial Campus at Fields Corner site, a comprehensive upland habitat restoration (13 acres) and wetland mitigation program (1.5 acres) is proposed for the site. In addition, approximately 172 acres of the site will remain undisturbed and protected by a “No Development” restriction which prohibits future building development. See MP-1, Overall Habitat Restoration & Wetland Mitigation Plan, MP-2 and MP-3 Habitat Restoration Plan, MP-4 Wetland and Wetland Buffer Mitigation Planting Plan, collectively, the restoration / mitigation plans, for details of the measures described below.

Objectives of Habitat Restoration and Wetland Mitigation

- Replace degraded upland habitat lost to development (buildings, parking and roads) with restored habitat areas using a variety of native species.
- Restore both wetland and upland habitat types to support wildlife species of concern which potentially occur on the site.
- Plant restoration areas with native seed mixes and plugs to support pollinators and other wildlife.
- Enhance and protect existing wildlife corridors to avoid wildlife mortality in developed portions of the site.

Background Studies

An independent Habitat Assessment was prepared for this property by The Mid-Atlantic Center for Herpetology and Conservation (MACHAC).¹ The Habitat Assessment identified the following habitats on the site: meadows/old fields, deciduous woodlands, an open-canopy fishless pond, two closed-canopy fishless ponds, several watercourses and two areas of mixed emergent/scrub-shrub/wooded wetland. The Habitat Assessment identified 37 species of amphibians and reptiles (herpetofauna) that could potentially inhabit the site. Of these potential species, one (Bog Turtle) is protected by both the New York State Department of Environmental Conservation (NYSDEC), listed as a state “Endangered” species, and the United States Fish and

¹ *Herpetofaunal Habitat Assessment of the Proposed Northeast Interstate Logistics Center*, survey conducted, and report prepared, by Brandon M. Ruhe of The Mid-Atlantic Center for Herpetology and Conservation (MACHAC), January 2019.

Wildlife Service (USFWS), listed as a federally “Threatened” species. An additional seven potential species are listed as “Species of Special Concern” by the NYSDEC: Jefferson Salamander, Blue-spotted Salamander, Marbled Salamander, Spotted Turtle, Wood Turtle, Eastern Box Turtle, and Eastern Hog-nosed Snake. Three potential species, the Four-toed Salamander, Atlantic Coast Leopard Frog and, Eastern Musk Turtle, are considered “Species of Greatest Conservation Need”, which is a conservation status rather than a regulatory status.

For each species, the Habitat Assessment identified “potentially suitable critical breeding habitat” as well as “potentially suitable critical upland habitat” on the site. In addition to protecting the critical breeding habitats on the site, the report also recommended “improving onsite habitats for species that may lose habitat as a result of development within the study area. For instance, Eastern Box Turtle habitat throughout the site may be improved through the reduction of non-native plants and the establishment of native meadow species.”

In addition to the amphibians and reptiles mentioned in the MACHAC report, the proposed upland habitat restoration will also potentially benefit numerous species of insects, song birds and small mammals which utilize meadow and woodland edge habitat. Due to loss of habitat to development and the spread of invasive plants, many of these species are also in documented decline. Since successful restoration of habitat requires active management and monitoring for a long period of time (5 – 10 years), the areas where restoration is proposed on the project site were chosen to be close to the proposed buildings, roads, and stormwater management areas to facilitate access for monitoring and maintenance. In addition, a total of 37 acres of the existing old field shrub/scrub habitat on Lot I will be protected in the existing condition as part of the “no-development” area.

Finally, the area where wetland restoration is proposed is immediately adjacent to the proposed Barrett Road widening. This area of emergent wetland and adjacent upland has been invaded by a dense stand of Phragmites as well as invasive shrubs such as multiflora rose and autumn olive. Restoration of this wetland will both improve habitat for wetland dependent species and enhance the connectivity of the wetland corridor under the road by replacement of the existing 18” RCP culvert with a 48” open-bottom arch culvert to facilitate wildlife movement.

Site Preparation and Planting of Upland Habitat Restoration Areas

For habitat restoration efforts to be successful, it is important to properly prepare the site, particularly where invasive species have become established or dominant. Because the Commercial Campus at Fields Corner site is within the New York City Watershed, herbicide use is not appropriate as a means of eliminating the existing vegetation. Therefore, at least one year of intensive management and weed control should be anticipated prior to planting of the restoration seed mix and woody materials. The following steps are required for proper site preparation:

1. Delineate the perimeter of the area where habitat restoration will occur and install silt fencing along the *entire* perimeter. The silt fencing will serve two functions – to exclude reptiles (turtles and snakes) from the restoration site, and to prevent sediment from leaving the site during site preparation.
2. Identify and mark any **native** trees or shrubs within the restoration area which are in good condition, and protect them from disturbance using construction fencing around the drip line of the canopy.
3. Using a brush hog mower with the blade set at 8” height, mow the remaining vegetation in the late winter or early spring (late February through March) or late fall (mid-October through November). Mow herbaceous vegetation around trees and shrubs to remain with a hand-held brush cutter or string trimmer. Once the vegetation has been mowed, check the area for reptiles or small mammals that may be trapped within the restoration area and remove them to an undisturbed area close to where they are found.
4. When vegetation begins to emerge in the spring, begin to till the areas that will be seeded as meadow using a deep plow or disk tiller. Repeat tilling every two to three weeks until weed seed germination is eliminated, or until the end of the growing season.
5. Collect representative soil samples from the restoration areas and have them tested for soil fertility and pH. Although native warm season grasses generally do not require any fertilization, it is important to understand the soil quality in post-agricultural areas. Use of a Biotic Soil Media™ (BSM™) may be required to improve the agronomic potential of the soil to support a sustainable meadow.
6. Once tilling is no longer necessary, the soil should be compacted with a roller packer or soil finisher prior to seeding. The BSM™ should be applied to the soil surface, followed

by application of hydro-mulch containing the seed mixture in the spring (mid-April – mid-June). If spring planting is not possible, seeding can be done in the early fall (September to mid-October) when air temperatures remain above 50°F.

The proposed restoration areas will be sown with seed mixes containing native warm season grasses and various forbs to support pollinators. The optimum seeding dates for these species is mid-spring to early summer (May and June), as they require minimum soil temperatures of 50°F and air temperatures above 60°F. Shrubs and trees can be planted in the spring or fall once the seed mixes have become established. Deer fencing is recommended to protect newly planted trees and shrubs.

Grasses and Forbs to be planted in the Upland Meadow Habitat Restoration Areas:

| Common Name | Botanical Name |
|-------------------------|---------------------------------|
| Big Bluestem | <i>Andropogon gerardii</i> |
| Little Bluestem | <i>Schizachyrium scoparium</i> |
| Switchgrass | <i>Panicum virgatum</i> |
| Deertongue | <i>Panicum clandestinum</i> |
| Indiangrass | <i>Sorghastrum nutans</i> |
| Virginia Wildrye | <i>Elymus virginicus</i> |
| Canada Wildrye | <i>Elymus canadensis</i> |
| Annual Ryegrass | <i>Lolium multiflorum</i> |
| Oats | <i>Avena sativa</i> |
| | |
| Partridge Pea | <i>Chamaecrista fasciculata</i> |
| Oxeye Sunflower | <i>Heliopsis helianthoides</i> |
| Showy Ticktrefoil | <i>Desmodium canadense</i> |
| Common Milkweed | <i>Asclepias syriaca</i> |
| Lanceleaf Coreopsis | <i>Coreopsis lanceolata</i> |
| Plains Coreopsis | <i>Coreopsis tinctoria</i> |
| Purple Coneflower | <i>Echinacea purpurea</i> |
| Blackeyed Susan | <i>Rudbeckia hirta</i> |
| Tall White Beardtongue | <i>Penstemon digitalis</i> |
| New England Aster | <i>Aster novae-angliae</i> |
| Smooth Blue Aster | <i>Aster laevis</i> |
| White Avens | <i>Geum canadense</i> |
| Wild Bergamot | <i>Moranda fistulosa</i> |
| Boneset | <i>Eupatorium perfoliatum</i> |
| Roundhead Lespedeza | <i>Lespedeza capitata</i> |
| Narrowleaf Mountainmint | <i>Pycnanthemum tenuifolium</i> |
| White Snakeroot | <i>Eupatorium rugosum</i> |
| Blue Vervain | <i>Verbena hastata</i> |

Management and Monitoring of Upland Habitat Restoration Areas

During the first two years of establishment of a native meadow, competition from weeds is the biggest obstacle to successful restoration. This is particularly true during the first growing season, as many species of warm season grass are slow to germinate. In order to ensure good vegetative cover, annual rye grass and oats are added to the seed mixture for rapid germination and soil stabilization. Therefore, it is critical to monitor the vegetation in the restoration areas carefully during the first and second year. The following steps are recommended for successful establishment:

1. Mowing should be used to control weeds during the first two years. When vegetation in the restoration area reaches a height of 12” – 18”, it should be mowed back to a height of 8”. This will reduce competition for sunlight and water, and will prevent unwanted species from becoming established and setting seed. It will also prevent thick layers of mulch from accumulating, which can smother developing seedlings.
2. Mowing should be discontinued in mid to late August during the first year to avoid cutting the warm season grasses that are becoming established.
3. Monitoring should begin at the end of the first growing season at designated stations throughout the restoration area. Data should be collected on species present, percent cover, structural diversity, and weed encroachment. Photographs should be taken at each monitoring station periodically to document progress. Monitoring should continue for at least five years, or until the meadow habitat is well established and self-sustaining.
4. Hand pulling of weeds or invasive plants is also appropriate throughout meadow establishment.
5. Once vegetation is established in the restoration area and mowing is no longer necessary, the silt fence should be removed from the perimeter to allow wildlife to reenter the habitat.

Wetland Habitat Restoration

A wetland and wetland buffer area totaling approximately 1.54 acres is proposed to be restored as primary compensatory mitigation for the 0.04 acres of direct wetland impacts that would occur from the proposed project. This area comprises an emergent marsh/shrub-scrub complex wetland that has become overgrown with common reed (*Phragmites australis*) over the last 10 -15 years. This wetland is also being encroached upon by invasive shrubs such as multiflora rose (*Rosa multiflora*) and autumn olive (*Elaeagnus umbellata*). This wetland is directly adjacent to, and downstream from, the existing road crossing of Barrett Road, and would be impacted by the proposed road widening and installation of the retaining walls.

At the time of the excavation for the retaining walls, the area of common reed and surrounding invasive vegetation (such as multiflora rose shrubs) will be flagged by a qualified wetland biologist and the rhizomes and shrubs will be excavated and removed from the site. This work should be done in the late fall or winter to avoid disturbance to species which might be using the vegetation for nesting or cover during the warmer months. The area will then be solarized by placing black plastic over the remaining soils during the growing season. This will help to sterilize the soil where the invasive species were growing by elimination of the seedlings and remaining rhizomes.

Following invasive vegetation removal, soil sterilization, and completion of the road construction, replacement plants (plugs and native seed mix) will be installed to match native emergent vegetation that is currently present in the wetland, such as tussock sedge (*Carex stricta*), sensitive fern (*Onoclea sensibilis*), and blue vervain (*Verbena hastata*). Native shrubs will be planted adjacent to the wetland in areas where invasive shrubs are removed. The replacement plants shall be placed, or their placement observed, by a qualified environmental consultant in accordance with Drawings MP-1 through MP-4. The entire area planted with the emergent species, along with areas planted with shrubs, will be protected by temporary deer fencing for a period of three years to allow root systems to become well established. During and following restoration, these areas would be monitored and maintained for a period of five years to ensure success of the restoration.

Management and Monitoring of Wetland Habitat Restoration and Adjacent Areas

Following the removal of the invasive plant species and the installation of the restoration plantings, the Environmental Monitor shall receive a list of the plant materials that have been

installed by the owner, along with the locations of invasive plant removal. The Environmental Monitor shall inspect the areas for compliance with the approved plans, and shall note any deficiencies in the installation of the plant materials so that these can be corrected at the earliest possible time. Once all of deficiencies have been corrected, the Environmental Monitor shall prepare and submit an initial compliance report to the appropriate regulatory agencies. The initial report shall include photographs of the restoration areas. Upon completion of the initial compliance report, the guarantee and monitoring periods shall commence, as outlined below.

Monitoring Period and Inspection Frequency

The wetland restoration areas shall be monitored for a period of five (5) years from the date of completion of the initial planting, which shall be noted in the initial compliance report. During the 5-year monitoring period, the Environmental Monitor shall inspect the restoration planting areas quarterly during the first two years, and yearly in the subsequent 3 years. The yearly inspections shall be during the growing season, between the dates of June 15 and October 1.

Assurances

The Permittee shall ensure that all restoration plantings have a minimum 85% survival and/or coverage rate, which must be met or exceeded at the end of the second growing season following the initial planting/seeding. If the 85% survival rate is not met at the end of the second growing season, the Permittee shall take all necessary measures to ensure the level of survival by the end of the next (third) growing season, including re-planting and reseeding if necessary. During all monitored growing seasons, the Permittee shall also remove any invasive plant species, such as multiflora rose, and autumn or Russian olive shrubs, mile-a-minute vines, common reed, or any other species listed by Invasive Species Council of the NYS DEC as invasive that may possibly occur within the restored areas.

Inspections and Reporting

The Environmental Monitor will be responsible for ensuring that the appropriate regulatory agencies receive an annual report on the status of the restoration plantings, no later than December 1st in each of the following five years after initial planting. During the monitoring period, the following shall be noted and adjusted or corrected as necessary:

1. **Sediment loading and soil erosion:** All planted areas shall be monitored for soil stability and erosion problems. In the event that erosion occurs, it shall be repaired immediately by the Permittee, and accumulated sediments within the restoration areas shall be removed by hand and deposited in an appropriate upland area outside of the regulated wetland and wetland adjacent area. All erosion areas will be repaired with soil and seeded with an appropriate native seed mix. Any repairs associated with erosion and sedimentation within the wetland, planted areas, or newly stabilized areas, shall be noted in the monitoring reports.
2. **Plant species composition and mortality:** After the initial planting, all planted areas shall be monitored for plant species and survival rates. The final species composition in the restoration areas can be influenced by a variety of factors, and therefore may change during the monitoring period. Reinforcement plantings and/or additional seeding may be necessary to compensate for losses following the initial planting. Removal and/or suppression of invasive species will also be carried out during the monitoring period to allow native plant materials to become established. Plant species (including native species which may colonize the site), survival rates, and invasive plant control measures taken shall be noted on the monitoring reports.
3. **Wildlife usage:** The usage of the areas by wildlife shall be monitored and recorded. Any observed animal species, including songbirds, reptiles, amphibians, and mammals, shall be noted on the monitoring reports.

The reports shall also identify, if necessary, corrective measures that need to be taken by the Permittee to meet the plant survival and vegetative cover requirements. The Environmental Monitor should report any necessary corrective measures immediately to the Permittee, in addition to reporting them in the annual reports to the regulatory agencies.

REFERENCES

Oehler, J.D., D.F. Covell, S. Capel, and B. Long, eds. *Managing Grasslands, Shrublands and Young Forests for Wildlife: A Guide for the Northeast*. The Northeast Upland Habitat Technical Committee, Massachusetts Division of Fisheries & Wildlife. 2006.

Salon P.R. and C.F. Miller. 2012. *A Guide to: Conservation Plantings on Critical Areas for the Northeast*. USDA, NRCS, Big Flats Plant Materials Center, Corning, NY