Revised Habitat Management Plan

Silo Ridge Resort Community

Town of Amenia
Dutchess County, New York

September 2014
Revised: January 2015

This Habitat Management Plan was originally prepared by The Chazen Companies (2008) and included as Appendix F of the Silo Ridge Resort Community EIS, and has been revised by VHB on behalf of Silo Ridge Ventures, LLC to reflect changes associated with the current Master Development Plan.

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0.0 FOREWORD

Understanding the Habitat Management Plan

Michael W. Klemens, PhD

Understanding the Silo Ridge property from an ecological perspective is important to evaluating the potential ecological impacts and conservation benefits of the proposed project. As there is on-going confusion about various ecological aspects of the project, I am writing this from the perspective of the Town of Amenia's ecological consultant, to explain how I have evaluated this project. The goal is to hopefully bring some clarity as to how I have conducted my ecological evaluation of this project.

It is important to first understand that the ecological quality of the site is not uniform. A considerable portion of the center of the site (which I refer to as the core) has been disturbed several times in the past by various land use and earthmoving activities. The current earthmoving activity, while alarming to some, is from an ecological perspective, yet another phase of disturbance in an area that over the last fifty years has been repeatedly disturbed for a variety of activities including golf courses and agricultural activities. In that same vein, many of the wetlands in the central core of the site have been either constructed or significantly altered by human activities over the last fifty years. This doesn't mean that one should abandon concern or oversight of activities within the core area, but one should put those activities into an ecological perspective. The strategies for managing impacts in the central core area are very different from those that should be employed in natural areas of the site.

Surrounding this central core area of human-altered habitats are intact natural habitats of high quality. This is not to imply that there has been a complete absence of disturbances to those areas over the last centuries, but those disturbances have been so infrequent and sporadic, that today these areas present as inter-connected, highly functional natural systems, with a corresponding broad array of biodiversity and ecological functions. These include Amenia Cascade Brook, Wetland AM-15, headwater wetlands (e.g., J) at the meadow woodland interface on the slopes, and a series of vernal pools embedded upon the forested ridge. The second equally critical ecological value are mature second growth forested moderate to steep slopes that rise up behind the central core of the site.

If one accepts this broad division of the Silo Ridge site into two distinct sub-sites, the natural and the human-altered, the prescriptions for ecological management follow quite clearly. First and foremost is to minimize impacts to these natural systems by ensuring that the natural wetlands retain their vegetated buffered, or if the buffers are not present, that they be re-vegetated. Vernal pools should be protected with a 750-foot forested area (as per Calhoun and Klemens, 2002). Impacts, including roads, residential development and light pollution of the naturally forested slopes should be minimized. Water quality entering those natural systems should be carefully engineered and monitored to avoid the following: increases in pollutants, increase in turbidity, increased run off volumes, decreased run off volumes, thermal spikes, and flashiness.

This logically leads the evaluation of the activities in the previously disturbed central core of the site, including the drainage streams, created ponds, and all the activities in that area (including grading and earthmoving) that could affect the downstream wetlands. And while many of these constructed wetlands are proposed to have vegetative buffering, it is a misnomer to consider these as having high habitat value. Certainly these wetlands will serve as habitat for some biodiversity, but generally these will be species that are more readily adapted to human-created habitats. The principle ecological concern as far as the constructed wetlands are concerned is not habitat creation, but prevention of the following: increases in pollutants, increase in turbidity, increased run off volumes, decreased run off volumes, thermal spikes, and flashiness. In the review of the impacts of the central core activities, I am heavily dependent on the engineering of the project including the SWPP, and have been working closely with the Town of Amenia's engineering consultant to ensure that the activities in the central core of the site are consistent with the protection of the receiving waters. The fact that East of Hudson standards were required by the Planning Board (in 2009) as mitigation to protect the Hills Pond Weed means that the water quality standards for this project are higher than any other project within Amenia or the region.

1.0 INTRODUCTION

1.1 Objective

The objective of the following Habitat Management Plan (HMP) for the Silo Ridge Site (hereafter referred to as the Site) is to address specific concerns regarding the project's potential effects upon on-site habitats and the resident or transient wildlife species that utilize these habitats. Various interested parties have raised these concerns in comments on the Draft Environmental Impact Statement (DEIS) for the Site. The Chazen Companies (TCC) developed this HMP to address potential risks to habitat quality and to describe the measures to be taken to mitigate these potential risks. A concurrent objective of the HMP is to address specific efforts to provide quality habitat for populations and assemblages of animal species that utilize the Site for critical habitat throughout all or a portion of their annual life cycle.

This HMP has been updated by VHB (most recently January 2015) for consistency with the current Master Development Plan prepared for Silo Ridge Ventures, LLC. Figures ENV-1, ENV-3, ENV-4, ENV-5, and ENV-6 have been updated. Appendix D, Table D-1, parts 1 and 2, have been updated.

1.2 Approach

The development of this HMP utilized information that was gathered during early Site investigations to prepare the DEIS. This information included on-site field investigations, input from federal and state agencies, and local conservation groups. Later efforts included additional Site visits and a more expansive investigation of the applicable scientific literature. Brief summaries of the approaches that TCC took to characterize the existing habitats and resident flora and fauna within the Site are presented below.

To characterize/inventory the existing habitats and wildlife resources, TCC completed a Habitat Assessment in 2005. In total, seven field visits were dedicated to characterizing the existing Site conditions. It should be noted that many of these studies were focused on a specific task (e.g., delineating wetland boundaries), and not all of the time spent on-Site was concentrated on inventorying existing habitats and wildlife resources. However, these studies were valuable for characterizing the vegetative communities and noteworthy observations of flora and fauna species were recorded during these efforts.

TCC completed several intensive data collection efforts to inventory the existing habitats and wildlife resources on the Site during supplementary studies conducted in 2007. These supplementary studies primarily focused on determining the presence/absence of endangered, threatened, and/or special concern (ETS) species at the Site. Focused ecological surveys conducted at the Site included an amphibian and reptile survey (including a timber rattlesnake (*Crotalus horridus*) survey), breeding bird survey, botanical survey, Phase I and II bog turtle (*Clemmys muhlenbergii*) surveys, and an Indiana bat (*Myotis sodalis*) survey.

TCC completed additional visits to the Site in the spring of 2008 to review current Site conditions and assess habitat quality in support of the management plans proposed in this document. Investigations to identify management methods and habitat enhancement options (e.g., planting palettes) included reviews of the applicable scientific literature and technical reports focusing on best management techniques for varied habitats and species.

In 2013 and 2014, VHB completed additional field studies particularly focused on the adjacent southern parcels owned by Harlem Valley Landfill Corp.

The HMP for the Site utilizes a simple and straightforward approach toward addressing habitat quality for wildlife populations at the Site. This approach follows a multi-step process that includes the following:

1. Characterize and Inventory Existing Habitats.

2. Identify Critical and Sensitive Habitat and Wildlife Resources.

    - Critical habitats for wildlife populations of special management concern.
    - Sensitive habitats that may be degraded by development at the Site.

3. Conserve Existing High Quality and Critical Habitat.

4. Restore Damaged Habitats to Restore Ecological Services.

5. Enhance Existing Habitats Affected or Potentially Affected by Development.

6. Mitigate Effects of Site Development (where possible)

    - Conservation Buffer
    - Water Quality Buffer
    - Mitigation Structures
    - Terrestrial Habitat Enhancements
    - Aquatic Habitat Enhancements

7. Protect Sensitive and Productive Habitats During Operations and Activities at the Site.

Habitat management[1] activities at the Site will ultimately be consolidated under the Natural Resources Management Plan (NRMP) prepared by Audubon International[2]. Additional activities and hydrologic controls at the Site will also cross over into the habitat management sphere. These include the Storm Water Pollution Prevention Plan (SWPPP) that covers the entire property and the Integrated Pest Management (IPM) and Environmental Monitoring Programs that are specific to the golf course and its immediately adjacent areas. Figure ENV-1 identifies the limits of proposed site disturbances for the project, and also the most significant environmental constraints (e.g., slopes, sensitive habitats, golf course) upon the breadth of development at the site.

As outlined in this document, the HMP will address both habitat/species viability issues (including habitat enhancements) and buffer management[3] issues (buffer creation and maintenance). Good buffers will provide protection against, and mitigation of, the potentially damaging effects of sedimentation, thermal inputs, and nutrient and contaminant loadings associated with storm water flow, irrigation runoff, and general habitat disturbances (Fischer and Fischenich 2000). Habitats benefit from energy inputs, in the form of labile carbon in leaf litter, to support more productive aquatic food webs (Kominoski et al. 2007). Cooler waters also contain greater concentrations of oxygen for aquatic organisms. Good buffers will also provide, in many instances, good terrestrial and aquatic edge habitat. However, good buffers require a certain degree of attenuation capability to be truly effective for the purposes expected of them. To that end, minimum requirements of width and vegetation type are identified for the two classes of buffers identified in the Buffer Management Plan (BMP). These requirements are identified in the appropriate sections of this report.

Good habitat will provide ecological services to wildlife. Habitat-related ecological services are geared toward providing essential nesting, foraging and shelter areas for particular species of animals or assemblages of interrelated species. Good habitat may function as an effective buffer if there is sufficient area and attenuation capability. However, good habitat can still provide very valuable ecological services in the absence of any buffering capacity and should not be discounted simply because it cannot perform both functions. Contrary to performance criteria for buffers, minimal enhancements of existing habitat can result in a measurable increase in ecological services to a few dependent or transient individuals or an isolated subpopulation of animals.

[1] Habitat Management is defined as managing on-site habitats to provide the ecological services (e.g., nesting, forage, and shelter) necessary for resident and transient wildlife populations on the property.

[2] See DEIS Appendix 9.11 for an example of the initial NRMP provided for the project as prepared by Audubon International.

[3] Buffer Management is defined as managing on-site buffers to provide attenuation capacity for mitigating the potentially degrading effects of sedimentation, solar radiation/thermal inputs, and nutrient/contaminant loadings to sensitive habitats on the property.

2.0 METHODOLOGY

2.1 Characterize and Inventory Existing Habitats

2.1.1 Habitat Classifications

To characterize and represent existing conditions at the Site, a simplified habitat classification system has been established to identify basic habitat units that combine elements of open space inventory and wildlife habitat functionality. Although considerable effort has been expended to map discrete vegetative cover types on the Site, this level of differentiation is not necessary to meet the HMP objectives outlined in Section 1.0. Taking the results of previous investigations at the Site in combination with basic terrestrial and aquatic habitat management units yields six basic habitat mapping units for the HMP. These units are identified below:

Silo Ridge Habitat Management Plan – Habitat Classification System

1. **Natural Forested Habitat –** all upland forested habitats.

2. **Grassland and Scrub/Shrub**

    a) **Native Fescue 6" to 1'**

        i. **P2 – Native Short Grass +/- 1' –** will be managed/maintained to preserve grassland functionality.

        ii. **P3 – Native Tall Grass > 1' –** will be managed/maintained to preserve grassland functionality.

        iii. **Gt – Transitional Grassland –** will be planted with trees and/or shrubs and managed for succession to forested habitat.

3. **Wetlands[4] –** includes all aquatic, semi-aquatic, and forested wetland habitats.

4. **Aquatic Habitats**

    a) **P1 Shoreline Group**

    b) **Aquatic Habitat[5]**

        i. **A, AQ – Ponds and Streams.**

[4 + 5] Subsequent analysis by VHB and Town of Amenia ecological consultant, Michael W. Klemens, PhD, have divided wetlands and aquatic habitats into two classes: natural and constructed.

ii. SWM – Storm Water Management Basins.

5. Golf course[6] – all in-play tees, fairways and roughs (all cut turf), bunkers, greens, and cart paths.

a) **HR /Fescue and Native Grasses – High Rough –** 4 to 6 inches in height, bordering in-play water hazards.

6. Residential and Commercial – all developed land including landscaped lawns and gardens.

The present Site-wide distribution and overall coverage area for each of these six habitat mapping units is displayed in Appendix C, Figure ENV-2 – Habitat Management Plan Existing Conditions. For comparison to existing conditions, post-development habitat distributions and coverage are included in Appendix C, Figure ENV-3 – Habitat Management Plan Proposed Conditions.

2.2 Identify Critical and Sensitive Habitat and Wildlife Resources

2.2.1 Critical Habitats for Wildlife Populations of Special Management Concern

Critical habitats for wildlife populations of special management concern addresses the special status of Endangered, Threatened and Special (ETS)[7] species regulated by the New York State Department of Environmental Conservation (NYSDEC) and the United States Fish and Wildlife Service (USFWS). A second category of "wildlife populations of special management concern" includes the bird and animal species observed at the Site which are listed on non-statutory watch lists such as Species of Greatest Conservation Need (NYSDEC), Birds of Conservation Concern (USFWS), Partners in Flight, or the Audubon Society's Watch List. Lastly, any species that has been specifically addressed in comments on the DEIS, regardless of its conservation status in NYS is also considered in the analysis of critical and sensitive habitat in the HMP. This includes a number of un-listed species of "local concern' that have been specifically addressed in comments on the DEIS. In most instances, these species have been observed during DEIS investigations at the site. Some species may not be included on the "resident list", their absence due to the fact that they may never spend appreciable portions of their annual activity cycle on site, and may only utilize site environs for very limited periods of the year (e.g., migrating raptors). In other instances, a number of these species are no longer present on site, being extirpated from site habitats but potentially present in adjacent and contiguous habitat units. In one instance, a referenced species, the eastern box turtle (*Terrapene carolina*) is unlikely to have ever inhabited site habitats since site elevations and geographic position exceed the normal limits associated with the box turtle's New York State range in the Hudson River watershed (Klemens 1993).

[6] Golf Course includes constructed wetlands, ponds, streams and stormwater management basins.

[7] Federally Endangered and Threatened Species are regulated by USFWS and NYSDEC; NYS Endangered and Threatened Species are regulated by NYSDEC; NYS Special Concerns Species are not regulated by an agency, however are of significance for the SEQRA review.

ETS investigations completed at the Site in support of the DEIS focused on the bog turtle, the Indiana bat, and the timber rattlesnake. The DEIS included in-depth documentation and discussions of the Site investigation efforts completed to locate these species. No extant populations of these ETS populations were discovered during these investigations, however, initial investigations did identify suitable on-site habitat for the bog turtle and Indiana bat. These existing habitats and the habitat requirements of these two ETS species are addressed in the HMP. Comments on the DEIS expressed concerns about the status of one USFWS/NYSDEC ETS bird species and one turtle species (e.g. the peregrine falcon (*Falco peregrinus*) and the bog turtle), both of which were not observed on the Site. Suitable foraging habitat for the peregrine falcon is present on the Site, and the habitat requirements of falcons are addressed in the HMP.

DEIS investigations at the Site documented the presence of 16 bird species[8] and 2 species of herpetofauna that are presently included on non-statutory watch lists. DEIS comments addressing wildlife populations of conservation concern, based on a species' inclusion on a non-statutory watch list, included 13 of the 16 bird species noted above. An additional 3 bird species (purple finch, *Carpodacus purpureus*), eastern wood-pewee (*Contopus virens*), chimney swift (Chaetura pelagica) whose conservation status in Dutchess County is uncertain, were also identified in DEIS comments and purported to be among the "listed" species identified at the site. Other species mentioned as a result of their recognized conservation status included three turtle species, one snake, and one aquatic plant. Of these five species, only the snake was observed on site. Two of the turtle species and the plant may have been present in the recent past, and extant populations may still exist in nearby adjacent and contiguous habitats. The third turtle species (eastern box turtle) is not likely to have been a historic resident at the site. Additional "un-listed" species of local conservation concern identified in the DEIS comments included three bird species, two salamander species and one fish species.

Table 1 of Appendix A includes all bird, mammal, and herpetofauna species observed on the Site during the DEIS investigations completed from 2005-2007. A brief assessment of the potential for post-development Site conditions to meet the general habitat requirements of all species previously identified on-site during DEIS investigations is also included in Table 1. Species concern ETR and "non-statutory watch listed" bird species that have been identified on-site, or specifically addressed in DEIS comments, are summarized in Table 2 of Appendix A along with brief descriptions of their habitat requirements for foraging, nesting and shelter. Brief narratives describing the natural history and habitat requirements of these 17 bird species are included in the Species Narratives section of Appendix A. Species narratives are also provided for the additional 9 animals and the single plant species addressed in DEIS comments. Habitat requirements for all of the "watch-list" and "un-listed" species identified in Table 2 or included in the narratives section of Appendix A are specifically addressed in the HMP.

[8] During the 2014 Breeding Bird Survey – Parcel 1, performed by Lisa Standley, PhD of VHB, 24 breeding bird species were confirmed on the adjacent south parcel owned by Harlem Valley Landfill Corp. – *See Appendix E*.

2.2.2 Sensitive Habitats at Risk for Degradation by Site Development

Sensitive habitats that may be degraded by development at the Site include all wetland and aquatic habitats on the property. Aquatic and wetland habitats in particular are susceptible to the degrading effects of sedimentation, increased thermal inputs from canopy removal and storm water discharge, as well as nutrient and contaminant loading from overland drainage (O'Laughlin and Belt 1995).

2.3 Conserve Existing High Quality and Critical Natural Habitats

Existing high quality and critical natural habitats on-site include forested slopes, woodland vernal pools, and natural wetlands and headwater streams. The HMP addresses efforts to conserve these areas and the high quality adjacent habitats in the vicinity of these fragile and sensitive natural features.

2.4 Restore Damaged Habitats to Restore Ecological Services

Damaged habitats on-site include severely eroded stream channels where high water flows have scoured creek beds, destabilized banks, and created conditions of where high water events contribute silt loads to receiving waters on-site. Another type of damage present at the Site includes channelized (i.e., culverted areas) where flow is buried beneath the surface or otherwise constrained beneath bridges and cart paths. The HMP includes significant aquatic habitat restoration projects. These include a stream bed restoration, stream bank stabilization, and erosion control project on a tributary to Cascade Amenia Brook; a floodplain restoration project on the Cascade Amenia Brook floodplain; and a stream bed restoration that removes culverts in sections of an intermittent stream to "daylight" the stream bed and restore riparian habitat and animal movement corridors.

2.5 Enhance Existing Habitats Affected or Potentially Affected by Development

Extensive areas of the Site will be targeted for habitat enhancement efforts. The majority of the enhancement activities will utilize vegetative plantings and management techniques to increase the value of ecological services provided by on-site habitat units. Specific planting palettes are planned for various enhancement projects. The HMP has identified locations throughout the Site and indicated the efforts that will be used to enhance existing terrestrial and aquatic habitats. Enhancement efforts will utilize vegetative plantings and habitat management activities to increase the value of ecological services provide by on-site habitat. Planting palettes of native species have been assembled for use in conjunction with aquatic and upland habitat enhancement efforts. An additional palette is to be used exclusively for establishing vegetative cover in stormwater management basin wet pools and attenuation basins. These planting palette lists are provided in Appendix B. Appendix B includes a brief qualitative assessment of the habitat value of each individual plant species identified in the planting palettes.

All plantings at the Site will be completed in concurrence with the controls outlined in the invasive species management and monitoring plan that will be prepared for the wetland restoration project

in Wetland AM-15 (See Section 5). Special care will be taken to avoid inadvertent transport of seed or reproductive structures into the planting zone. This will include a thorough wash-down of all clearing and planting equipment (e.g., tires, undercarriage, etc.) used at the Site. Additional efforts will be undertaken to perform the work during a favorable season when the potential for wind-borne dispersal of invasive plant seeds is minimal.

2.6 Mitigate Effects of Site Development

Efforts to mitigate the potentially harmful results of Site development include actions to protect sensitive habitats from the degrading effects of sedimentation, increased thermal inputs from storm water discharge and canopy removal, and nutrient/contaminant loading from overland drainage. The BMP (See Section 4) will utilize mitigation strategies and habitat enhancements to provide protection to sensitive on-site habitats.

2.6.1 Buffers

Conservation Buffers: Conservation buffers preserve a minimum of 100 feet of undisturbed, functional native terrestrial vegetation. The 100-foot benchmark is derived from NYSDEC Article 24 Adjacent Area setbacks for the protection of wetland habitats from land use disturbances. Conservation buffers preserve existing terrestrial plant communities and will provide the greatest protections for on-site critical habitats. Conservation buffers also perform the same functions as Water Quality Buffers, attenuating nutrient and contaminant transport and loadings to surface waters and sediments.

Water Quality Buffers: Water quality buffers include at least 30 feet of terrestrial vegetation. Additionally, buffer quality and effectiveness relates to a variety of Site-specific factors including slope, plant community composition, soil type and contaminant load (e.g., chemical concentration) and composition (e.g., chemical type) (Fischer and Fischenich 2000). Depending on site-specific conditions, 30 to 50 feet is the generally acceptable benchmark for passive buffer effectiveness (e.g., minimum acceptable removal efficiencies) to control sedimentation and for mitigating nutrient (nitrogen/phosphorus) and contaminant loadings (absorbed components to transported solids, TSS removal) to surface waters from precipitation- or irrigation-based overland flow. (Vought et. al. 1994; Daniels and Gilliam, 1996). Thirty feet is the minimum acceptable buffer width for water quality buffers at the Site, however 50 to 100 feet wide buffers will be established whenever and wherever site conditions permit.

2.6.2 Mitigation Structures

The 2009 MDP specified Oversized Bottomless Box Culverts or Oversized Bottomless Arched Culverts. These are oversized culverts that preserve aquatic and semi-aquatic substrate, natural unconstrained flow regime, and provide sufficient light infiltration and air circulation to maintain an environment conductive to unrestricted animal movements along aquatic corridors. The main entrance road crossing utilizes an oversized bottomless arched culvert, which has been sized to a

minimum standard to provide sufficient space for unrestricted movement along aquatic corridors by the largest native mammals resident at the site or its immediate environs.

In consultation with the Town's ecological consultant, VHB has developed an alternative to the box culverts that creates less of an impediment to the movement of water and wildlife. Timber crossings are proposed for the ten (10) timber bridge crossings located in the golf course and a typical timber bridge design is proposed for the vehicular bridge over Stream J. These timber bridges include abutments and approaches constructed outside of the annual high water mark and elevated above the functional stream bed (including stream banks) to maintain an environment conducive to unrestricted animal movements along aquatic corridors.

2.6.3 Habitat Enhancements

Terrestrial Habitat Enhancements: Terrestrial habitat enhancements comprise vegetated areas that range between 5 and 30 feet in width. Under a best-case scenario, terrestrial plant communities provide functional value as refuge, forage and in some cases breeding habitat for resident birds, small mammals, and herptofauna. In other instances, use of these areas by resident wildlife may actually increase their vulnerability to predation. Insufficient cover, patchiness and isolation are frequent problems confronting resource managers during efforts to augment the value of golf course habitats for wildlife. Higher degrees of connectivity to adjacent undisturbed habitats (providing safe ingress/egress from these foraging areas) and well developed ground cover and mid-canopy layers are important attributes to develop when designing terrestrial habitat enhancements.

Depending on the areas of the planting, terrestrial habitat enhancements also may provide limited attenuation of overland nutrient and contaminant transport and loadings to adjacent surface waters and wetland habitat. These benefits accrue through the filtering effects that vegetation can provide for suspended particles. Sequestered in the humic matrix of a healthy soil, nutrients can be readily converted to biomass, and contaminants are exposed to enhanced biodegradation and physicochemical breakdown processes.

Aquatic Habitat Enhancements: Aquatic habitat enhancements comprise less than 5 feet of terrestrial vegetation and are primarily composed of shoreline and emergent aquatic (riparian or littoral) vegetation. These enhancements may provide a limited range of wetland ecological services in terms of habitat provision and nutrient uptake.

2.7 Protect Sensitive and Productive Habitats During Operations/Activities at the Site

Both the HMP and BMP will include specific management objectives and corresponding maintenance schedules for meeting their stated goals. Maintenance schedules will be designated for each habitat unit, buffer, or enhancement area category at the Site. Maintenance compliance records will be maintained by the appropriate site managers and completed/filed on an annual basis with Audubon International. These records will be available to designated town and local officials for on-site review at the end of each calendar year.

3.0 HABITAT MANAGEMENT PLAN AND INITIATIVES

3.1 Habitat-Specific Wildlife Population Management Initiatives

The following sections describe the management goals and maintenance schedules specific to each habitat unit at the Site. Table 1 of Appendix A includes all bird, mammal and herpetofauna species observed on the Site during the DEIS investigations completed from 2005-2007. This table includes a check list that identifies the sufficiency of post-development habitat quality and quantity at the Site and the Site's potential for providing minimum species-specific requirements for breeding, forage, and shelter. Section 3.2 provides a Site-wide perspective of the integrated goals for the HMP.

3.1.1 Upland Forest

After the Site is fully developed, there will be approximately 298.1 acres of upland forested habitat present, the majority of which extends in a continuous unit extending along the north-south ridgeline on the western border (Appendix C, Figure ENV-3). The second largest parcel of intact forest habitat lies in the northeast corner of the Site, north of Route 44, and this unit is approximately 48 acres in size. An 11 acre unit runs along the northwestern border of NYSDEC Wetland AM-15. Lastly, several wooded knolls are interspersed throughout the Site, the largest of which covers just over 3 acres.

These forest units encompass the most sensitive and critical habitat features on the Site. These include three productive woodland vernal pools on top of the ridge used by large numbers of woodland salamanders and frogs as spring breeding habitat. This unit also protects the headwaters of Stream/Wetland J, a classic representation of a headwater stream/wetland complex. Stream/Wetland J supports an abundant and healthy community of aquatic salamanders including the regionally rare dusky salamander (*Desmognathus fuscus*). The northern forest unit (north of Route 44) provides uninterrupted riparian habitat adjacent to Stream V. The forested perimeter of Wetland AM-15 provides essential buffering of wetland habitats in NYSDEC Wetland AM-15, a wetland complex that is reported to support bog turtle populations in off-site areas. This wooded buffer includes a stand of old growth shagbark hickory (*Carya ovata*) trees that may possibly provide maternal roosting habitat for the endangered Indiana bat at some point in the future. Aside from these critical habitats and wildlife populations of special concern, these forest units support a diverse community of woodland birds, mammals, and herpetofauna (See Table 1 Parts 1, 2, 3 in Appendix A).

Riparian upland forest habitats at the Site will be managed using a combination of passive and active techniques. Buffer areas of over 750 feet will be retained around the two northern-most vernal pools, and the southern pool will be buffered by approximately 600 feet of undisturbed forest. Losses of adjacent contiguous forest habitat on the eastern periphery to the southern pool comprise less than 10% of the total contiguous area within a 750-foot radius buffer, and area not anticipated to significantly impact the functional attributes of this sensitive habitat unit (Calhoun and Klemens 2002). A conservation buffer greater than 100 feet in width protects the head water

areas of Stream J and almost its entire east and west banks. No homes are proposed within 50 feet of Wetland J/JJ and limited development including roadway, bridge, utility crossings and associated grading is proposed within 50 feet of the remainder of Wetland J/JJ. At Stream V, conservation buffers extend beyond 100 feet from the northeast bank, and water quality buffers extend between 60 to 100 feet on the southwest bank to protect water quality and maintain a healthy riparian habitat. Almost the entire area of forest surrounding Wetland AM-15, including the stand of shagbark hickory, is included in the NYSDEC 100-foot Adjacent Area, and will be protected from future disturbances of any kind.

The primary management approach to be followed in these large contiguous units and the smaller forested knolls throughout the Site will be limits on use. Vehicle access and recreational use will be limited. To promote development of an old growth forest and its accompanying rich biological diversity, the two largest woodlots will be permitted to mature and logging will not be permitted. Standing dead and downed snags will not be felled or cleared except for trail maintenance and access. If tree felling activities in the smaller woodlots are required during Site construction efforts or for subsequent general maintenance of on-site facilities, cutting schedules will be restricted to the period of October through March to avoid potential impacts to bats and other nesting birds.

The HMP for the Site includes the creation of significant areas of transitional grasslands, especially along the perimeter of many of the smaller forest plots that are interspersed within the redesigned golf course. Tree species will be selected for their wildlife value with priority given to seed, nut and fruit producing varieties that will increase the mast crop for the newly expanded forest areas. These new plantings will be allowed to mature into forested lands, thereby increasing the area of forest habitat on the property. As transition areas these new plantings will provide productive "soft edges" to existing forest areas, increasing the value of ecological services they provide to canopy nesting woodland birds, including the large number of neotropical migrant species who utilize the on-site forest habitats on an annual basis (Gillihan 2000).

3.1.2 Grasslands

After the Site is fully developed, there will be approximately 95.8 acres of grassland habitats present for use by resident and transient wildlife (Appendix C, Figure ENV-3). The vast majority of this grassland habitat will exist as a complex of patchy interconnected plantings snaking throughout the golf course; tall grass plantings will separate fairways of different holes, while short grasses will be planted to separate tee benches from fairways of the same hole. Transitional grasslands will be planted around margins of existing forest to expand canopy habitat. Significant areas of grassland buffers (tall, short, transitional plantings) have also been added to protect sensitive aquatic resources on the Site (See BMP in Section 4).

3.1.2.1 Native Fescue

The planting palette for native fescue includes a mixture of short native grasses, primarily fescues. These native grasses will be planted between the golf course in-play areas and native short grassland areas to provide a transition similar to the high-cut rough described in Section 4.2.

3.1.2.2 Maintained Short (P2) Grasslands

The planting palette for short grasslands at the Site includes a mixture of native grasses and forbs, and it is identified as the P2 group in Appendix B. The final seed mix utilized for plantings at the Site will be dependent upon availability of seed supplies at the time of planting. Short grasses will be maintained to remain free of woody plants by application of a mowing schedule. Mowing will be completed on a semi-annual or annual basis depending upon location. All cutting will be completed outside of the nesting season for grassland birds (October/November) and activity periods for resident herptofauna. In these habitats, fall cutting will be lowered to less than 6 inches to increase the vulnerability of small mammals to predation, and in this way achieving the dual objectives of maintaining these populations at manageable levels and providing increased accessibility to these populations for resident/overwintering predators at the Site. All cut vegetation will remain in-place to provide nesting habitat/cover for small mammals and birds. Cutting records will be maintained and updated on an annual basis by Audubon International.

3.1.2.3 Maintained Tall (P3) Grasslands

The planting palette for tall grasslands at the Site includes a mixture of native grasses and forbs, emphasizing grassland development. This planting palette is identified as the P3 group in Appendix B. The final seed mix utilized for plantings at the Site will be dependent upon availability of seed supplies at the time of planting. Tall grasslands will be maintained to remain free of woody plants by application of a mowing schedule. Mowing will be completed on a annual schedule, with each area being cut on a once a year rotation. All cutting will be completed after the nesting season for grassland birds is completed. All cut vegetation will remain in-place to provide nesting habitat/cover for small mammals and birds. Cutting schedules will be limited to a late fall period between late October and the end of November to encourage grassland development (Ochterski 2006) and minimize any potential mortality to resident herptofauna. Within discrete tall grass units, a varied mowing schedule will be implemented to vary the height and density of grasses available to wildlife. This would include mowing a portion of each unit each year. Mowing records will be maintained and updated on an annual basis by Audubon International.

3.1.2.4 Transitional (GT) Grasslands

Transitional grasslands will be established by over-seeding with the P3 tall grass planting palette and select planting of individual trees and shrubs (seeds or rooted stock) from the Gt palette (See Appendix B). In many instances, transitional grasslands will be located between existing wood lots and tall grassland habitats. In other areas, transitional grasslands will be developed in areas disturbed (e.g., cleared and graded) during construction, or in areas of former agricultural fields or formerly maintained turf grass. A central component of transitional grasslands will be their management toward establishing a central area of climax forests, or alternatively establishing areas of climax forest that will connect to and expand the areas of existing woodlots.

The climax forest will be re-established by planting upper story trees, understory trees, and shrubs (from Gt lists). Tree and shrub plantings will be selected and planted in attempts to provide a varied and high value habitat for the broadest array of prey and predator species. For example,

tree plantings will include clusters of evergreens to provide preferred roost/nest/den sites for nocturnal/crepuscular foragers (e.g., owls) and overwintering resident wildlife. Shrubs will be selected to provide winter forage and planted with intent to provide summer nesting habitat and winter shelter. Once tree and shrub plantings are established, these areas will be left unattended to follow a natural succession into upland forests.

Transitional grassland planting will be used extensively within the golf course, in some instances extending the limits or connecting existing woodlots and in other instances used to establish new vegetative communities and vary the texture of the course itself. Maintenance of adjacent tall grass areas will provide excellent opportunities to create a soft and heterogeneous edge of maintained shrub land between the developing forest and maintained meadow units. This will be accomplished by removing various amounts of maturing woody vegetation (bush whacking) in the transitional areas on an intermittent basis. Establishment of a multi-strata area consisting of native woody (trees and shrubs) and herbaceous vegetation provides important wildlife habitat for insects, birds and mammals and various herpetofauna (CTDEP 2006). This approach will provide a significantly higher level of ecological services to both grassland and forest wildlife assemblages while minimizing the deleterious effects of nest predation associated with hard edges between forested and grassland habitats (Angelstam 1986). Maintenance records for woody vegetation removal will be maintained and updated on an annual basis by Audubon International.

3.1.3 Natural and Constructed Wetlands

The site includes discrete wetland areas totaling a combined 46.08 acres (34.95 acres of natural wetlands and 11.13 acres of constructed wetlands) in area. The vast majority of natural, on-site wetland habitat is contained within Wetland AM-15 in the southeastern corner of the property. Management activities identified for this 26-acre wetland are described in greater detail in section 3.1.4 below. With regard to the remaining wetland units on the site, site development will not impact any natural wetland habitats on the site.

All flowing waters on-site have been targeted for the establishment of either buffers or terrestrial habitat enhancement areas. Wherever possible, aquatic shoreline plantings (P1 palette, See Appendix B) have also been incorporated into habitat enhancement plans for these lotic habitats.

Streamside buffers and habitat enhancements will not receive any active management efforts. The IPM describes adjustments to pesticide applications in the vicinity of streams with buffers and habitat enhancement plantings. Where in-play golf course features cannot support buffer or terrestrial enhancement plantings, the IPM describes adjustments to mowing height as an addition to modified pesticide applications.

As mentioned earlier, buffers and habitat enhancements in the form of vegetative plantings will improve water quality by decreasing nutrient and contaminant loadings, decreasing thermal inputs (cooling water temperatures to provide greater dissolved oxygen concentrations), and providing a carbon energy source (leaf litter). Habitat improvement for aquatic herpetofauna will include increased value as foraging, and shelter habitat. Resident fishes will benefit from decreased turbidity, and cooler more oxygenated water (Sweka and Hartman 2001).

All pond habitats on the Site have been targeted for aquatic habitat enhancement plantings including littoral shelf aquatic plant communities (P0 planting palette, see Appendix B) and the shoreline group (P1 planting palette, see Appendix B). These enhancements will provide significant improvements to the habitat quality and level of ecological services provided by these units. Resident fish populations in these ponds will benefit from increased food sources. With increases in fish populations, these habitats will provide increased values as foraging habitat for a variety of piscivorous (fish eating) bird and semi-aquatic mammal species. Increased shelter value of shoreline vegetation will support a more diverse community of herpetofauna and aquatic and wading birds (Weller 1999). After shoreline communities develop sufficiently, nesting habitats for shoreline bird species will also be available.

Storm water management basins (SWM) are included in the HMP because of their obvious potential to provide functional ecological services to resident wildlife at the Site. The design of these storage features includes maintenance of a wet pool that will hold water under most climatic conditions. Design features also include an attenuation basin that will experience periodic inundation by accumulated runoff. SWM wet pools and attenuation basins require seeding and/or planting with aquatic and facultative vegetation because of their potential to become colonized by various invasive plant species and subsequently contribute to the spread of invasives over a broader area on the Site. SWMs will be vegetated with plants selected from the wetland shelf and erosion control/restoration planting palette (Palettes include Aquatic Bench, P0 [Littoral Shelf Group] and P1 [Shoreline Group], see Appendix B).

Figures ENV-4 – ENV-6 (Appendix C) denote a 5 to 50-foot habitat enhancement area that originates from the edge of the wet pool at each SWM. Plantings for these habitat enhancement areas will be consistent with the vegetative communities in the out-of-play or in-play areas immediately adjacent to each SWM. The modified pesticide spraying schedule described previously for riparian buffers and habitat enhancements will be implemented adjacent to SWMs.

3.1.4 Wetland AM-15

Where areas within the 100-foot Adjacent Area will be restored from currently cut turf to transitional grassland (Gt plantings), a limited invasive species removal and habitat restoration program will be implemented. This restoration program will also include an invasive species monitoring and control component to assure the success of new plantings within the Adjacent Area. Areas overrun with the invasive multiflora rose (*Rosa multiflora*) will be grubbed to remove the rose bushes and replanted with tall grass (P3) and trees and shrubs (Gt). The area will be monitored to detect the success of rose removal efforts and to detect the presence of new invasive species (multiflora rose, purple loosestrife) in the planting area. If newly established invasive communities are observed, control measures will be applied to eliminate these species from the restoration zone. Control measures used will include physical removal and/or selective chemical control with limited basal herbicide applications. Additional details specific to the NYSDEC requirements for this restoration and monitoring effort are provided in Appendix E to the FEIS.

3.1.5 Golf Course

For purposes of this HMP, in-play golf course areas (i.e. actively maintained tees, fairways, roughs, bunkers, greens and cart paths) are considered to provide no measurable habitat value for resident or transient wildlife at the Site. This is a conservative assumption that ignores the obvious use of, or in some instances preferences for, golf course terrestrial and aquatic habitat areas by small mammals (e.g., mice, voles, moles, chipmunks, groundhogs, rabbits, squirrels, muskrats, raccoons, opossums, weasels), larger mammals (e.g., deer), aquatic birds (e.g., ducks, geese, herons), perching birds (blackbirds, thrushes, sparrows, finches, wrens), nectar-gathering birds (humming birds), and raptors (hawks and owls). Many of these species, the small mammals in particular, prefer to use the elevated berms surrounding bunkers and tees for denning habitat. Some birds also become quite content to utilize golf course aquatic habitats as their primary nesting habitat (e.g., Canada geese). Wading birds are common visitors to aquatic habitats. Predatory birds can frequently be observed foraging on fairways.

This HMP recognizes that despite the stated assumption that the golf course will offer no quality habitat to resident or transient wildlife species, an unavoidable fact is that some wildlife species become easily habituated to human activity and tend to utilize golf course habitats to the extent that they become a nuisance to golfers, or more significantly, that they begin to cause damage to the structure of in-play amenities. At most golf courses there is a real need to include management activities that actually discourage or prevent resident wildlife from utilizing golf course habitats. Nuisance wildlife control activities on the golf course will be undertaken on a case-specific basis by the golf course superintendent and property manager and are not treated as a component of the HMP.

3.1.6 Residential and Commercial

For purposes of this HMP, residential and commercial habitats include all developed land including structures, paved areas (parking lots, roads, and paths), as well as, landscaped lawns and gardens. Well maintained structures and roads can be accurately characterized as offering little or no ecological services to resident wildlife. Landscaped lawns and gardens do offer a limited scope of ecological services to some bird and small mammal species. This value can be increased for many bird species by the provision of nest boxes and feeding stations. Nuisance wildlife or feral animal (e.g., feral cats) populations can become common to areas that do not receive adequate maintenance and maintain sufficient sanitation controls for waste removal. The Silo Ridge property will be managed to meet the highest standards of upkeep and sanitation controls. If needed, nuisance wildlife control activities for Site facilities will be undertaken on a case-specific basis by the property manager and are not treated as a component of the HMP.

3.2 Connectivity and Sustainability

The HMP directly addresses the issue of habitat fragmentation that has been raised in comments to the DEIS. The HMP employs a number of different approaches to maintain connectivity between habitats and to facilitate animal movements during foraging, dispersal from nests or dens, and seasonal migrations associated with breeding or regulating physiological homeostasis. The

simplest of these approaches is to establish or expand existing habitat to eliminate gaps between functional units. The present golf course design contributes greatly to this goal. The new design establishes short grass plantings around the tees, plantings and maintenance of tall grass habitats between fairways and around the perimeter of in-play areas, and creation of transitional grasslands throughout the Site to expand existing forested habitats. At many locations throughout the Site, these habitat units are contiguous and provide uninterrupted connectivity between aquatic shoreline or wetlands and upland habitats.

This HMP and its accompanying BMP have been designed to provide sustainable habitat services to resident wildlife species on the Site. Maintenance schedules for mowing will be effective at maintaining grassland functionality. Forest management directives will be effective at preserving the integrity of sensitive riparian, wetland and vernal pool habitats contained within. The establishment of transitional grasslands with tree and shrub plantings in areas adjacent to tall grass will allow for the perpetual maintenance of a heterogeneous, irregular and soft edge between grasslands and forests thereby minimizing the damaging actions of nest predators and maximizing the benefits that a productive edge habitat can provide for both woodland and grassland species (Gillihan 2000). On the golf course, modified turf maintenance activities described in the IPM will protect the sustained productivity of riparian and aquatic edge buffers and habitat enhancement areas.

4.0 Buffer Management Plan and Initiatives

4.1. Objectives

The BMP's primary objective is to mitigate the effects of Site development. Activities leading to the degradation of aquatic and wetland resources can be mitigated to a large extent through efforts which intercept and redirect the environmental fate and transport processes that carry excess nutrients, mobile contaminants and eroding soil particles to sediment sinks in these natural features (Lowrance et al. 1984; Peterjohn and Correll 1984). Thermal pollution can be mitigated in some instances by simply replacing tree and shrub canopy coverage along stream banks to increase shading of affected streams (PADEP 2005). Damaging thermal hydrologic shocks to aquatic systems that originate as heated storm water runoff from impervious surfaces in a developed plot of land require considerably greater efforts to ameliorate the harmful effects to receiving waters. The SWPPP for the Site is the mitigation tool for addressing storm-related events where channeled overland runoff can be captured and attenuated prior to its introduction to surface waters. SWPPP design is not addressed in the buffer management plan except to identify the proposed locations of SWPPP storm water management basins (SWM), and to identify the extent of a 30 foot buffer area surrounding the draft design wet pool, attenuation basins, and adjacent terrestrial habitat. A standard planting list for SWM wet pools/attenuation basins is also provided in Appendix B. The BMP will focus on reducing sediment, nutrient, and contaminant transport and loading associated with overland sheet flow and ephemeral drainage swales that are not captured by the SWPPP.

Development activities leading to habitat loss are more difficult to mitigate against, and in absolute terms lost habitat is difficult to recover. Wherever possible, existing high quality habitat will be targeted for conservation and insulated from all degrading effects of development (e.g., the approach used for NYSDEC administered Adjacent Areas for wetlands). However, ecological services can be conserved, or alternatively replaced, to varying extents by enhancing habitats that have suffered injury or damage in the past. In this manner the BMP will focus on reestablishing canopy cover for on-site streams and on enhancing aquatic edge and shoreline habitats with a variety of terrestrial and aquatic planting groups.

4.2 Methods and Specifications

The BMP includes discrete areas of habitat conservation and protective vegetation zones adjacent to critical and sensitive wetland and aquatic habitats at the Site. A large number of vegetation zones are also identified as terrestrial habitat enhancements, due to the fact that a minimum 30 foot width of vegetation cannot be established next to the habitat unit targeted for protection. This occurrence is due to space and slope limitations for construction of roads, housing, or commercial units. On the golf course, this occurrence is due to space limitations and design specifications for in-play hazards.

Aquatic enhancement areas are identified for almost all of the impounded and flowing waters on the Site. These areas include narrow zones of aquatic and shoreline plantings at the margins of these habitats. In most instances these plantings do not interfere with any activities at the Site;

however, there are some areas in the golf course where these plantings must be limited in order to facilitate play around greens and fairways.

After review of the site-specific buffer specifications for "in-play" aquatic hazard areas on the golf course, the Fazio design concurred with the original Ernie Els design team determination that establishment of the low/high grass mixture along some of the surface water features at the site would result in unacceptable levels of interference with legal play. These instances are limited to fairway areas bisected by streams, and ponded areas whose edges border fairway approaches to greens or the green fringe. For this reason, some terrestrial enhancement areas now include, or have been entirely replaced with, a "high-cut" fescue rough (4 to 6 inches in height) which will vary from 5 to 15 feet in width along these specific hazards. This "high-cut" rough will be established to provide a minimum level of attenuation for overland storm water flow during high precipitation events. These rough areas will receive the same limits on the use of insecticides and herbicides described in the IPM program for individual water quality buffers and terrestrial habitat enhancement areas at the site (See Section 4.3). Mitigation structures reduce impacts to aquatic systems and provide resident wildlife with unobstructed access to the ecological services that in-stream and aquatic edge habitats provide. Three different types of mitigation structures are identified in the BMP.

Figures ENV-4 – ENV-6 in Appendix C show the locations and approximate area of coverage for all conservation buffers and water quality buffers on the Site. Detailed descriptions of buffer locations and buffering quality (e.g., aquatic edge coverage, in linear feet, for water quality and conservation buffers) at each on-site habitat unit are listed on Table 1, Appendix D. Table 1, Part 1 includes a summary description of both the current and proposed water quality buffer (minimum width 30 feet), coverage at each of the natural habitat units. This comparison effectively illustrates the significant commitment that has been made to increase the quality, area and effectiveness of natural vegetative buffers at the site.

The conservation and water quality buffers, and associated terrestrial/aquatic habitat enhancements and mitigation structures that have been established in the Silo Ridge Community Development Plan, represent a concerted effort to implement a sustainable and low impact approach that prioritizes efforts to avoid and minimize ecological impacts to both on-site and off-site natural resources. This approach is reflected in a HMP, BMP and IPM that together identify specific site improvements and management methods to protect and enhance existing natural resources and the ecological services they provide.

4.3 Management/Maintenance Program

Once the individual buffers and habitat enhancement areas are established at the Site, the BMP will be administered as part of the IPM program at the Site. The IPM program identifies guidelines for pesticide use at the golf course. A key component of the IPM program with regard to buffers and habitat enhancements will be limits on the use of insecticides and herbicides in the vicinity of established buffers and habitat enhancements. Limits will include a 30-foot no-spray zone immediately adjacent to sensitive aquatic edge habitats. Additionally, where terrestrial enhancements provide less than 30 feet of vegetation between in-play areas of the golf course and

sensitive aquatic edge habitats, the adjacent 30-foot no-spray zone will be augmented with a second 30-foot limited spray zone. No-Spray and limited-spray zones will be clearly demarcated to assure consistent compliance with the prescribed areas-specific restrictions on pesticide use. Demarcation methods will vary according to location on the course and will include a combination of permanent above-grade markers (e.g., PVC plugs) and natural marking methods (e.g., variation of grass cutting height, vegetation type). Further details on pesticide application practices on the golf course are provided in the Integrated Pest Management Plan (Audubon International, 2007).

5.0 RESTORATION PROJECTS

All restoration projects will be completed with close attention to preventing invasive species colonization within the restoration planting zones. As previously mentioned, special care will be taken to avoid inadvertent transport of seed or reproductive structures into the planting zone. This will include a thorough wash-down of all clearing and planting equipment (e.g., tires, undercarriage, etc.) used at the Site. Additional efforts will be undertaken to perform the work during a favorable season when the potential for wind-bourn transport of invasive plant seeds is minimal.

5.1 Stream E-2

A highly degraded reach of Stream E-2[9], immediately upstream and inclusive of its confluence with Cascade Amenia Brook, is targeted for a streambed restoration effort. (See Map ENV-4, Appendix C). Grass and shrub plantings along this highly eroded streambed will stabilize banks, reduce bank erosion and create a low shrub canopy to reduce thermal inputs. Shoreline plantings (hydrophilic low shrubs and ferns which will not interfere with the field of play) will aid in stabilizing stream banks. Large cobble and water bars will be added in-stream, and the stream bed itself will be widened to reduce flow velocities. This project will include approximately 150 linear feet of stream bed. Refer to the Silo Ridge Resort Community Phase 1 Site Plans, Sheet L5.01.

5.2 Cascade Amenia Brook Floodplain

An effort will be undertaken to restore the flood plain adjacent to Cascade Amenia Brook. The restoration area for this project will include approximately 1.5 acres of land between Pond D and the Hole 8 fairway, and approximately 300 feet of linear bank-side habitat along Cascade Amenia Brook (See Map ENV-4 for approximate location). Refer to the Silo Ridge Resort Community Phase 1 Site Plans, Sheet L5.01.

The conceptual plan calls for re-establishment of plant communities that are consistent with species assemblages currently present in adjacent reaches of the flood plain. Existing communities within the flood plain include open meadow, successional field, and climax forest. Habitat functionally will be graded between wet/moist and dry/upland species depending upon location in the flood plain. All plant species used in this project will be native to the area, and where ever possible plant species will be chosen to duplicate species already established on-site or in contiguous flood-plain habitats.

Open Meadow: The open meadow will be situated adjacent to successional field plantings and it will be comprised of a mixture of herbaceous groundcovers (P2 and P3 lists) that will be seeded according to soil type. Maintenance of the meadow will be limited to seasonal mowing to preserve grassland functionality.

[9] Stream E-2 is the downstream, ecological, continuation of Stream V.

Successional Field: The successional field is adjacent and lies between the open meadow and climax forest. It is primarily an area where pioneer tree species, shrubs and herbaceous groundcover will eventually transition into trees. Tree growth is expected to occur naturally from seed produced by mature trees in the adjacent climax forest plantings. This area will be planted with small caliper trees and shrubs (selected from Gt lists) in a variety of sizes and seeded with the appropriate seed mixture (from P3 list) all according to soil type.

Climax Forest: The climax forest will be re-established by planting upper story trees, understory trees, and shrubs (FP Restoration list). Herbaceous ground cover will be seeded. Establishment of a multi-strata area consisting of native woody (trees and shrubs) and herbaceous vegetation provides important wildlife habitat for insects, birds and mammals (CTDEP 2006).

Existing Woodlot Enhancement: Existing riparian tree stands adjacent to Cascade Amenia Brook will also be enhanced with plantings of understory trees, shrubs (from FP Restoration list) and seeding of herbaceous groundcover (from P2 lists).

5.3 Stream N/P

Stream N/P is a lengthy stretch of below-ground culverted stream that drains Wetland P and its headwater spring. Approximately 250 feet of Stream N/P drainage, bisecting the Hole 16 tee area, will be addressed in a restoration project to "daylight" the stream bed. (See Map ENV-6, Appendix C). Grass and shrub plantings along this highly eroded streambed will stabilize banks, reduce bank erosion and create a low shrub canopy to reduce thermal inputs. Shoreline plantings (hydrophilic low shrubs, grasses, sedges and ferns which will not interfere with the field of play) will aid in stabilizing stream banks. Large cobble and water bars will be added in-stream, and the stream bed itself will be widened to reduce flow velocities.

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Appendix A:
Habitat Quality for Resident Species at the Site

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Table 1
Part 1
Habitat Suitability Summary Tables

Presence of Habitat for Birds Identified on the Silo Ridge Study Area during the Breeding Bird Survey[10]

Common Name	Order	Scientific Name	Breeding Habitat	Wintering Habitat	Foraging Habitat
Great Blue Heron	Ciconiiformes	*Ardea herodias*	X		X
Green Heron	Ciconiiformes	*Butorides virescens*	X		X
Black Vulture	Ciconiiformes	*Coragyps atratus*	X	X	X
Turkey Vulture	Ciconiiformes	*Cathartes aura*	X	X	X
Canada Goose	Anseriformes	*Branta canadensis*	X		X
Wood Duck	Anseriformes	*Aix sponsa*	X	X	X
Mallard	Anseriformes	*Anas platyrhynchos*	X	X	X
Common Merganser	Anseriformes	*Mergus merganser*	X	X	X
Cooper's Hawk	Falconiformes	*Accipiter cooperii*	X	X	X
Red-shouldered Hawk	Falconiformes	*Buteo lineatus*	X	X	X
Red-tail Hawk	Falconiformes	*Buteo jamaicensis*	X	X	X
Wild Turkey	Galliformes	*Meleagris gallopavo*	X	X	X
Virginia Rail	Gruiformes	*Rallus limicola*	X		X
Killdeer	Charadriiformes	*Charadrius vociferus*	X		X

[10] During the 2014 Breeding Bird Survey – Parcel 1, performed by Lisa Standley, PhD of VHB, 24 breeding bird species were confirmed on the adjacent south parcel owned by Harlem Valley Landfill Corp. – See Appendix E.

Common Name	Order	Scientific Name	Breeding Habitat	Wintering Habitat	Foraging Habitat
American Woodcock	Charadriiformes	*Scolopax minor*	X		X
Rock Pigeon	Columbiformes	*Columba livia*	X	X	X
Mourning Dove	Columbiformes	*Zenaida macroura*	X	X	X
Great Horned Owl	Strigiformes	*Bubo virginianus*	X	X	X
Chimney Swift	Apodiformes	*Chaetura pelagica*	X		X
Ruby-throated Hummingbird	Apodiformes	*Archilochus colubris*	X		X
Belted Kingfisher	Coraciiformes	*Ceryle alcyon*	X	X	X
Red-bellied Woodpecker	Piciformes	*Melanerpes carolinus*	X	X	X
Yellow-bellied Sapsucker	Piciformes	*Sphyrapicus varius*	X	X	X
Downy Woodpecker	Piciformes	*Picoides pubescens*	X	X	X
Hairy Woodpecker	Piciformes	*Picoides villosus*	X	X	X
Northern Flicker	Piciformes	*Colaptes auratus*	X	X	X
Pileated Woodpecker	Piciformes	*Dryocopus pileatus*	X	X	X
Eastern Wood-Pewee	Passeriformes	*Contopus virens*	X		X
Willow Flycatcher	Passeriformes	*Empidonax traillii*	X		X
Least Flycatcher	Passeriformes	*Empidonax minimus*	X		X
Eastern Phoebe	Passeriformes	*Sayornis phoebe*	X		X
Great crested Flycatcher	Passeriformes	*Myiarchus crinitus*	X		X
Eastern Kingbird	Passeriformes	*Tyrannus*	X		X
Yellow-throated Vireo	Passeriformes	*Vireo flavifrons*	X		X
Warbling Vireo	Passeriformes	*Vireo gilvus*	X		X
Red-eyed Vireo	Passeriformes	*Vireo olivaceus*	X		X
Blue Jay	Passeriformes	*Cyanocitta cristata*	X	X	X
American Crow	Passeriformes	*Corvus brachyrhynchos*	X	X	X
Fish Crow	Passeriformes	*Corvus ossifragus*	X	X	X

Common Name	Order	Scientific Name	Breeding Habitat	Wintering Habitat	Foraging Habitat
Common Raven	Passeriformes	*Corvus corax*	X	X	X
Tree Swallow	Passeriformes	*Tachycineta bicolor*	X		X
Bank Swallow	Passeriformes	*Riparia*	X		X
Barn Swallow	Passeriformes	*Hirundo rustica*	X		X
Black-capped Chickadee	Passeriformes	*Poecile atricapilla*	X	X	X
Tufted Titmouse	Passeriformes	*Baeolophus bicolor*	X	X	X
White-breasted Nuthatch	Passeriformes	*Sitta carolinensis*	X	X	X
Carolina Wren	Passeriformes	*Thryothorus ludovicianus*	X	X	X
House Wren	Passeriformes	*Troglodytes aedon*	X		X
Blue-gray Gnatcatcher	Passeriformes	*Polioptila caerulea*	X		X
Eastern Bluebird	Passeriformes	*Sialia sialis*	X	X	X
Veery	Passeriformes	*Catharus fuscescens*	X		X
Hermit Thrush	Passeriformes	*Catharus guttatus*	X		X
Wood Thrush	Passeriformes	*Hylocichla mustelina*	X		X
American Robin	Passeriformes	*Turdus migratorius*	X	X	X
Gray Catbird	Passeriformes	*Dumetella carolinensis*	X		X
Northern Mockingbird	Passeriformes	*Mimus polyglottos*	X	X	X
Brown Thrasher	Passeriformes	*Toxostoma rufum*	X		X
European Starling	Passeriformes	*Sturnus vulgaris*	X	X	X
Cedar Waxwing	Passeriformes	*Bombycilla cedrorum*	X	X	X
Blue-winged Warbler	Passeriformes	*Vermivora pinus*	X		X
Yellow Warbler	Passeriformes	*Dendroica petechia*	X		X
Chestnut-sided Warbler	Passeriformes	*Dendroica pensylvanica*	X		X
Prairie Warbler	Passeriformes	*Dendroica discolor*	X		X
Palm Warbler	Passeriformes	*Dendroica palmarum*	X		X

Common Name	Order	Scientific Name	Breeding Habitat	Wintering Habitat	Foraging Habitat
Black-and-White Warbler	Passeriformes	*Mniotilta varia*	X		X
American Redstart	Passeriformes	*Setophaga ruticilla*	X		X
Worm-eating Warbler	Passeriformes	*Helmitheros vermivorus*	X		X
Ovenbird	Passeriformes	*Seiurus aurocapilla*	X		X
Common Yellowthroat	Passeriformes	*Geothlypis trichas*	X		X
Scarlet Tanager	Passeriformes	*Piranga olivacea*	X		X
Eastern Towhee	Passeriformes	*Pipilo erythrophthalmus*	X		X
Chipping Sparrow	Passeriformes	*Spizella passerina*	X		X
Field Sparrow	Passeriformes	*Spizella pusilla*	X	X	X
Song Sparrow	Passeriformes	*Melospiza melodia*	X	X	X
Swamp Sparrow	Passeriformes	*Melospiza georgiana*	X		X
Northern Cardinal	Passeriformes	*Cardinalis*	X	X	X
Rose-breasted Grosbeak	Passeriformes	*Pheucticus ludovicianus*	X		X
Indigo Bunting	Passeriformes	*Passerina cyanea*	X		X
Red-winged Blackbird	Passeriformes	*Agelaius phoeniceus*	X		X
Common Grackle	Passeriformes	*Quiscalus quiscula*	X	X	X
Brown-headed Cowbird	Passeriformes	*Molothrus ater*	X	X	X
Orchard Oriole	Passeriformes	*Icterus spurius*	X		X
Baltimore Oriole	Passeriformes	*Icterus galbula*	X		X
Purple Finch	Passeriformes	*Carpodacus purpureus*	X	X	X
House Finch	Passeriformes	*Carpodacus mexicanus*	X	X	X
American Goldfinch	Passeriformes	*Carduelis tristis*	X	X	X
House Sparrow	Passeriformes	*Passer domesticus*	X		X

Table 1
Part 2
Habitat Suitability Summary Tables

Presence of Habitat for Mammals Identified on the Silo Ridge Study Area during Field Surveys

Common Name	Order	Family	Scientific Name	Breeding Habitat	Wintering Habitat	Foraging Habitat
White-tailed deer	Artiodactyla	Cervidae	*Odocoileus virginianus*	X	X	X
Coyote	Carnivora	Canidae	*Canis latrans*	X	X	X
Raccoon	Carnivora	Procyonidae	*Procyon lotor*	X	X	X
Black bear	Carnivora	Ursidae	*Ursus americanus*	X	X	X
Striped Skunk	Carnivora	Mephitidae	*Mephitis*	X	X	X
Eastern cottontail	Lagomorpha	Leporidae	*Sylvilagus floridanus*	X	X	X
Beaver	Rodentia	Castoridae	*Castor canadensis*	X	X	X
Woodchuck	Rodentia	Sciuridae	*Marmota monax*	X	X	X
Eastern gray squirrel	Rodentia	Sciuridae	*Sciurus carolinensis*	X	X	X
Eastern chipmunk	Rodentia	Sciuridae	*Tamias striatus*	X	X	X
Eastern red bat	Chirptera	Vespertilionidae	*Lasiurus borealis*	X		X

Common Name	Order	Family	Scientific Name	Breeding Habitat	Wintering Habitat	Foraging Habitat
Big brown bat	Chiroptera	Vespertilionidae	*Eptesicus fucus*	X		X
Little brown bat	Chiroptera	Vespertilionidae	*Myotis lucifugus*	X		X
Northern long-eared bat	Chiroptera	Vespertilionidae	*Myotis sepentrionalis*	X		X
Southern flying squirrel	Rodentia	Sciuridae	*Glaucomyina volans*	X	X	X
Woodland-jumping mouse	Rodentia	Dipodidae	*Napaeozapus insignis*	X	X	X
Muskrat	Rodentia	Cricetidae	*Ondatra zibethicus*	X	X	X
Meadow Vole	Rodentia	Cricetidae	*Microtus pennsylvanicus*	X	X	X
White-footed mouse	Rodentia	Cricetidae	*Peromyscus leucopus*	X	X	X
Deer mouse	Rodentia	Cricetidae	*Peromyscus maniculatus*	X	X	X

Table 1
Part 3
Habitat Suitability Summary Tables

Presence of Habitat for Reptiles/Amphibians Identified on the Silo Ridge Study Area during Field Surveys

Common Name	Order	Family	Scientific Name	Breeding Habitat	Wintering Habitat	Foraging Habitat
American toad	Anura	Bufonidae	*Bufo americanus*	X	X	X
Spring peeper	Anura	Hylidae	*Pseudacris crucifer*	X	X	X
Green frog	Anura	Ranidae	*Rana clamitans*	X	X	X
Pickerel frog	Anura	Ranidae	*Rana palustris*	X	X	X
Dusky salamander	Caudata	Plethodontidae	*Desmognathus fuscus*	X	X	X
Northerntwo-lined salamander	Caudata	Plethodontidae	*Eurycea bislineata*	X	X	X
Redback salamander	Caudata	Plethodontidae	*Plethodon cinereus*	X	X	X
Red-spotted newt	Caudata	Salamandridae	*Notophthalmus viridescens*	X	X	X
Eastern painted turtle	Testudinata	Emydidae	*Chrysemys picta*	X	X	X
Eastern garter snake	Squamata	Colubridae	*Thamnophis sirtalis*	X	X	X
Snapping turtle	Testudines	Chelydridae	*Chelydra serpentina*	X	X	X

Common Name	Order	Family	Scientific Name	Breeding Habitat	Wintering Habitat	Foraging Habitat
Wood turtle	Testudines	Emydidae	*Clemmys insculpta*	X	X	X
Spotted turtle	Testudines	Emydidae	*Clemmys guttata*	X	X	X
Black racer	Squamata	Colubridae	*Coluber constrictor*	X	X	X
Northern water snake	Squamata	Colubridae	*Nerodia sipedon*	X	X	X
Gray tree frog	Anura	Hylidae	*Hyla versicolor*	X	X	X
Bullfrog	Anura	Ranidae	*Rana catesbeiana*	X	X	X
Wood frog	Anura	Ranidae	*Rana sylvatica*	X	X	X

Table 2
Listed Birds Observed On-site

Common Name	Scientific Name	Conservation Status	Rank	Preferred Habitat	Foraging Habits	Nesting Habitat	Site Observation Record
Cooper's Hawk	*Accipiter cooperii*	Global (G)/State (S) Rarity Rank State-listed Species Species of Greatest Conservation Need	G5/S4 SC	Fragmented woodlands, streamside groves (deciduous)	Preys on songbirds and small mammals	Open bowl of sticks lined with bark or vegetation, placed in main crotch or against trunk. Often on top of old crow, squirrel, or hawk nests	Migrant passover
Red-shouldered hawk	*Buteo lineatus*	G/S Rarity Rank State-listed Species Species of Greatest Conservation Need	G5/S4 SC	Mature, moist, mixed woodlands, often near streams	Hunts for snakes, frogs, mice, crayfish, and young birds from perches	Large bowl of sticks, dried leaves, bark, lichens, live conifer twigs. Main crotch of tree often near water	Migrant passover
Virginia rail	*Rallus limicola*	G/S Rarity Rank Listed status is currently indeterminable	G5/S5	Freshwater and brackish marshes and wetlands; coastal salt marshes	Probes water and mud with bill for insects, aquatic invertebrates, fish, frogs, and small snakes	Basket of loosely woven vegetation, often with a canopy placed above shallow water	In Wetland L
American woodcock	*Scolopax minor*	G/S Rarity Rank Partners in Flight Species of Greatest Conservation Need	G5/S5 AI	Young forests and old fields	Probes in dirt and leaf litter for earthworms	Ground; in moist woodlands and thickets	Tracks found along road near maintenance building

Common Name	Scientific Name	Conservation Status	Rank	Preferred Habitat	Foraging Habits	Nesting Habitat	Site Observation Record
Chimney swift	*Chaetura pelagica*	G/S Rarity Rank Listed status is currently indeterminable	G5/S5	Urban areas	Forages over open areas for caddiflies, mayflies, crane flies, beetles, wasps, ants, and bees	Chimneys or other constructed features such as air vents, garages, silos, barns, and lighthouses	Silos near golf course
Yellow-bellied sapsucker	*Sphyrapicus varius*	G/S Rarity Rank USFWS Bird of Conservation Concern	G5/S5	Early successional trees along wide riparian zones	Creates shallow holes in trees and feeds on sap. Feeds on insects gleaned from tree bark or captured in flight.	Constructed nest cavities in a range of tree species	Top of ridge
Eastern wood-pewee	*Contopus virens*	G/S Rarity Rank Listed status is currently indeterminable	G5/S5	Forest clearings and edges associated with wooded communities	Consumes flying insects during ventures from perch or consumes insects from leaves on the ground	On a tree or sapling	Top and base of ridge
Willow flycatcher	*Empidonax traillii*	G/S Rarity Rank Audubon Watch List Partners in Flight Species of Greatest Conservation Need	G5/S5 Yellow AI	Bogs, ponds, birch and alder thickets	Consumes primarily insects, some berries	Open cupped nests built low in crotch of shrubs/small tree near water	Near Wetland L + 2014 Harlem Valley Landfill (Standley, Appendix E)

Common Name	Scientific Name	Conservation Status	Rank	Preferred Habitat	Foraging Habits	Nesting Habitat	Site Observation Record
Wood thrush	*Hylocichla mustelina*	G/S Rarity Rank Audubon Watch List Partners in Flight Species of Greatest Conservation Need USFWS Bird of Conservation Concern	G5/S5 Yellow AI	Swamps, moist deciduous or mixed forests	Forages under leaf litter under forest canopy. Eats ground insects and berries (late-summer)	Open cup of leaves and grasses lined with mud placed on lower limbs of trees/shrubs	Throughout forested areas
Blue-winged warbler	*Vermivora pinus*	G/S Rarity Rank Audubon Watch List Partners in Flight Species of Greatest Conservation Need USFWS Bird of Conservation Concern	G5/S5 Yellow AI	Brushy meadows, second-growth hardwood	Forages in upper half of trees and shrubs for insects and spiders.	Open cup usually on or near ground	Uplands adjacent to Wetland L + 2014 Harlem Valley Landfill (Standley, Appendix E)
Prairie warbler	*Dendroica discolor*	G/S Rarity Rank Audubon Watch List Partners in Flight Species of Greatest Conservation Need USFWS Bird of Conservation Concern	G5/S5 Yellow AI	Open woodlands, scrublands, overgrown fields	Forages in lower branches and brush	Open cupped nests placed in trees/shrubs usually less than 3 meters from ground	South end of property in open field with several cedars/shrubs + 2014 Harlem Valley Landfill (Standley, Appendix E)

Common Name	Scientific Name	Conservation Status	Rank	Preferred Habitat	Foraging Habits	Nesting Habitat	Site Observation Record
Worm-eating warbler	*Helmitheros vermivorus*	G/S Rarity Rank Partners in Flight Species of Greatest Conservation Need USFWS Bird of Conservation Concern	G5/S4 AI	Dense undergrowth wooded slopes	Feeds on branches in clusters of dead leaves	Cupped nest placed on ground	On top of ridge
Scarlet tanager	*Piranga olivacea*	G/S Rarity Rank Species of Greatest Conservation Need	G5/NR	Forest interior	Insectivore and trees/shrubs for fruit	Crotch of tree	Base of ridge, tree line north of Wetland L, On top of ridge
Brown thrasher	*Toxostoma rufun*	G/S Rarity Rank Species of Greatest Conservation Concern	G5/NR	Thickets and Hedgerows	Ground forager	Low in a tree or shrub, occasionally placed on ground	Golf course
Peregrine falcon	*Falco peregrinus*	G/S Rarity Rank State-listed Species Species of Greatest Conservation Need USFWS Bird of Conservation Concern	G4/S3 E	Open landscape with adjacent cliffs	Cliffs or artificial structures (bridges, buildings, etc.)	Shallow scraped areas	Not observed onsite
Baltimore oriole	*Icterus galbula*	G/S Rarity Rank USFWS Bird of Conservation Concern	G5/S5	Deciduous woodland edges	Gleans or probes for caterpillars, fruit, adult insects, and spiders	Nest placed in isolated trees at edge of woodlands, along waterways, or in urban parks	Golf course + 2014 Harlem Valley Landfill (Standley, Appendix E)

Common Name	Scientific Name	Conservation Status	Rank	Preferred Habitat	Foraging Habits	Nesting Habitat	Site Observation Record
Purple finch	*Carpodacus purpureus*	G/S Rarity Rank Listed status is currently indeterminable	G5/S5	Breeding: Moist or cool coniferous forests Wintering: Broad range of habitats	Forges for seeds, buds, blossoms, nectar, tree fruits, and insects on outer portion of tree branches	Branch of conifer tree under overhanging branch or structure; also may place nest on ground	Base of ridge
Field Guide to the Birds of North America, National Geographic Society, 2nd Edition							
Cornell Lab of Ornithology "All About Birds" website http://www.birds.cornell.edu/AllAboutBirds/BirdGuide/							
The Birds of North American Online website: http://bna.birds.cornell.edu/bna							

Global (G)/State (S) Rarity Rank
G4 – Apparently Secure-Uncommon but not rare; some cause for long-term concern due to declines or other factors
G5 – Secure-Common; widespread and abundant
S3 – typically 21 – 100 occurrences
S4 – apparently secure in NYS
S5 – demonstrably secure in NYS
NR – not rated yet

State-listed Species
E – Endangered
SC – Special Concern

Audubon Watch List
Yellow – denotes species that are either declining or are rare. These are typically species of natural conservation concern**.**

Partners in Flight
AI – denotes species with Area Importance

Species Narratives

Cooper's hawk

The Cooper's hawk (*Accipiter cooperii)* generally has breeding habitat in southern Canada and northern United States, is a year-round resident in the central portion of the United States including southern New York, and has non-breeding habitat in Mexico and the coastal regions of the Gulf States. Its breeding habitat includes deciduous, mixed, and evergreen forests and woodlots. It seems to be tolerant of human disturbances and fragmentation with breeding being observed increasingly in suburban and urban areas. In studies conducted in New York, the nests were largely located within mixed forests with extensive canopy cover (~90%) in the more mature trees. Little is known about the overwintering habitat requirements for the Cooper's hawk, but some studies suggest that forests and edges were preferred over fields and other land uses. The Cooper's hawk feeds on a medium sized birds and mammals and typically utilizes perch-and-scan periods to identify prey. It also flies close to the ground, using bushes to disguise its approach.

Source: Curtis, Odette E., R. N. Rosenfield and J. Bielefeldt. 2006. Cooper's Hawk (*Accipiter cooperii*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/075.

Red-shouldered hawk

The red-shouldered hawk (*Buteo lineatus)* generally has breeding habitat in southeastern Canada and northeastern United States, is a year-round resident in the eastern-central portion of the United States including southern New York and along the Pacific coast, and has non-breeding habitat in Mexico. The preferential breeding habitat is mature, mixed deciduous-coniferous woodlands, especially bottomland hardwoods, riparian areas, and flooded deciduous swamps. The nests are usually placed in deciduous or deciduous/coniferous forests in a crotch of a main trunk that is below the canopy but more than halfway up the tree. The wintering habitat is similar to the breeding habitat but also includes lowland areas near water. Generally, red-shouldered hawks are more often in open habitat in the winter than during the breeding season. The red-shouldered hawk primarily feeds on small mammals, frogs, and snakes. It has been observed hunting from a variety of perches, including trees in the forest canopy, hay piles, poles, and fences.

Source: Dykstra, Cheryl R., Jeffrey L. Hays and Scott T. Crocoll. 2008. Red-shouldered Hawk (*Buteo lineatus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/107.

Virginia rail

The Virginia rail (*Rallus limicola)* is largely a migrant species, wintering in Mexico and southern coastal areas in the United States. It breeds in the northern and western United States with some resident populations along the Pacific Coast and the Chesapeake Bay. Its breeding

habitat is freshwater and brackish marshes and wetlands with robust emergent vegetation. It nests within areas of robust emergent vegetation that are touching, slightly submerged below, or just above the water surface. The Virginia rail requires standing water, moist soils, or mudflats for foraging and prefers shallow and intermediate water depths (0 to 6 inches). It feeds on invertebrates, small fish, and occasionally seeds.

Source: Conway, Courtney J. 1995. Virginia Rail (*Rallus limicola*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/173.

American woodcock

The American woodcock (*Scolopax minor)* is found throughout the eastern United States with breeding populations located in the northern states including New York, year-round populations in the southern states, and wintering populations along the Gulf. In its breeding habitat, the American woodcock is found in young forests and old fields. The nests are placed on the ground in young, upland, mixed-growth woodlands. It has a long bill that is specialized for extracting earthworms from the ground. The primary feeding habitat is defined by earthworm abundance, which varies by region but areas with favorable soil moisture (15 to 80%) and temperature (50° F to 64° F) support high densities of earthworm populations.

Source: Keppie, D. M. and R. M. Whiting, Jr. 1994. American Woodcock (*Scolopax minor*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/100.

Chimney swift

The breeding range of the chimney swift (*Chaetura palegica*) extends over much of the eastern United States and southeastern Canada. It migrates to its wintering habitat in the upper Amazon basin. It has a variety of habitats in its breeding range, but few details of this habitat have been quantified. The chimney swift appears to concentrate in urban areas where there is higher density of nest sites and communal roosts. While it appears that the chimney swifts nested in hollow trees, tree cavities, or caves prior to European settlement, the birds adapted to nesting in chimneys and other constructed features such as air vents, old open wells, abandoned cisterns, outhouses, boathouses, garages, silos, small and large barns, lighthouses, and firewood houses. The chimney swift's prey includes caddisflies, mayflies, crane flies, beetles, wasps, ants, and bees. It most frequently forages over open areas such as ponds and lakes but forages in a variety of habitats including over forests.

Source: Cink, Calvin L. and Charles T. Collins. 2002. Chimney Swift (*Chaetura pelagica*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/646.

Yellow-bellied sapsucker

The breeding range of the yellow-bellied sapsucker (*Sphyrapicus varius)* extends from Canada into New York, Pennsylvania, and northern New England. It winters in the southeast United States, the Caribbean, Mexico, and Central America. The yellow-bellied sapsucker requires early-successional tree species for both nesting and feeding. Typically, the bird is found along riparian zones up to 6,500 feet wide, particularly in quaking aspen (*Populus tremuloides*) and birch (*Betula* sp.). The eggs are laid in nest cavities that the males excavate from trees. Across its breeding range, a variety of tree species, including both living and decaying quaking aspen, beech (*Fagus* sp.), and elm (*Ulmus* spp.), have been observed being utilized as nesting areas. The yellow-bellied sapsucker creates shallow holes in tree bark and feeds on the sap that flows into these wells. It also feed on insects gleaned from the bark of the trees or captures them during flight.

Source: Walters, Eric L., Edward H. Miller and Peter E. Lowther. 2002. Yellow-bellied Sapsucker (*Sphyrapicus varius*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/662.

Eastern wood-pewee

The breeding range of the eastern wood-pewee (*Contopus virens*) extends over the eastern half of the United States and southeastern Canada. Its wintering habitat is located in South America. It breeding habitat includes forest clearings and edges associated with a variety of wooded communities, including deciduous and coniferous forests. In the Midwest, the eastern wood-pewee is often located within riparian areas but tends to avoid stream communities in eastern forests. The eastern wood-pewee does not appear to be area sensitive as it utilizes a variety of forest fragment sizes including edge and suburban habitats. The nests are always located within a tree or sapling. In one Canadian study, the most commonly utilized trees were elms (Ulmus spp.), oaks (Quercus spp.), maples (Acer spp.), birches (Betula spp.), and apples (Pyrus spp.). The eastern wood-pewee eats small flying insects during ventures from its perch and also consumes insects from leaves on the ground. The preferential feeding perches are dead branches located at intermediate heights (36 feet) in the sub-canopy or canopy.

Source: Mccarty, John P. 1996. Eastern Wood-Pewee (*Contopus virens*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/245.

Willow flycatcher

The willow flycatcher (*Empidonax traillii*) is a migrant species that winters in southern Mexico to northern South America. Its breeding habitat includes wet habitats in the northern and western portions of the United States, including New York State in its entirety. Throughout its range, the female builds the nest in a low crotch of a willow shrub (or other shrub or small tree species) that is located near water. The willow flycatcher is primarily an insectivore, although it occasionally will eat fruit. It is mostly an aerial forager that prefers a short distance, horizontal flight from low

perches on willows, but it has also been observed hover-gleaning from leaf surfaces and taking insects from the ground.

Source: Sedgwick, James A. 2000. Willow Flycatcher (*Empidonax traillii*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/533.

Wood thrush

The wood thrush (*Hylocichla mustelina)* is a migrant species that winters in the lower elevations between southeastern Mexico and Panama and breeds in the eastern half of the United States. Its primary breeding habitat includes the interior and edges of deciduous and mixed forests that contain a shrub-canopy layer, shade, moist soils, and leaf litter. Nests are mostly placed below 20 feet in trees and shrubs, usually in a crotch or fork. The wood thrush feeds largely on soil invertebrates and on fruits from shrubs later in the season. It forages under the forest canopy in the leaf litter where there is little to no herbaceous cover.

Source: Roth, R. R., M. S. Johnson and T. J. Underwood. 1996. Wood Thrush (*Hylocichla mustelina*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/246.

Blue-winged warbler

The blue-winged warbler *(Vermivora pinus)* is a migrant species that is found in Northeastern and Midwestern portions of the United States during the breeding season and the Gulf portions of Mexico and Central America in the winter. In its breeding range, its habitat includes overgrown old fields, brushy swamps, dense shrublands, forest edges, and forest clearings. It nests in early to mid-succession habitat such as the transitional habitat between forests and fields. The nests are on or near the ground often shaded by large trees. The blue-winged warbler feeds on insects, particularly caterpillars, crickets, grasshoppers, and spiders. Its foraging habitat is the upper half of trees and shrubs but also in areas closer to the ground in areas of dense vegetation.

Source: Gill, Frank B., Ronald A. Canterbury and John L. Confer. 2001. Blue-winged Warbler *(Vermivora pinus)*, The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/584.

Prairie warbler

The prairie warbler *(Dendroica discolor)* is a migrant species that winters in the Bahamas, on Caribbean islands, and in southern Florida. Its breeding range is primarily located in the southeastern United States but extends into southern New York and New England. The prairie warbler requires early successional habitats, such as shrubby old fields, early-stage regenerating forests, and dunes for breeding. It is likely that the species was rare or absent in much of its present

breeding range prior to European settlement. Nests are often placed near undefended boundaries in trees and shrubs with numerous branches, twigs, and leaves distributed throughout plant. In the breeding grounds, the foraging habitat is varied as the prairie warbler is a generalist and interrupts almost all activities to capture food resources. For example, a male advertising will feed in high perches but during most other times will feed within a few meters of the ground. The most common feeding mechanisms include gleaning insects and spiders from leaves and branches while perching or hopping; fly-catching; and hovering under leaves, at flowers, or at spider webs.

Source: Nolan Jr., V., E. D. Ketterson and C. A. Buerkle. 1999. Prairie Warbler *(Dendroica discolor)*, The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/455.

Worm-eating warbler

The worm-eating warbler *(Helmitheros vermivorum)* is a migrant species that winters in the forest and scrub habitats of the Greater Antilles and in the moist forests of Central America. It breeds in eastern North America, largely nesting in locations where large tracts of deciduous and mixed forest overlap with moderate to steep slopes and patches of dense understory shrubs. Breeding populations have also have been found in low-elevation, coastal forests. The worm-eating warbler is considered to be area sensitive with minimum area requirements ranging between 50 acres to 840 acres. The nests are usually placed on the ground, often near a stream or wetland. It is usually hidden under a drift of dead leaves at the base of a sapling, against the roots of shrubs and trees, beside a rock ledge or outcrop, or in dense low shrubs. Alternatively, nests may be built on level ground in open places with little shade. The worm-eating warbler's diet largely consists of caterpillars, other insects, and spiders. Before leaf-out, the worm-eating warbler hops through the understory and probes into suspended dead leaves for food. Once the leaves begin to emerge, the worm-eating warbler expands it searching area to include new leaves and flower buds.

Source: Hanners, Lise A. and Stephen R. Patton. 1998. Worm-eating Warbler *(Helmitheros vermivorum)*, The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/367.

Scarlet tanager

The scarlet tanager (*Piranga olivacea*) is a neotropical migrant, breeding in the northeastern portion of the United States and wintering in South America. Its breeding range corresponds to the location of the community broadly identified as Eastern Deciduous Forest. As a forest interior species, it is an area dependent species requiring at least 24 to 30 acres to support a viable population. It prefers mature forest but has been observed in successional forests as well. It usually places its nest in a crotch of a tree among a cluster of leaves where there is a clear, unobstructed view of the ground and clear flyways from adjacent trees. The scarlet tanager is primarily an insectivore, feeding on caterpillars and adult insects by hovering and gleaning. It also forages in trees and shrubs for fruits.

Source: Mowbray, Thomas B. 1999. Scarlet Tanager (*Piranga olivacea*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/479.

Brown thrasher

The brown thrasher (*Toxostoma rufum*) is located east of the Rocky Mountains in the United States with breeding habitat in the north, year round habitat in the south, and wintering habitat in a portion of Texas. In the eastern United States, its primary breeding habitat is thickets and hedgerows within deciduous forest clearings and edges. The nest is usually placed low in a tree or shrub but occasionally is placed on the ground. The brown thrasher is a ground forager typically eating insects and spiders during the breeding season and seeds, fruits, and berries during the late summer.

Source: Cavitt, John F. and Carola A. Haas. 2000. Brown Thrasher (*Toxostoma rufum*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/557.

Peregrine falcon

The peregrine falcon (*Falco peregrinus*) is widely distributed and its habitat includes a wide variety of ecosystem types. During the breeding season, it can be found most everywhere except the Amazon Basin, the Sahara Desert, the steppes of central and eastern Asia, and Antarctica. It is most commonly found in habitats that contain cliffs or some sort of nesting platforms and open gulfs of air for hunting. The peregrine falcon also inhabits a wide variety of habitats in its wintering range. The only difference between the breeding and wintering habitat is that the wintering habitat may occur in open-relief areas without suitable nesting areas. Besides natural cliffs ranging between 25 and 1,300 feet, suitable nesting platforms include old nests of other bird species on electric pylons, channel buoys, and towers; stone quarries; factory silos; buildings, churches, and bridges in urban centers; and power plants. The diet of the peregrine falcon includes birds, bats, and rodents. The prey is typically captured while the peregrine falcon is in flight. Occasionally, the peregrine falcon will walk on the ground to prey on nestling birds and rodents.

Source: White, Clayton M., Nancy J. Clum, Tom J. Cade and W. Grainger Hunt. 2002. Peregrine Falcon (*Falco peregrinus*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/660.

Baltimore oriole

The Baltimore oriole *(Icterus galbula)* has breeding habitat throughout central-southern Canada and central and northern United States. It has wintering habitat in Florida and portions of the Caribbean, Mexico, Central America, and northern South America. In its breeding range, the Baltimore oriole is found in a wide range of habitats but tends to favor woodland edges including riparian edges and open areas with scattered trees. It prefers deciduous trees over coniferous trees.

The nests are often located in isolated trees at the edge of woodlands, along waterways, or in urban parklands. The Baltimore oriole's diet during the breeding season largely consists of caterpillars, fruit, adult insects, and spiders. It forages for its prey in trees or bushes by gleaning or probing.

Source: Rising, James D. and Nancy J. Flood. 1998. Baltimore Oriole *(Icterus galbula)*, The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/384.

Purple finch

The purple finch *(Carpodacus purpureus)* has breeding habitat throughout southern and central Canada, is a year-round resident in the northeast United States including New York and along the Pacific coast, and has wintering habitat in the central and southeastern portions of the United States. Its primary breeding habitat is found in moist or cool coniferous forests, but the breeding habitat also frequently includes mixed coniferous-deciduous forests, bog edges, and riparian corridors. The purple finch has also been observed breeding in deciduous forests; orchards; ornamental plantations; pastures and lawns that contain scattered conifers and shrubs; hedgerows; and developed areas. The nest is usually placed on a branch of a conifer tree that is 2 to 60 meters above ground under an overhanging branch or structure; however, occasionally the nest is constructed on the ground. The wintering habitat includes a broad range of habitats, including coniferous, deciduous, and mixed coniferous-deciduous forests; urban and suburban areas; mixed shrub and conifer habitats; weedy fields; and hedgerows. The purple finch forages mainly on seed, buds, blossoms, nectar, tree fruits, and occasionally insects. While it may feed on the ground, it typically feeds on the outer portion of the tree branches of heights ranging between 1 to 100 feet.

Source: Wootton, J. Timothy. 1996. Purple Finch *(Carpodacus purpureus)*, The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/208.

Great blue heron

The great blue heron *(Ardea herodias)* is found year-round throughout most of the United States. In southern Canada and the northern Plain States it is only found during the breeding season, and some populations of the great blue heron overwinter in Central America and northern, coastal South America. Its breeding habitat includes slow moving or calm freshwater or areas along seacoasts. During the winter along the east coast of the United States, the blue heron's habitat includes coastal marine areas such as salt marshes. The populations along the east coast nest in trees or bushes or on the ground near inland waters. The great blue heron typically nests in colonies located on islands or in wooded swamps to minimize nest predation. The great blue heron predominantly preys on fish by wading along the shoreline of oceans, marshes, lakes, and rivers. However, it may hunt in upland fields for rodents during the winter. The great blue heron also eats amphibians, invertebrates, reptiles, mammals, and birds.

Source: Butler, Robert W. 1992. Great Blue Heron *(Ardea herodias)*, The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/025

Red-tailed hawk

The red-tailed hawk (*Buteo jamaicensis*) is widely distributed throughout North America with breeding populations in Canada and the northern United States. Resident populations are found throughout much of the United States (including New York), Mexico, the Pacific Coast of Central America, and the Caribbean. In both its breeding and wintering range, the habitat requirements for the red-tailed hawk include open areas with patches of trees or similar structures to serve as perch sites. The habitat types that encompass these requirements are quite broad and include scrub deserts, plains and montane grassland, agricultural fields, pastures, urban parklands, broken coniferous and deciduous woodlands, and tropical rain forests. Nests are placed in a location that provides unobstructed access from above and a view of the surrounding area. Examples include within the crown of a tall tree within a woodlot area, cliffs, and constructed ledges (e.g., buildings). The red-tailed hawk preys on medium sized mammals, birds, snakes, and occasionally insects and fresh carrion. It is a sit-and-wait predator, so its feeding habitat requirements include elevated perch sites.

Source: Preston, C. R. and R. D. Beane. 1993. Red-tailed Hawk (*Buteo jamaicensis*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/052

Wild turkey

The wild turkey (*Meleagris gallopavo*) is a non-migratory species whose range includes portions of most of the Unites States and portions of Mexico. Its range in the western United States is much patchier than in the eastern portion. In the northeast, the wild turkey is found in oak-hickory (*Quercus carya*) forests and forests of red oak (*Quercus rubra*), beech (*Fagus grandifolia*), cherry (*Prunus serotina*), white ash (*Fraxinus americana*) during the fall, winter, and spring. During the summer nesting period, its range includes forest openings. It nests on the ground in a depressional area in dead leaves at the base of a tree or under a brush pile in the forest. The wild turkey forages in flocks searching the ground for vegetable matter but will occasionally mount a shrub or low tree to access fruits.

Source: Eaton, Stephen W. 1992. Wild Turkey (*Meleagris gallopavo*), The Birds of North America Online (A. Poole, Ed.). Ithaca: Cornell Lab of Ornithology; Retrieved from the Birds of North America Online: http://bna.birds.cornell.edu/bna/species/022

HERPETOFAUNA

Dusky salamander

The dusky salamander (*Desmognathus fuscus*) is a permanent resident along the majority of the east coast of the United States, including throughout New York except for Long Island. Its habitat is comprised of stream and spring margins, leaf-filled trickles, and the beds of partially dry streams in deep ravines. It burrows in or using soil. It occasionally enters the water but is largely a terrestrial species. The female attends to the eggs, which can be found in June, July, and August underneath logs, stones, or bark in the vicinity of water. It feeds largely on terrestrial insects but also on small aquatic invertebrates.

Sources: Bishop. S.C. 1943. Handbook of Salamanders of the United States, of Canada, and of Lower California. Ithaca, New York: Comstock Publishing Group, Inc. p. 188-192.

NatureServe. 2008. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.0. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: May 16, 2008).

NYSDEC. 2008. New York State Amphibian and Reptile Atlas. Available: http://www.dec.ny.gov/animals/7140.html. (Accessed: May 16, 2008).

Two-lined salamander

The two-lined salamander (*Eurycea bislineata bislineata*) is a permanent resident in the northeast United States, including throughout New York except for eastern Long Island. The primary habitat includes stream edges underneath stones and logs in areas with well saturated soils. During the egg-laying period, it is found in more aquatic habitats. The eggs are laid underneath submerged rocks, logs, or aquatic plants. It feeds largely on terrestrial insects but also on small aquatic invertebrates.

Source: Bishop. S.C. 1943. Handbook of Salamanders of the United States, of Canada, and of Lower California. Ithaca, New York: Comstock Publishing Group, Inc. p. 404-407.

NatureServe. 2008. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.0. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: May 16, 2008).

NYSDEC. 2008. New York State Amphibian and Reptile Atlas. Available: http://www.dec.ny.gov/animals/7140.html. (Accessed: May 16, 2008).

Spotted turtle (NYS Special Concern Species)

The spotted turtle (*Clemmys guttata*) is found along the Coastal Atlantic Plain from Maine to Florida and along the Great Lakes in Michigan, Ohio, New York, and Pennsylvania. In New York, specifically, it has been found along the Hudson Valley, particularly in the southern portion of the state, and in the counties near Lake Erie. The spotted turtle's habitat includes a wide variety of shallow wetlands, including swamps, bogs, fens, wet pastures, marshes, tidally influenced brackish streams, and small woodland streams. Once the temperatures drop below 32° F, the spotted turtle becomes dormant and overwinters in muskrat burrows or at the bottom of pools of running water. After the end of the breeding season in May, females leave the breeding pools to find nesting habitat, which is typically an open area such as a meadow, field, or edge of road. The spotted turtle is omnivorous and feeds in the water on aquatic grasses, green algae, aquatic insect larvae, small crustaceans, snails, tadpoles, salamanders, and fish.

Sources: Ernst, C.H., J.E. Lovich, R.W. Barbour. 1994. Turtles of the United States and Canada. Washington D.C.: Smithsonian Institutional Press. p. 205-212.

NYSDEC. 2008. Spotted Turtle Fact Sheet. Available: http://www.dec.ny.gov/animals/7150.html. (Accessed: May 17, 2008).

NYSDEC. 2008. New York State Amphibian and Reptile Atlas. Available: http://www.dec.ny.gov/animals/7140.html. (Accessed: May 17, 2008).

Bog turtle (NYS Endangered and Federally Threatened Species)

The distribution of the bog turtle (*Clemmys muhlenbergii*) is discontinuous over the northeastern United States. In New York, the bog turtle has been reported in the southern Hudson Valley (Columbia, Dutchess, Ulster, Sullivan, Orange, Putnam, and Westchester Counties) and along Lake Erie (Oswego, Cayuga, and Seneca Counties). In New York, bog turtles are primarily located in early successional habitat types with open canopies, such as wet meadows and spring-fed sphagnum bogs. More generally, its key habitat components seem to include clear, slow moving waters with soft, highly organic substrates and open canopies. The bog turtle overwinters in the soft bottoms of waterways or burrows of small mammals. The females nest in open areas away from wetter areas of habitat, such as elevated sedge tussocks, sphagnum moss above the water line, adjacent pastures, or even sides of railroad embankments. It is an omnivorous species that feeds on both land and water. Its primary food sources include insects, berries, seeds, frogs, nestling birds, earthworms, and plant material.

Sources: Ernst, C.H., J.E. Lovich, R.W. Barbour. 1994. Turtles of the United States and Canada. Washington D.C.: Smithsonian Institutional Press. p. 213-221.

NYSDEC. 2008. Bog Turtle Fact Sheet. Available: http://www.dec.ny.gov/animals/7164.html. (Accessed: May 17, 2008).

NYSDEC. 2008. New York State Amphibian and Reptile Atlas. Available: http://www.dec.ny.gov/animals/7140.html. (Accessed: May 17, 2008).

Wood turtle (NYS Special Concern)

The wood turtle (*Clemmys insculpta*) is generally found in the northeast United States and along the Great Lakes in the Midwest. It has been found throughout much of New York State, except along Long Island. Wood turtles are generally found in close association with permanent streams but become more terrestrial in the summer, roaming in deciduous woods, cultivated fields, and woodland bogs, marshy pastures. However, even in the summer it is never far from water and typically enters a stream every few days. The wood turtle overwinters in the bottoms or banks of streams where water flows all winter, including pools underneath a layer of ice. Other overwintering locations include underwater muskrat burrows, beaver lodges, or over-bank roots. Nesting requirements include exposure to direct sunlight, well-drained but moist and or soil substrate that is not subject to flooding, and a substrate free of rocks and thick vegetation. The wood turtle is omnivorous and has been observed eating berries, fungi, invertebrates, flowers, and plant material.

Sources: Ernst, C.H., J.E. Lovich, R.W. Barbour. 1994. Turtles of the United States and Canada. Washington D.C.: Smithsonian Institutional Press. p. 222-233.

NatureServe. 2008. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.0. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: May 16, 2008).

NYSDEC. 2008. New York State Amphibian and Reptile Atlas. Available: http://www.dec.ny.gov/animals/7140.html. (Accessed: May 16, 2008).

Eastern box turtle (NYS Special Concern)

The eastern box turtle (*Terrapene carolina*) is located throughout the southeastern United States. The northern limits include the southern portions of New York, Massachusetts, New Hampshire, and Maine. More specifically in New York, the eastern box turtle has been observed in Long Island and the counties along the lower Hudson Valley. Generally, the eastern box turtle inhabits open woodlands but can also be found in pastures and marshy meadows. The eastern box turtle hibernates by burrowing into loose soil, sand, vegetable debris, muddy bottoms of ponds or streams and by entering into mammal burrows. It is postulated that the depth at which soil freezes may limit the northern distribution of this species. The preferable nesting habitat includes an open elevated patch of sandy or loamy soils. The eastern box turtle is an omnivorous species that feeds on both land and water with the younger turtles being chiefly carnivorous and the adults being more herbivorous. The diet across all life stages includes fungi, flowers, seeds, fruits, snails, crayfish, caterpillars, slugs, and centipedes.

Source: Ernst, C.H., J.E. Lovich, R.W. Barbour. 1994. Turtles of the United States and Canada. Washington D.C.: Smithsonian Institutional Press. p. 250-265.

NYSDEC. 2008. New York State Amphibian and Reptile Atlas. Available: http://www.dec.ny.gov/animals/7140.html. (Accessed: May 17, 2008).

Northern black racer

The northern black racer (*Coluber constrictor*) is a widely distributed snake being found throughout the continental United States, except for Alaska. In New York, the northern black racer has been primarily observed in Long Island and the counties along the lower Hudson Valley. It inhabits abandoned fields, grasslands, open woodlands, and grassy-bordered streams. It hibernates in rocky hillsides in large numbers and often with other species. The female lay its eggs in rotting tree stumps, in sawdust piles, under rocks, or in tunnels of small mammal burrows. It is primarily a ground dwelling species and eats large insects, frogs, lizards, other snakes, rodents, and birds.

Sources: Behler, J.L. and F.W. King. 1979. The Audubon Society Field Guide to North American Reptiles and Amphibians. New York: Alfred A. Knopf, Inc. p. 596-599.

NYSDEC. 2008. New York State Amphibian and Reptile Atlas. Available: http://www.dec.ny.gov/animals/7140.html. (Accessed: May 17, 2008).

FISH

Brook trout

The brook trout (*Salvelinus fontinalis)* is found throughout the northeastern United States and is a native to New York streams. However, it also has been introduced throughout much of the United States. Brook trout inhabit clear headwater streams with low temperatures and high dissolved oxygen levels. It can also be found in lakes. Brook trout spawn in the fall within sand and gravel areas where groundwater upwelling occurs. Young brook trout feed on insect larvae and small crustaceans, whereas adults feed on small fish and crayfish.

Sources: Cornell University. 2008. Brook trout (*Salvelinus fontinalis*). Available: http://pond.dnr.cornell.edu/nyfish/Salmonidae/brook_trout.html. (Accessed May 17, 2008).

NatureServe. 2008. NatureServe Explorer: An online encyclopedia of life [web application]. Version 7.0. NatureServe, Arlington, Virginia. Available http://www.natureserve.org/explorer. (Accessed: May 17, 2008).

PLANTS

Hill's pondweed (NY Threatened)

Hill's pondweed (*Potamogeton hillii*) is an obligate wetland plant found in the northeast, upper Midwest, and a portion of Canada. In New York it is found in the calcareous wetlands, ponds, streams, lakes, and ditches of the eastern Hudson Valley and central New York. The recorded

water levels where Hill's pondweed has been found vary from 0 feet (exposed muddy substrate) to 8 feet.

Sources: New York Natural Heritage Program. 2008. Species notes for Hill's pondweed. Available: http://www.acris.nynhp.org/report.php?id=9799 (Accessed: May 17, 2008).

USDA. 2008. USDA Plant Database, Plants Profile for Hill's pondweed (*Potamogeton hillii*). Available: http://plants.usda.gov/ (Accessed: May 17, 2008).

Appendix B:
Planting Plans and Species Habitat Value

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Silo Ridge Resort Community

Planting Plans

Aquatic Bench Plants, Wetland Shelf and Erosion Control/Restoration Group for Storm Water Management Basins.

Grasses
Ernst Seeds "Restoration Basin Wildlife Mix"

Sedges
Bearded Sedge (*Carex comosa*)
Fringed Sedge (*Carex crinita*)
Wool Grass (*Scirpus cyperinus*)

Rushes
Soft Rush (*Juncus effusus*)
Hardstem Bull Rush (*Scirpus acutus*)

Forbs
Sweet Flag (*Acorus americanus*)
Pickerelweed (*Pontederia cordata*)
Burreed (*Sparganium americanum*)
Arrow Arum (*Peltandra virginica*)

P0 – Littoral Shelf Group for Emergent Aquatic Habitat Enhancement Margins

Plant species for the P0 group have been selected to be consistent with the littoral aquatic communities present in the onsite and contiguous wetlands at the Silo Ridge property. Prior to establishing a final list, a qualitative survey will be completed to confirm the species proposed for this planting and to identify new species that can be added to the list.

Sedges
Fringed Sedge (*Carex crinita*)
Shallow Sedge (*Carex lurida*)
Wool Grass (*Scirpus cyperinus*)

Rush
Soft Rush (*Juncus effusus*)
Dark Green Bull Rush (*Scirpus atrovirens*)

Forb
Broadleaf Cattail (*Typha latifolia***)**

P1 – Shoreline Group for Aquatic Habitat Enhancement Margins

Grasses
Rice Cut Grass (*Leersia oryzoides*)
Seed mix: New England Wetland Plants "Wet Mix"

Sedges
Water Sedge (*Carex aquatilis*)
Awl Sedge (*Carex stipata*)

Forbs
Swamp Milkweed (*Asclepias incarnata*)
Marsh Marigold (*Caltha palustris*)
Spotted Joe-pye Weed (*Eupatorium maculatum*)

Rushes
Soft Rush (*Juncus effusus var. Pylaei*)
Hardstem Bull Rush (*Scirpus acutus*)
Dark Green Bull Rush (*Scirpus atrovirens*)

Shrubs
See Gt Shrubs for Shrub plant list for P1 - use OBL or FAC/WET

HR/FESCUE - NATIVE GRASS MIX FOR IN-PLAY BUFFERS AND HABITAT ENHANCEMENTS

Sheep fescue (*Festuca ovina*)
Red fescue (*Festuca rubra*)
Fine-leaved fescue (*Festuca trachyphylla, F. filiformis*)
Little bluestem (*Schizachyrium scoparium*)
Tufted hairgrass (*Deschampsia caespitosa*)

NOTE: These grasses have been selected for this palette because of their compatibility with golf course usage while also protecting water quality and wildlife habitat. Fescue grasses have short stature, drought tolerance, and low nutrient requirements. These fescues are native to Europe, but have been widely naturalized in North America since the 1700s. There are no native fescue species with which these could interbreed. Horticultural varieties of these species have been developed to enhance drought resistance, disease tolerance, and growth form. The specific varieties used in will be selected based on availability, drought resistance and disease tolerance. The little bluestem and tufted hairgrass are native species and will not have any allowable substitutions.

P2 – Short Grasses and Forbs for In-Play Buffers and Habitat Enhancements (Maintained Short Grassland)

Grasses
Dropseed (*Sporobolus asper*)
Little Bluestem (*Schizachyrium scoparium*)
Poverty Grass (*Danthonia spicata*)
Sideoats Gramma (*Bouteloua curtipendula*)
Tufted Hairgrass (*Deschampsia cespitosa*)
Purple Lovegrass (*Eragrotis spectabilis*)

Forbs
Common Evening Primrose (*Oenothera biennis*)
Columbine (*Aquilegia canadensis*)
Heath Aster (*Aster ericoides*)
New England Aster (*Aster novae-angliae*)
Canada Trick-trefoil (*Desmodium canadense*)
Wild Lupine (*Lupinus perennis*)
Wild Bergamot (*Monarda fistcosa*)
Sundrops (*Oenothera fruticosa*)
Beardtongue (*Penstemon digitalis*)
Perennial Phlox (*Phlox paniculata*)
Cut-leaf Coneflower (*Rudbeckia laciniata*)
Blue Vervain (*Verbena hastata*)

P3 – Tall Grasses and Forbs (Maintained Tall Grassland)

Grasses
Canada Wild Rye (*Elymus canadensis*)
Prairie Cordgrass (*Spartina pectinata*)
Switchgrass (*Panicum virgatum*)
Big Bluestem (*Andropogon gerardii*)
Sideoats Gramma (*Bouteloua curtipendula*)
Dropseed (*Sporobolus asper*)
Indian Grass (*Sorghastrum nutans*)
Poverty Grass (*Danthonia spicata*)
Purple Lovegrass (*Eragrotis spectabilis*)
Little Bluestem (*Schizachyrium scoparium*)

Forbs
Common Evening Primrose (*Oenothera biennis*)
Columbine (*Aquilegia canadensis*)
Heath Aster (*Aster ericoides*)
New England Aster (*Aster novae-angliae*)
Canada Trick-trefoil (*Desmodium canadense*)

Wild Lupine (*Lupinus perennis*)
Wild Bergamot (*Monarda fistulosa*)
Sundrops (*Oenothera fruticosa*)
Beardtongue (*Penstemon digitalis*)
Perennial Phlox (*Phlox paniculata*)
Cut-leaf Coneflower (*Rudbeckia laciniata*)
Blue Vervain (*Verbena hastata*)

Gt – Shrubs and Trees for Out-of-Play Buffers and Habitat Enhancements (Transitional Grassland)

Shrubs (*OblWet*) (use with P1 Plant Palette)
Bog Laurel (*Kalmia polifolia*)

Shrubs (*FacWet*) (use with P1 Plant Palette)
Swamp Dogwood (*Cornus amomum*)
Gray Dogwood (*Cornus foemina/ racemosa*)
High-bush Cranberry (*Viburnum opulus var. Americanum*)
Nannyberry or Wild raisin (*Viburnum lentago or V. nudum*)
Southern Arrowwood (*Viburnum dentatum*)
Elderberry (*Sambucus canadensis*)
Red chokeberry (*Aronia arbutifolia*)
Sweet pepperbush (*Clethra alnifolia*)
Red-twig dogwood (*Cornus sericea*)
Inkberry (*Ilex glabra*)
Winterberry (*Ilex verticillata*)
Hardhack (*Spiraea tomentosa*)
Lowbush blueberry (*Vaccinium angustifolium*)
Highbush blueberry (*Vaccinium corymbosum*)

Trees (*FacWet*) (use with P1 Plant Palette)
River Birch (*Betula nigra*)
Bitternut (*Carya cordiformis*)
Silver Maple (*Acer saccharinum*)
American Larch (*Larix laricina*)
Eastern White Cedar (*Thuja occidentalis*)
Green Ash (*Fraxinus pennsylvanica*)
Red maple (*Acer rubrum*)
Atlantic white cedar (*Chamaecyparis thyoides*)
Tupelo (*Nyssa sylvatica*)
Swamp white oak (*Quercus bicolor*)
Black willow (*Salix nigra*)

Shrubs (*FacUpland*)
Witch Hazel (*Hamamelis virginiana*)

Staghorn Sumac (*Rhus hirta/typhina*)
Chokecherry (*Prunus virginiana*)
Maple-leaf viburnum (*Viburnum acerifolium*)
Bayberry (Myrica pensylvanica)
Spicebush (Lindera benzoin)

Trees (*FacUpland*)
Red Maple (*Acer rubrum*)
Paper Birch (*Betula papyrifera*)
Shagbark Hickory (*Carya ovata*)
Beech (*Fagus grandifolia*)
Pin Cherry (*Prunus pennsylvanica*)
Eastern Red Cedar (*Juniperus virginiana*)
Eastern White Pine (*Pinus strobus*)
White Spruce (*Picea glauca*)
Red Pine (*Pinus resinosa*)
Hornbeam (*Carpinus caroliniana*)
Hop Hornbeam (*Ostrya virginiana*)
Bigtooth aspen (*Populus grandidentata*)
White oak (*Quercus alba*)
Scarlet oak (*Quercus coccinea*)
Black oak (*Quercus velutina*)
Red oak (*Quercus rubra*)
Sassafras (*Sassafras albidum*)

FLOOD PLAIN RESTORATION

Upperstory Trees
Red Maple (Acer rubrum)
Sweet Birch (Betula lenta)
White Pine (Nyssa sylvatica)
Swamp White Oak (Quercus bicolor)

Understory Trees
Serviceberry (Amelanchier canadensis)
Alternate Leaved Dogwood (Cornus alternifolia)
Witch Hazel (Hamamelis virginiana)
Red Cedar (Juniperus virginiana)
Chokecherry (Prunus virginiana)

Shrubs and Ferns
Sweet Pepperbrush (Clethra alnifolia)
Silky Dogwood (Cornus amomum)
Gray Dogwood (Cornus racemosa)
American Hazelnut (Corylus americana)

Winterberry (Ilex verticillata)
Spicebush (Lindera benzoin)
Royal Fern (Osmunda regalis)
Elderberry (Sambucus canadensis)
Meadowsweet (Spirea latifolia)
Cranberrybush Viburnum (Viburnum trilobum)

Appendix C:
Figures

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Legend

- EXISTING PROPERTY LINE
- ADJACENT PROPERTY LINE
- PROPOSED LOT LINE ADJUSTMENT
- PROPOSED EASEMENT
- BUF BUF NYSDEC 100' WETLANDS BUFFER LINE
- 100 YEAR FLOOD PLAIN
- GOLF COURSE FAIRWAYS, TEES, AND GREENS
- GOLF COURSE BUNKERS
- GOLF CART PATH
- WETLANDS
- WATER
- PROPOSED DEVELOPMENT (INCLUDING ROADWAYS AND BUILDING)
- AREAS OF SLOPES < 15%
- AREAS OF SLOPES = 15%-30%
- AREAS OF SLOPES => 30%
- 100' NYSDEC WETLAND BUFFER
- 100 YEAR FLOOD PLAIN

OWNER:
Silo Ridge Ventures, LLC
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PROJECT SURVEYOR:
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9 Broadway
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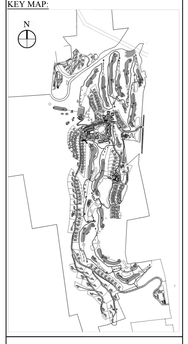
KEY MAP:



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SCALE IN FEET

No.	Revision	Date	Appvd
2	PER TOWN COMMENTS	1/8/2015	ACD
1	PER TOWN COMMENTS	6/19/14	ACD

Designed by: JC | Drawn by: CMG | Checked by: MWJ
CAD checked by: MB | Approved by: ACD
Scale: As Shown | Date: March 3, 2014

Project Title:
Silo Ridge Resort Community Master Development Plan
4651 Route 22
Amenia, New York

Issued for:
Amended Special Use Permit/ Master Development Plan Approval
Not Issued for Construction

Drawing Title:
Environmental Constraints Map

Drawing Number:
ENV-1

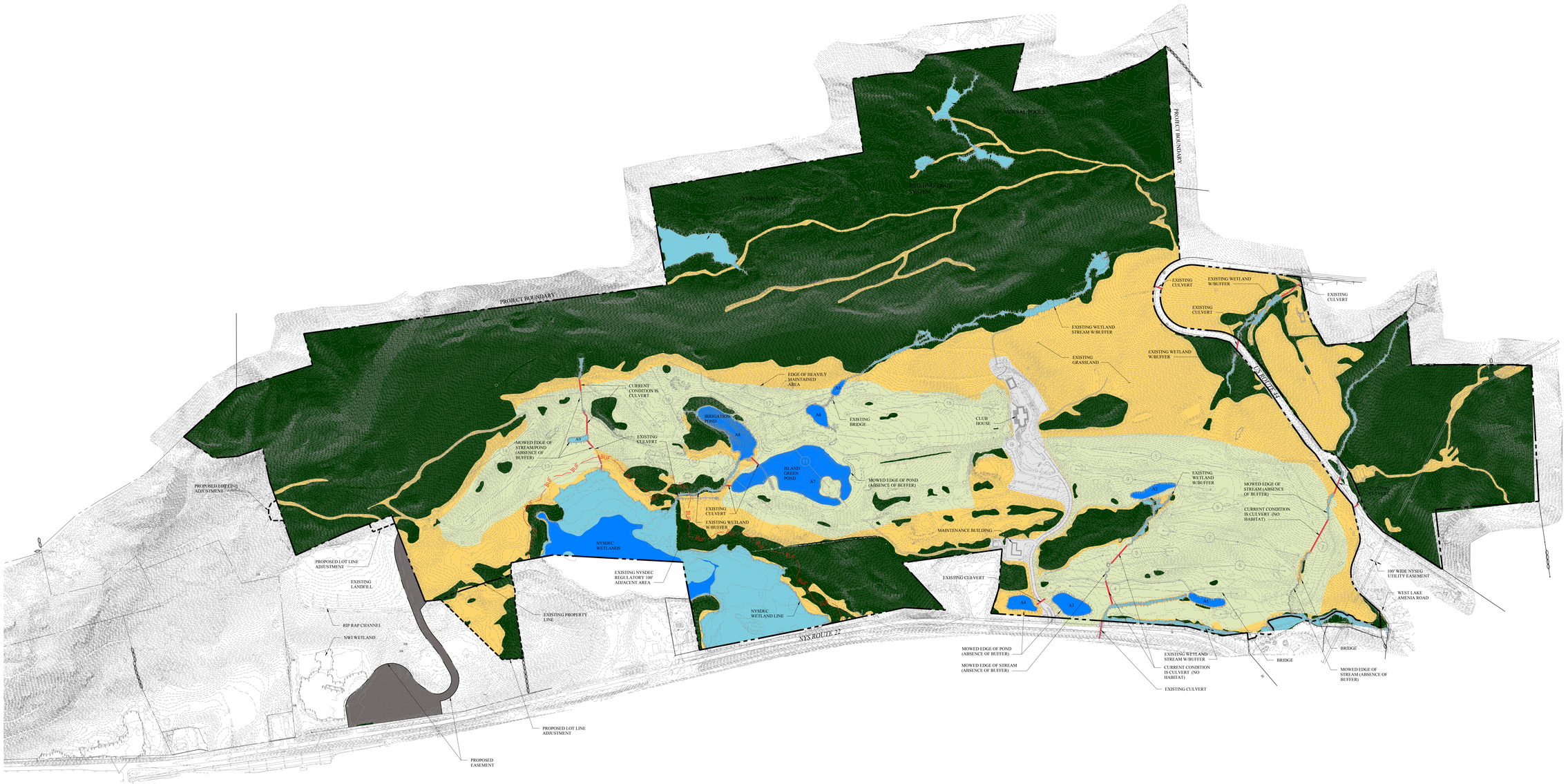
Sheet 36 of 41

Project Number:
29011.00

Legend

- EXISTING PROPERTY LINE
- ADJACENT PROPERTY LINE
- PROPOSED LOT LINE ADJUSTMENT
- PROPOSED EASEMENT
- BUF — BUF — NYSDEC 100' WETLANDS BUFFER LINE

Existing Acreage	Habitat Classification Legend
350	FOREST HABITAT
138	GRASSLAND AND SCRUB/SHRUB (INCLUDES APPROXIMATELY 10 ACRES OF IN-PRODUCTION AGRICULTURAL FIELDS)
24	WETLANDS
16	AQUATIC HABITAT (A#: CURRENT ON-SITE IMPOUNDMENTS AND STREAMS)
138	GOLF COURSE (ALL IN PLAY TEES, FAIRWAYS, ROUGHS, BUNKERS, GREENS AND CART PATHS)
10	RESIDENTIAL AND COMMERCIAL DEVELOPMENT ZONE (INCLUDES LANDSCAPING)
676±	TOTAL SITE ACREAGE
6.6	EXISTING ROAD AND PARKING AREA (NO HABITAT)



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Drawing Title
Habitat Management Plan Existing Conditions

Drawing Number
ENV-2

Sheet 37 of 41

Project Number
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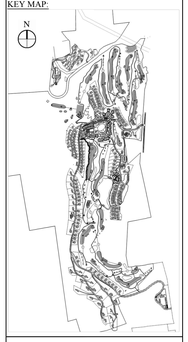

Legend

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- PROPOSED EASEMENT
- BUF — BUF — NYSDEC 100' WETLANDS BUFFER LINE

Proposed Acreage	Habitat Classification Legend
90.3	GOLF COURSE – IN PLAY ALL IN PLAY TEES, FAIRWAYS, ROUGHS, BUNKERS, AND GREENS
24.1	NATIVE FESCUE 6" – 1'
4.9	P1, SHORELINE GROUP
40.3	P2, NATIVE SHORT GRASS ±1'
19.1	P3, NATIVE TALL GRASS >1'
12.3	GT, TRANSITIONAL GRASSES
298.1	FOREST HABITAT
20.9	AQUATIC HABITAT (INCLUDES PO) SWM – CONSTRUCTED STORMWATER MANAGEMENT PRACTICES AH – CURRENT ON-SITE IMPOUNDMENTS AND STREAMS
31.4	WETLANDS
134.9	RESIDENTIAL AND COMMERCIAL DEVELOPMENT ZONE INCLUDES LANDSCAPING
676.3	TOTAL SITE ACREAGE
7.4	PROPOSED EASEMENT NOT INCLUDED IN TOTAL SITE ACREAGE

NOTE:
REFER TO DRAWING NOS. ENV-4, -5, -6 FOR BUFFER LOCATIONS AND DETAILS.

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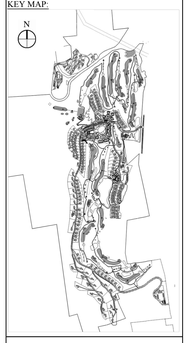

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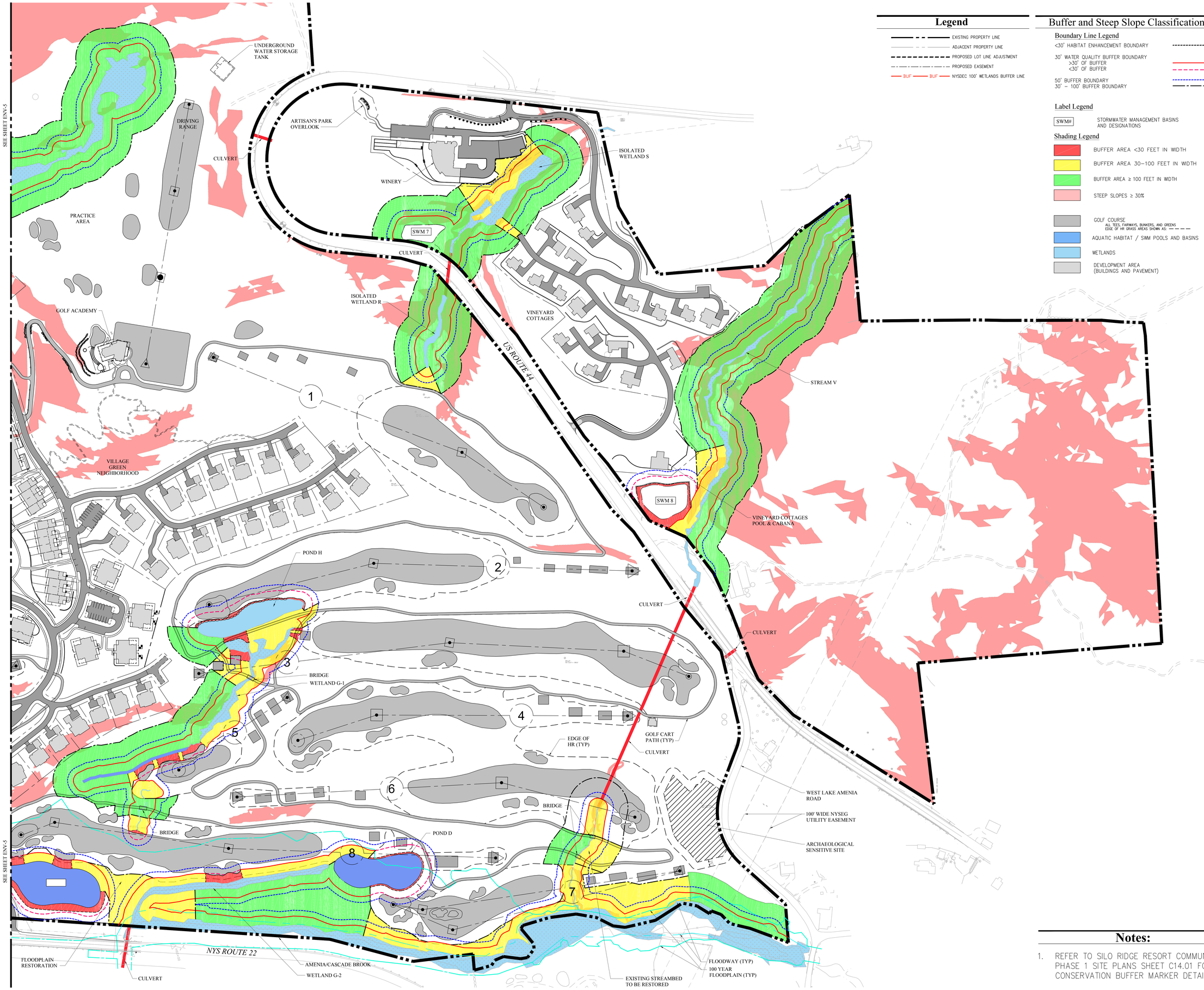
Drawing Title
Habitat Management Plan Proposed Conditions

Drawing Number
ENV-3

Sheet 38 of 41

Project Number
29011.00

SEE SHEET ENV-5



Legend

- EXISTING PROPERTY LINE
- ADJACENT PROPERTY LINE
- PROPOSED LOT LINE ADJUSTMENT
- PROPOSED EASEMENT
- BUF BUF NYSDEC 100' WETLANDS BUFFER LINE

Buffer and Steep Slope Classification System

Boundary Line Legend

- <30' HABITAT ENHANCEMENT BOUNDARY
- 30' WATER QUALITY BUFFER BOUNDARY
  - >30' OF BUFFER
  - <30' OF BUFFER
- 50' BUFFER BOUNDARY
- 30' – 100' BUFFER BOUNDARY

Label Legend

SWM# STORMWATER MANAGEMENT BASINS AND DESIGNATIONS

Shading Legend

- BUFFER AREA <30 FEET IN WIDTH
- BUFFER AREA 30–100 FEET IN WIDTH
- BUFFER AREA ≥ 100 FEET IN WIDTH
- STEEP SLOPES ≥ 30%
- GOLF COURSE
  ALL TEES, FAIRWAYS, BUNKERS, AND GREENS EDGE OF HR GRASS AREAS SHOWN AS: — — — —
- AQUATIC HABITAT / SWM POOLS AND BASINS
- WETLANDS
- DEVELOPMENT AREA (BUILDINGS AND PAVEMENT)

Notes:

1. REFER TO SILO RIDGE RESORT COMMUNITY PHASE 1 SITE PLANS SHEET C14.01 FOR CONSERVATION BUFFER MARKER DETAIL.

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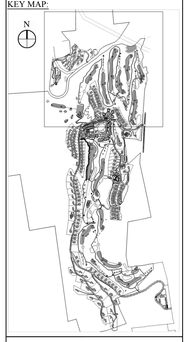

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4651 Route 22
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Drawing Title
Habitat Management Plan
Buffering Plan - North

Drawing Number
ENV-4

Sheet of
39 41

Project Number
29011.00

Legend

- EXISTING PROPERTY LINE
- ADJACENT PROPERTY LINE
- PROPOSED LOT LINE ADJUSTMENT
- PROPOSED EASEMENT
- BUF BUF NYSDEC 100' WETLANDS BUFFER LINE

Notes:

1. REFER TO SILO RIDGE RESORT COMMUNITY PHASE 1 SITE PLANS SHEET C14.01 FOR CONSERVATION BUFFER MARKER DETAIL.

Buffer and Steep Slope Classification System

Boundary Line Legend

- <30' HABITAT ENHANCEMENT BOUNDARY
- 30' WATER QUALITY BUFFER BOUNDARY
  - >30' OF BUFFER
  - <30' OF BUFFER
- 50' BUFFER BOUNDARY
- 30' – 100' BUFFER BOUNDARY

Label Legend

- SWM# — STORMWATER MANAGEMENT BASINS AND DESIGNATIONS

Shading Legend

- BUFFER AREA <30 FEET IN WIDTH
- BUFFER AREA 30–100 FEET IN WIDTH
- BUFFER AREA ≥ 100 FEET IN WIDTH
- STEEP SLOPES ≥ 30%
- GOLF COURSE
  - ALL TEES, FAIRWAYS, BUNKERS, AND GREENS
  - EDGE OF HR GRASS AREAS SHOWN AS: — — —
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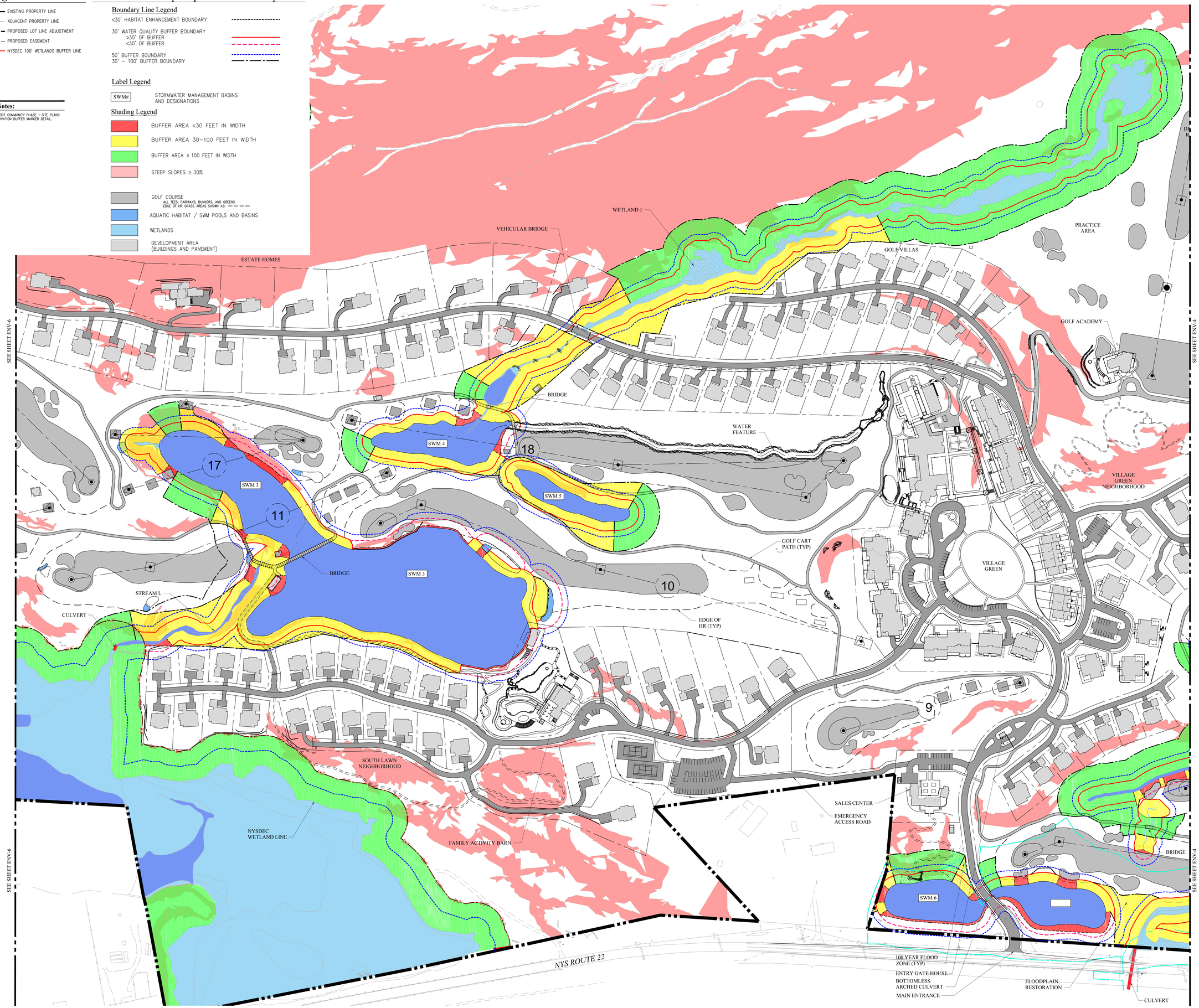

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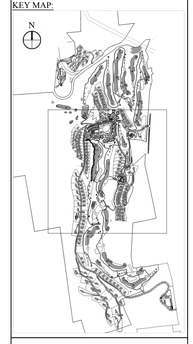

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4651 Route 22
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Drawing Title
Habitat Management Plan
Bufering Plan - Center

Drawing Number
ENV-5

Sheet of
40 41

Project Number
29011.00

Buffer and Steep Slope Classification System

Boundary Line Legend

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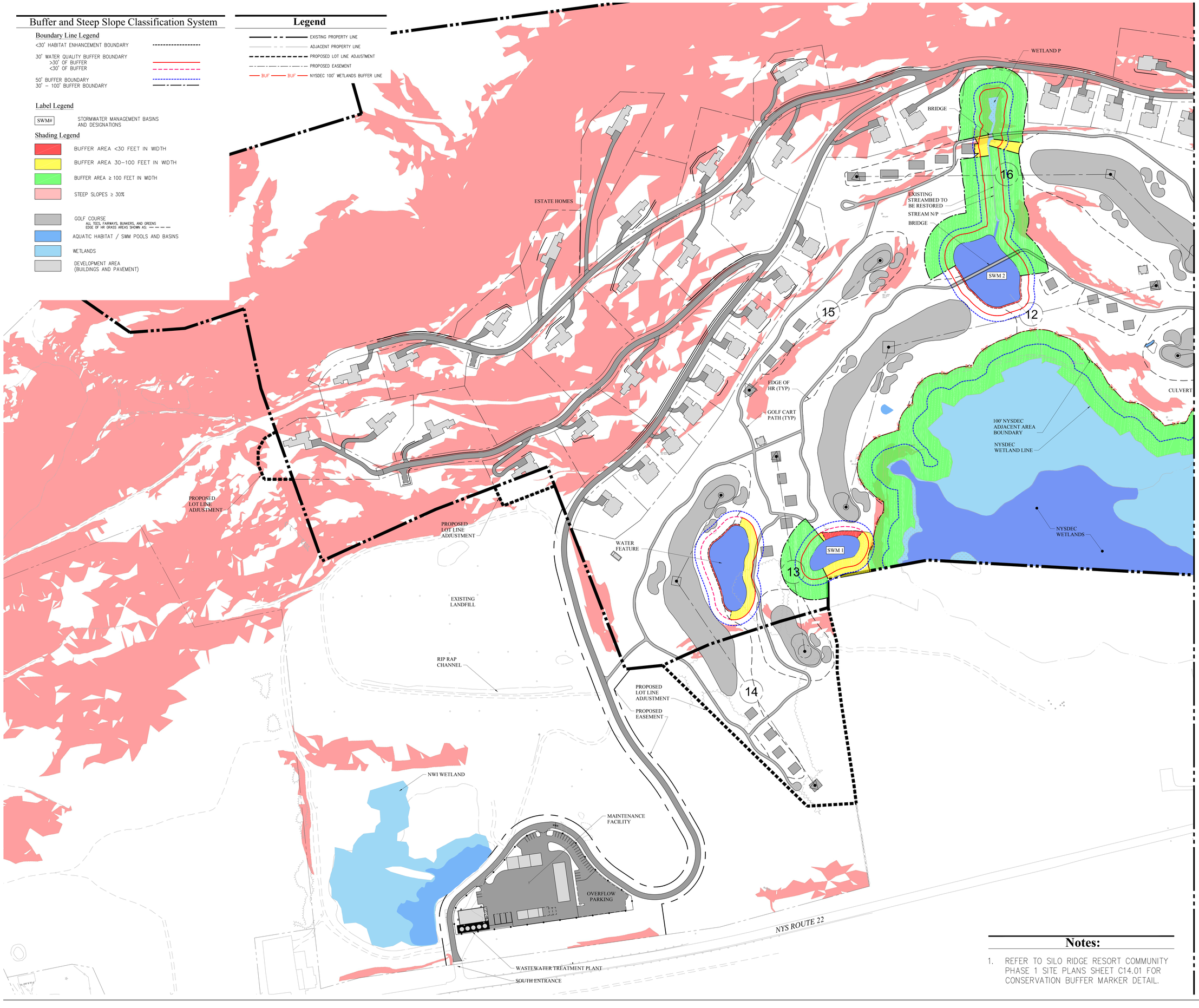

SEE SHEET ENV-5

SEE SHEET ENV-5

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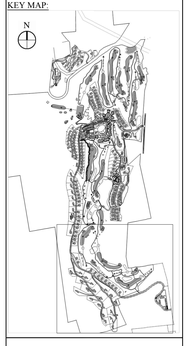

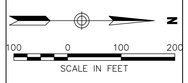

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Drawing Title
Habitat Management Plan
Buffering Plan - South

Drawing Number
ENV-6

Sheet 41 of 41

Project Number
29011.00

Water Quality Buffer (30 feet in width) Coverage
Natural Sensitive Habitats

		EXISITNG			APPROVED 2009 MDP			PROPOSED 2014 MDP		
Location (Map #)	**Habitat Unit**	**Aquatic Edge (Linear ft.)[1]**	**Aquatic Edge with ≥ 30 ft. Buffer (Linear Feet)**		**Aquatic Edge (Linear ft.)[1]**	**Aquatic Edge with ≥ 30 ft. Buffer (Linear Feet)**		**Aquatic Edge (Linear ft.)[1]**	**Aquatic Edge with ≥ 30 ft. Buffer (Linear Feet)**	
		Existing Linear Feet	**Exisitng Buffered Linear Feet**	**% Buffered**	**Approved 2009 Linear Feet**	**Approved 2009 Linear Feet**	**% Buffered**	**Proposed 2014 Linear Feet**	**Proposed Buffered Linear Feet**	**% Buffered**
ENV-4	Isolated Wetland S	1368	1368	100%	1368	1368	100%	1368	1368	100%
ENV-4	Stream V	2903	2903	100%	2903	2903	100%	2903	2903	100%
ENV-4	Amenia Brook[4]	7078	3226	46%	7078	5961	84%	7078	6947	98%
ENV-5	Wetland J	6727	6081	90%	6727	6433	96%	6727	6599	98%
ENV-5	Stream L	1233	509	41%	1233	1088	88%	1233	1114	90%
ENV-6	Wetland P	403	403	100%	403	403	100%	403	403	100%
ENV-6	Wetland AM-15	7850	7222	92%	7850	7850	100%	7850	7850	100%
N/A	Wetland U	2257	2257	100%	2257	2257	100%	2257	2257	100%
N/A	Wetland X	428	428	100%	428	428	100%	428	428	100%
N/A	Wetland W	3317	3317	100%	3317	3317	100%	3317	3317	100%
Totals		**33,564**	**27,714**	**83%**	**33,564**	**32,008**	**95%**	**33,564**	**33,186**	**99%**

Notes

1. Linear aquatic edge for ponds/SWM is measured by the shoreline distance of waterbody. Linear edge habitat for wetlands is determined using the delineated line distance of the wetland. Stream linear edge habitat is calculated accoring to the linear distance along the top of each bank (2 banks) of stream bed. Current and (Proposed) edge habitat distances vary in some instances due to expansion of existing ponds or day-lighting of stream channels for the redesigned golf course (see Figures ENV-4,5,6 for additional detail).

2. The current buffered area represents site conditions and on-site vegetative buffers, in excess of 30 feet in width, presently adjacent to sensitive habitats at the Silo Ridge Site as of August 2008.

3. The proposed buffered area represents all conservation and water quality buffers identified in the Habitat Management Plan in excess of 30 foot in width. When appropriate, percent buffered calculations include the expanded habitat distances identified for total aquatic edge.

4. Amenia Brook includes Wetland C-1, Wetland C-2, and Wetland C-3

Water Quality Buffer (30 feet in width) Coverage
Constructed Habitats

		EXISITNG			APPROVED 2009 MDP			PROPOSED 2014 MDP		
Location (Map #)	**Habitat Unit**	**Aquatic Edge (Linear ft.)[1]**	**Aquatic Edge with ≥ 30 ft. Buffer (Linear Feet)**		**Aquatic Edge (Linear ft.)[1]**	**Aquatic Edge with ≥ 30 ft. Buffer (Linear Feet)**		**Aquatic Edge (Linear ft.)[1]**	**Aquatic Edge with ≥ 30 ft. Buffer (Linear Feet)**	
		Existing Linear Feet	**Exisitng Buffered Linear Feet**	**% Buffered**	**Approved 2009 Linear Feet**	**Approved 2009 Linear Feet**	**% Buffered**	**Proposed 2014 Linear Feet**	**Proposed Buffered Linear Feet**	**% Buffered**
ENV-4	Isolated Stream R	712	712	100%	712	712	100%	712	572	80%
ENV-4	Pond D	696	696	0%	1031	616	60%	740	290	39%
ENV-4	Pond H	817	0	0%	817	545	67%	807	175	22%
ENV-4	Stream E-1	472	253	54%	472	394	83%	0	0	0%
ENV-4	Stream E-2	1206	0	0%	1806	873	48%	808	808	100%
ENV-4	Isolated Wetland I	242	242	100%	242	0	0%	0	0	0%
ENV-4	SWM 1 - Approved 2009	0	0	0%	463	463	100%	0	0	0%
ENV-4	SWM 2 - Approved 2009	0	0	0%	881	440	50%	0	0	0%
ENV-4	SWM 3 - Approved 2009	0	0	0%	277	153	55%	0	0	0%
ENV-4	SWM 4 - Approved 2009	0	0	0%	1781	1067	60%	0	0	0%
ENV-4	SWM 7 - Proposed 2014	0	0	0%	0	0	0%	362	362	100%
ENV-4	SWM 8 - Proposed 2014	0	0	0%	0	0	0%	489	0	0%
ENV-5	Wetland G-1	1604	1299	81%	1604	1192	74%	1604	1352	84%
ENV-5	Wetland G-2	396	0	0%	396	221	56%	396	389	98%
ENV-5	Pond B (SWM 6 - Proposed 2014)	796	0	0%	796	269	34%	927	342	37%
ENV-5	Pond A (SWM 6 - Proposed 2014)	631	0	0%	631	592	94%	830	324	39%
ENV-5	Pond J-1 (SWM 4 - Proposed 2014)	589	0	0%	589	156	26%	1081	878	81%
ENV-5	Pond Z[4] (SWM 3 - Proposed 2014)	3210	0	0%	3210	2002	62%	2278	1547	68%
ENV-5	Pond K[4] (SWM 3 - Proposed 2014)	1716	990	58%	1716	1577	92%	1412	1109	79%
ENV-5	Wetland O	1136	0	0%	1136	0	0%	0	0	0%
ENV-5	Wetland OO	156	0	0%	156	0	0%	0	0	0%
ENV-5	SWM 5 - Approved 2009	0	0	0%	375	291	78%	0	0	0%
ENV-5	SWM 6 - Approved 2009	0	0	0%	602	602	100%	0	0	0%
ENV-5	SWM 7 - Approved 2009	0	0	0%	840	789	94%	0	0	0%
ENV-5	SWM 8 - Approved 2009	0	0	0%	690	690	100%	0	0	0%
ENV-5	SWM 9 - Approved 2009	0	0	0%	660	660	100%	0	0	0%
ENV-5	SWM 10 - Approved 2009	0	0	0%	801	801	100%	0	0	0%
ENV-5	SWM 5 - Proposed 2014	0	0	0%	0	0	0%	879	879	100%
ENV-5	Stream QQ	670	0	0%	670	393	59%	0	0	0%
ENV-6	Stream N/P	341	0	0%	341	164	48%	525	525	100%
ENV-6	Wetland N (SWM 2 - Proposed 2014)	390	0	0%	390	205	53%	744	374	50%
ENV-6	SWM 11 - Approved 2009	0	0	0%	1405	1405	0%		0	0%
ENV-6	SWM 1 - Proposed 2014	0	0	0%	0	0	0%	401	354	88%
ENV-6	Water Feature - Proposed 2014	0	0	0%	0	0	0%	709	340	48%
Totals		**15,780**	**4,192**	**27%**	**25,490**	**17,272**	**68%**	**15,704**	**10,620**	**68%**

Notes

1. Linear aquatic edge for ponds/SWM is measured by the shoreline distance of waterbody. Linear edge habitat for wetlands is determined using the delineated line distance of the wetland. Stream linear edge habitat is calculated accoring to the linear distance along the top of each bank (2banks) of stream bed. Current and (Proposed) edge habitat distances vary in some instances due to expansion of existing ponds or day-lighting of stream channels for the redesigned golf course (see Figures ENV-4,5,6 for additional detail).

2. The current buffered area represents site conditions and on-site vegetative buffers, in excess of 30 feet in width, presently adjacent to sensitive habitats at the Silo Ridge Site as of August 2008.

3. The proposed buffered area represents all conservation and water quality buffers identified in the Habitat Management Plan in excess of 30 foot in width. When appropriate, percent buffered calculations include the expanded habitat distances identified for total aquatic edge.

4. The reduction of the aquatic edges for Ponds K and Z is due to the removal of the green island at the northern edge for Pond Z, as well as the connection of Pond K with Pond Z.

Appendix E:
Breeding Bird Survey

Breeding Bird Survey – Parcel 1

Silo Ridge Resort Community

Amenia
New York

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August, 2014

1 Introduction

1.1 Purpose of this Report

A breeding bird survey was conducted for the Silo Ridge South Parcel, an area that was not surveyed for the 2008 Habitat Management Plan but is now included in the development plan. The purpose of this survey was to identify the avian species using the site, and to particularly to determine whether the portions of the South Parcel site included in the development plan provides habitat for grassland bird species. The survey was requested by the Town's environmental consultant, Dr. Michael Klemens.

1.2 Site Description

Parcel 1 is located along Route 22, south of the main Silo Ridge property. It is bisected by an unpaved road. The property includes the former Hudson Valley Landfill. During an initial site evaluation on May 8, 2014, Parcel 1 was characterized as eight distinct vegetation/cover type units, described below and shown on Figure 1.

- **Area A** (5.4 acres) – immediately north of the South Gate. A rolling area of roughly mowed cultural grassland (grassland dominated by introduced grass species) with small islands of shrubs and trees. The grass is mowed to control shrub establishment. Dominant species include *Festuca* spp. (fescues), *Galium* spp. (bedstraws), asters, *Vicia* sp. (vetch), red clover (*Trifolium pratense*) and yellow hop clover (*T. dubium*). Shrubs are primarily the invasive *Elaeagnus*, with some *Rosa multiflora*. Scattered small trees are primarily cottonwood (*Populus deltoides*).
- **Area B** (4.8 acres) - west and north of Area A. This area has more steeply sloping topography and bedrock outcrops, with areas of exposed gravel soils. The non-native grasses dominant in Site A are largely replaced with the native little bluestem (*Schizachyrium scoparium*). A dense thicket of invasive shrubs, primarily *Elaeagnus* (Russian or autumn olive) occurs between the field and the woods to the north. Small thicketts of the non-native mugwort (*Artemisia vulgaris*) and sparse small red cedars (*Juniperus virginiana*) also occur in Area B.

- **Area C (**4.4 acres**)** – this is a flat area with apparently richer soils than Area B, and has a similar plant composition to Area A. Area C transitions to a small forested area with dense shrub borders.
- **Area D** (9.2 acres) – this mostly natural area is a slope separating the golf course from the capped former landfill. It consists of patches of grass (similar to Area A) interspersed with shrub patches and small stands of gray birch (*Betula populifolia*).
- **Area E** (15.1 acres) – the capped former landfill (the former Hudson Valley Landfill), is a large flat expanse of cultural grassland with an array of hoods and vents. The vegetation is quite uniform, a dense grass cover of *Festuca* and *Poa* (bluegrass) species, with some patches of *Setaria* (foxtail grass*). Galium, Trifolium,* asters, and *Vicia* are also common. There are no shrubs in this area. Area E is mowed as required by NYSDEC to maintain the landfill cap.
- **Area H** (3.4 acres) - the slope below Area E. This slope is dominated by invasive shrubs interspersed with patches of mugwort.
- **Area I-J** (8.2 acres) is a flat area north of an earthen dam. It appears likely that the entire area was once a farm pond. Currently, the western portion of this area is vegetated by cultural grassland, with a high proportion of mugwort. Wetland species, including *Phalaris arundinacea* (reed canary grass), some *Lythrum salicaria* (purple loosestrife), and occasional *Carex* spp. also occur here, as well as a small stand of cottonwoods. This grassland is being overtaken by *Phragmites*. (common reed) This vegetation type transitions into a wetland with patches of open water and shrubs, as well as a dense stand of *Phragmites*.

According to Kiviat[1], these communities are characterized as old fields (Area B, D, H, I), mowed fields and pastures (Area A, C, E) and marshes (Area J). Cunningham et al.[2] characterize these as shrubland, grassland, and non-tidal wetlands. A more fine-grained ecological classification is provided by Edinger et al.[3]. Based on the NYSDEC classification, communities on Parcel 1 include Successional Old Field, Successional Shrubland, Landfill, Shallow Emergent Marsh, and Reed Grass/Purple Loosestrife Marsh.

Although there are forested areas west and north of the parcel, these were not investigated as part of this survey and are similar to the forested habitats included in the 2008 study.

1.3 Methodology

The breeding bird survey included a preliminary survey in early May, 2014 and a detailed survey on May 29, 2014.

[1] Kiviat, Eric. 1984. Vegetation of Dutchess County, New York. In The Hudson Valley Regional Review, September 1984. Pp 144-173.
[2] Cunningham, Mary Ann, Neil Curri, Robert Wills. 2010. Biological Resources and Biodiversity of Dutchess County, NY. Natural Resources Inventory of Dutchess County NY, Chapter 6.
[3] Edinger, G.J. et al. 2002. Ecological Communities of New York State. Second Edition (Draft). New York Natural Heritage Program, NYSDEC.

1.3.1 Preliminary Survey

VHB biologists conducted a preliminary survey on May 8, 2014 to map vegetation units, identify survey point locations, and record bird species present on that date. Because May 8 is early in the migratory season, birds present may be still migrating further north, or may not have established breeding territories. The birds observed at that date are indicative of birds that may nest on the site, but cannot be confirmed as breeding species. This preliminary survey was conducted from 9 AM to 12 PM. The temperature was 55^0F, and there was a light drizzle. Bird species recorded were seen or identified by calls/song.

1.3.2 Detailed Survey

The detailed survey was conducted using standard point-centered breeding bird survey methods. VHB biologists stood at pre-determined survey points for 15-minute intervals, and recorded all bird species seen or identified by calls/song. Where possible, the number of birds of each species was recorded. However, the numbers may not be accurate given that the birds were moving around within each vegetation unit and, in some cases, between vegetation units. Any additional species observed while walking between survey points were also recorded.

Species were classified as confirmed breeding if nesting, carrying nesting materials, or carrying food was observed. Species were classified as probable breeding if pairs were observed, or territorial singing was observed. Species classified as potential breeding were observed to be foraging on the site, as a single individual or if preferred nesting habitat was not present. Species classified as "flyover" were flying over the site, either in transit or foraging for aerial insects. This classification system was based on the New York Breeding Bird Atlas methodology[4].

The survey was conducted from 6 AM to 9:30 AM on May 29. Weather was clear with no wind. Temperature ranged from 42^0 to 59^0.

On May 29, we observed that all of the grassed areas (Area A, Area C, Area E) had been mowed subsequent to the May 8, 2014 preliminary site visit. Grass heights averaged 6 inches. Several forbs, particularly *Trifolium dubium*, were in flower. The shrubs (*Elaeagnus, Lonicera* spp.) were also in bloom.

1.4 Qualifications

The Breeding Bird survey was conducted by Dr. Lisa Standley. Dr. Standley is an ecologist and VHB's Chief Environmental Scientist. She has over 25 years of conducting wildlife habitat and bird surveys in the Northeast, with a focus on surveys of grassland bird species (grasshopper sparrow, eastern meadowlark, upland sandpiper). In addition to her professional

▼

[4] NYS Department of Environmental conservation, NYS Breeding Bird Atlas 2000. http://www.dec.ny.gov/cfmx/extabbs/bba/index accessed May 30 2014.

qualifications, Dr. Standley serves on the Massachusetts Audubon Society Council and Science Advisory Committee.

2 Results

2.1 Breeding Bird Survey – Species Recorded

A total of 36 species were recorded at Parcel 1 over the two site visits. Of these, 24 were confirmed/probable/potential breeding species.

2.1.1 Preliminary Survey

A total of 16 species were observed in early May, either within the identified vegetation units or were heard calling from the adjacent forested areas. The most abundant species observed were red-winged blackbirds (in Area J), catbirds (all areas), and towhees (Areas B, D).

2.1.2 Detailed Survey

A total of 32 species were observed on May 29, either within the vegetation study units, the adjacent off-site woods (4), or flying overhead (4). The remaining 24 species are confirmed breeding (red-winged blackbird, field sparrow, robin), probable (indigo bunting, willow flycatcher, northern oriole, song sparrow, warbling vireo, blue-winged warbler, prairie warbler, yellow warbler, and northern yellowthroat) or potential breeding species. Killdeer were seen only in Area E, the capped landfill, and were classified as "confirmed" on the basis of broken-wing behavior. The most abundant species in the wetland was red-winged blackbird; robin was most abundant in the upland, followed by catbird and the warbler species.

Table 1. Bird Survey Observations, May 2014

May 29	May 8	Observation/Breeding Status[1]
Blackbird, red-winged	Blackbird, red-winged	Confirmed Breeding
Blue jay		Potential Breeding
Bunting, indigo		Probable Breeding
Cardinal		Potential Breeding
Catbird, gray	Catbird	Confirmed Breeding
Cedar waxwing		Potential Breeding
Chimney swift		Flyover – no habitat present within study area
Cowbird, brown-headed		Potential Breeding
	Flicker, northern	No breeding habitat within study area
Dove, mourning		Flyover – not breeding within study area
Flycatcher, willow		Probable Breeding
Goldfinch		Potential Breeding
Grackle, common		Potential Breeding
Hummingbird, ruby-throated		Probable Breeding (note: feeding on *Lonicera* and *Elaeagnus*)
Killdeer		Confirmed Breeding
Kingbird, eastern		Potential Breeding
Oriole, northern		Probable Breeding
Ovenbird	Ovenbird	No breeding habitat within study area
	Phoebe, eastern	Observed May 8, not present May 29
Redstart	Redstart	Observed in woods, not within study area
Robin	Robin	Confirmed Breeding
Sparrow, chipping		Potential Breeding
Sparrow, field	Sparrow, field	Confirmed Breeding
Sparrow, song	Sparrow, song	Probable Breeding
Swallow, barn		Flyover – no breeding habitat within study area
Swallow, tree		Flyover – no breeding habitat within study area
Thrush, wood		No breeding habitat within study area
Towhee, eastern	Towhee, eastern	Potential Breeding
Turkey		No breeding habitat within study area
Vireo, warbling	Vireo, warbling	Probable Breeding
	Warbler, black and white	Observed May 8, not present May 29
Vulture, turkey		No breeding habitat within study area
Warbler, blue-winged	Warbler, blue-winged	Probable Breeding

Warbler, prairie	Warbler, prairie	Probable Breeding
Warbler, yellow	Warbler, yellow	Probable Breeding
Yellowthroat, common	Yellowthroat, common	Probable Breeding

1 NYS Department of Environmental Conservation, NYS Breeding Bird Atlas breeding categories

2.2 Discussion

The study shows that the majority of confirmed or probable breeding bird species using Parcel 1 were present during the first week of May. Two species seen during the preliminary survey were not present in late May (eastern phoebe, black and white warbler), indicating that these species either failed to establish breeding territories or were still in migration.

The breeding bird species on Parcel 1 are characteristic of marsh and shrub-swamp wetlands (red-winged blackbird, willow flycatcher, yellow warbler, common yellowthroat) and of oldfield habitats (catbird, towhee, blue-winged warbler, prairie warbler, field sparrow, song sparrow, robin, indigo bunting). Two species (warbling vireo, northern oriole) preferentially nest in tall trees, often near watercourses, consistent with our field observations of these species in the taller cottonwoods near Wetland J.

None of the species observed on Parcel 1, whether breeding, foraging, or transient, are considered to be NY species of special concern. None of these are obligate grassland species (for example, grasshopper sparrow, upland sandpiper, bobolink, savannah sparrow). The species observed in Parcel 1 are characteristic of common oldfield and wetland habitats found throughout Dutchess County (see Kiviat 1984; Cunningham et al. 2010).

The NYS Breeding Bird Atlas[5] includes Parcel 1 within Survey Block 6163C. The 2000-2005 Survey identified 89 confirmed, probable or possible species within this block. All of the species identified during the May 2014 Parcel 1 survey were previously recorded in the Atlas Block 6163C.

The Town's consultant asked if the old-field and grassland areas (A, B, C) would have the potential to be an "attraction zone" for grassland species if these areas were not mowed. These areas together total 14.6 acres (5.9 hectares) of grassland habitat. In the absence of mowing, it is most likely that invasive shrubs (*Elaeagnus*, *Lonicera*, *Rosa multiflora*) would replace the grass. These species are already present in shrub patches and dominate the northern portion of Area A under existing conditions. This grassed area is not large enough to support populations of area-sensitive grassland sparrows (savannah sparrow, grasshopper sparrow, henslow's sparrow) or other species (bobolink, eastern meadowlark). Smith (1997) found the minimum grassland required for grassland sparrows in upstate New York to be 29 acres (11.7 ha), 40 acres (16.2 ha) and 82 acres (33.2 ha), respectively[6]. He found that

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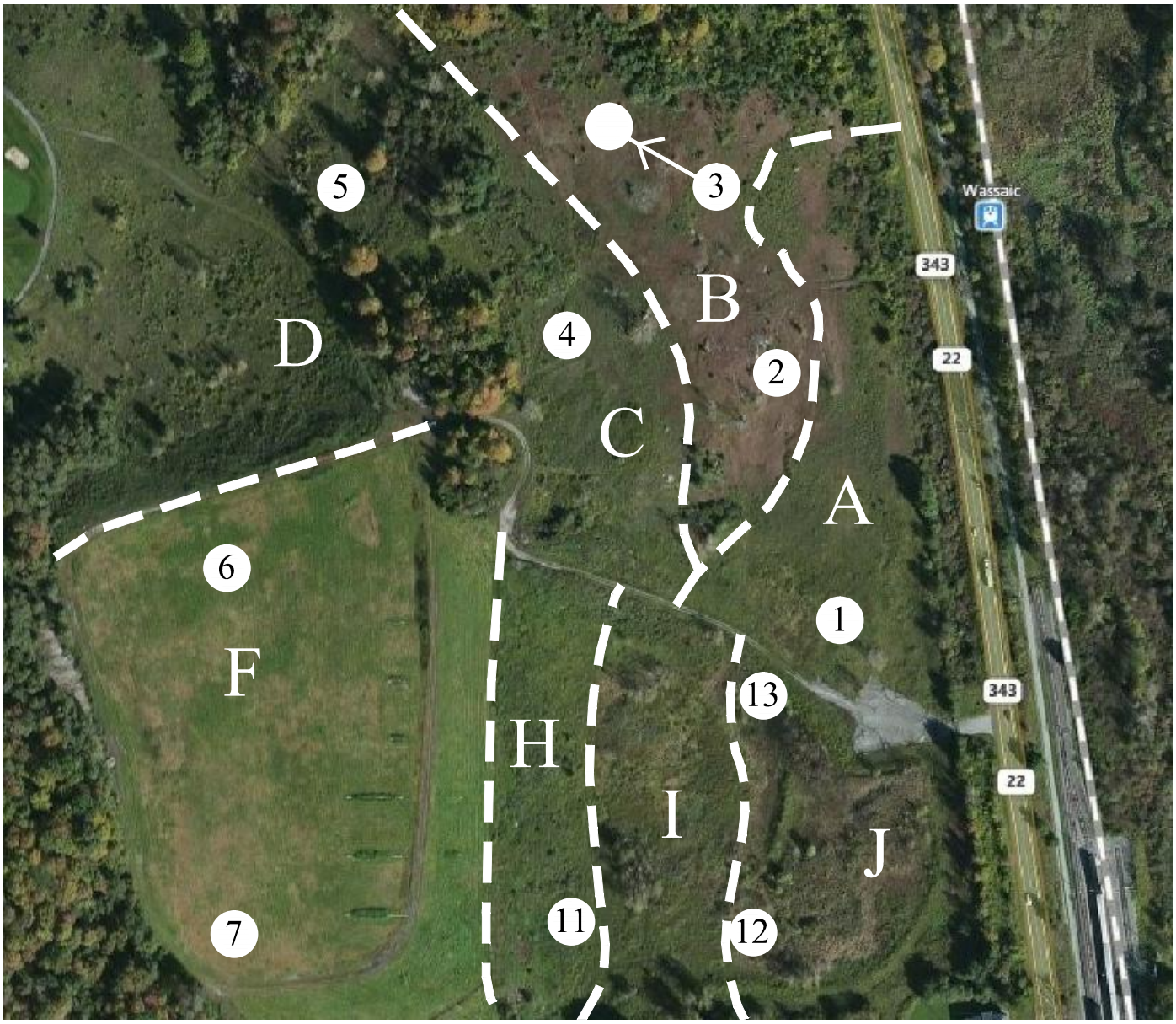
[5] NYS Department of Environmental conservation, NYS Breeding Bird Atlas 2000. http://www.dec.ny.gov/cfmx/extabbs/bba/index accessed May 30 2014.

[6] Smith, C.R. 1997. Use of Public Grazing Lands by Henslow's Sparrows, Grasshopper Sparrows, and Associated Grassland Birds in Central New York State. In Vickery, P.D. and P.W. Dunwiddie, eds. Grasslands of Eastern North America: Ecology and Conservation of Native and Agricultural Landscapes. Massachusetts Audubon Society. Lincoln, MA. Pp. 171-186.

bobolinks and eastern meadowlarks require substantially larger areas (40 acres, 16.2 ha, and 59 acres, 24 ha). While Site E, the former landfill, would have suitable habitat for bobolinks (tall dense mesic grassland) if not mowed, this area is only 15 acres (6 ha) in size and would be unlikely to support a viable population.



VHB Engineering, Surveying & Landscape Architecture, P.C.

Field Sketch - Parcel 1 Bird Survey
Not To Scale

Figure 1
June 3, 2014

Silo Ridge Resort Community
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Amenia, New York 12501