Planning
Transportation
Land Development
Environmental

August 4, 2014

Ref: 29011.00

Brian A. Orzel
Project Manager/Civil Engineer
U.S. Army Corps of Engineers
New York District
Jacob K. Javits Federal Building
26 Federal Plaza, Room 2109
New York, NY 10278-0090

Re: Request for Nationwide Permit Determination
Proposed Silo Ridge Resort Community
4651 Route 22
Town of Amenia
Dutchess County, New York

Dear Mr. Orzel:

VHB Engineering, Surveying and Landscape Architecture, P.C. (VHB) is serving as the environmental and engineering consultant to Silo Ridge Ventures, LLC (the "applicant"), which is proposing to construct the Silo Ridge Resort Community (the "proposed action") at the above-referenced 682.5±-acre property and within a 6.6±-acre easement located at the southern adjoining property (the "subject property") (site location maps included in Attachment B, *Overall Existing Conditions Plan* [Sheet C2.00] included in Attachment C).

More specifically, the applicant is proposing to construct three lodging (hotel/condominium) buildings and a total of 224 residences, including town homes, single-family homes and condominiums at the subject property, in conjunction with the redesigning of the existing golf course located at the site (Attachment C, Sheet C5.00). Additional proposed amenities include a clubhouse/lodge, restaurant, lounge, golf pro shop, golf academy, pavilion, family activity barn, gatehouse, sales center, fitness spa, below-ground parking and a maintenance facility. Project-related ground disturbance would occur within a 269.3 acre project area. The proposed action would occur during three construction phases, which would take place over the course of approximately seven years.

The subject property includes both natural and constructed streams, ponds and associated wetlands, as previously delineated by the Chazen Companies and subsequently verified by the United States Army Corps of Engineers (USACE). With the exception of Wetlands A, I, R, and S, the wetland/aquatic features shown on the wetland survey map (Attachment D) have been previously determined by the USACE to be jurisdictional waters of the United States, as detailed in USACE correspondence dated July 25, 2008 (Attachment E).

50 Main Street, Suite 360
White Plains, New York 10606
914.467.6600 ▪ FAX 914.761.3759
www.vhb.com

Implementation of the proposed action would result in a minimal loss of area to on-site waters of the United States, due primarily to the construction of vegetated stormwater management basins (SWMs) at various locations (Attachment C, Sheet C7.00). As shown on Table 1 below, minimal losses would occur within Wetlands E-1, E-2, G-2, O, OO, and QQ. However, as further detailed on Table 1, expansions to existing waters of the United States would occur within Wetlands A, B, D, J-1, K, N and Z as a result of the proposed action.

Table 1 – Summary of Impacts to On-Site Waters of the United States

Wetland Feature	Existing Area (acres)	Loss (acres)	Gain (acres)	Post-Construction Area (acres)
A & B	1.39	-	0.37	1.76
C-1	1.12	-	-	1.12
C-2	0.38	-	-	0.38
C-3	0.12	-	-	0.12
D	0.43	-	0.24	0.67
E-1	0.05	0.05	-	0.00
E-2	0.04	0.01	-	0.03
G-1	0.33	-	-	0.33
G-2	0.01	0.01	-	0.00
H	0.51	-	-	0.51
J	2.06	-	-	2.06
J-1	0.40	-	0.08	0.48
K & Z	7.59	-	0.65	8.24
L	26.19	-	-	26.19
N	0.15	-	0.44	0.59
O	0.03	0.03	-	0.00
OO	0.01	0.01	-	0.00
P	0.06	-	-	0.06
QQ	0.02	0.02	-	0.00
U	2.78	-	-	2.78
V	0.35	-	-	0.35
W	1.30	-	-	1.30
X	0.25	-	-	0.25
Total	45.57	0.13	1.78	47.22

In total, the proposed action would result in the loss of 0.13 acres of waters of the United States, while 1.78 acres of additional area would be added to existing waters of the United States. As such, a net increase of 1.65 acres of waters of the United States would be achieved, resulting in a 13.7:1 replacement ratio. Additional minimal loss of wetland area would occur within Wetlands I and R as a result of the proposed action, however, pursuant to the aforementioned USACE correspondence

(Attachment E), these two features have been determined to be non-jurisdictional waters by the USACE.

As detailed previously, mitigation for the proposed loss of 0.13 acres of waters of the United States would occur through a net addition of 1.65 acres of waters of the United States. As detailed in the *Silo Ridge Resort Community Revised Habitat Management Plan* (Attachment F), the expanded wetland and aquatic habitat areas would be planted with native sedges, rushes, forbs, grasses and shrubs typical of the existing littoral aquatic and emergent wetland plant communities at the subject property.
Additionally, the aforementioned habitat management plan also includes the following additional mitigation measures:

- All on-site pond habitats have been targeted for aquatic habitat enhancement plantings, including littoral shelf aquatic plant communities and shoreline communities.
- All on-site streams have been targeted for the establishment of either stream-side buffers or terrestrial habitat enhancement areas. Wherever possible, aquatic shoreline plantings have also been incorporated into habitat enhancement plans for these lotic habitats.
- In total, the project will include the creation of over 43,491 feet of conservation and water quality buffers around wetlands, aquatic features and stormwater management practices throughout the subject property.
- Stormwater management basins (SWM) are included in the HMP because of their potential to provide additional wetland and facultative wetland habitat, as well as functional ecological services to resident wildlife. As such, the design of these storage features includes maintenance of a wet pool that will hold water under most climatic conditions and an attenuation basin that will experience periodic inundation by accumulated runoff. SWM wet pools and attenuation basins would be seeded and/or planting with aquatic and facultative vegetation.
- A highly degraded 150-foot reach of Wetland (Stream) V immediately upstream and inclusive of its confluence with Amenia Brook, is targeted for a streambed restoration effort, which will including bank and shoreline plantings, installation of large cobble and water bars, and widening of the stream channel, in order to reduce flow velocities.
- A restoration effort would occur within an approximately 1.5 acre portion of the Amenia Creek flood plain, including 300 feet of linear bank-side habitat along Amenia Brook. The conceptual plan calls for re-establishment of native plant communities that are consistent with species assemblages currently present in adjacent reaches of the flood plain, including open meadow, successional field, and climax forest.
- An approximately 250-foot culverted stretch of Wetland (Stream) P would be addressed in a restoration project to “daylight” the stream bed. The restoration effort would also include bank and shoreline plantings, installation of large cobble and water bars, and widening of the stream channel, in order to reduce flow velocities.

Furthermore, in order to avoid significant adverse impacts to waters of the United States, during construction activities, comprehensive erosion and sediment control practices have been prepared for the proposed action (Attachment C, Sheet C12.00).

Finally, it is important to note that stormwater management practices for the proposed action have been prepared in accordance with the *New York State Stormwater Management Design Manual* (August 2010).

In summary, based upon the foregoing design features, mitigation measures and stormwater management practices, no significant adverse impacts to jurisdictional waters of the United States are anticipated, and a net increase of 1.65 acre of jurisdictional waters of the United States would occur. Moreover, it is anticipated that any decreases in net ecological services precipitated by the minimal loss of existing wetland area will be compensated for many-times over by the net increase in waters of the United States, as well as the aforementioned shoreline/water quality buffers and wetland restoration projects proposed for Wetlands P, V and Amenia Brook.

As the proposed action would involve the filling of less than 0.50 acre of non-tidal jurisdictional waters of the United States (0.13 acre of filling is proposed), it appears that the proposed action could be accomplished under United States Army Corps of Engineers (USACE) Nationwide Permit Nos. 29 (Residential Developments), 39 (Commercial and Institutional Developments) and/or 42 (Recreational Facilities). Accordingly, the applicant respectfully requests that a Nationwide Permit determination be issued for the proposed action.

To assist in the processing of this request, we are hereby enclosing three sets of the following:

Attachment A	USACE Joint Application for Permit
Attachment B	Site location map and excerpts of the USGS Topographic Map, Amenia, New York Quadrangle and National Wetlands Inventory Map
Attachment C	Project Plans – *Silo Ridge Resort Community* Sheets C2.00, C5.00, C7.00 and C12.00
Attachment D	*Map of Wetland Survey*, last updated May 30, 2007
Attachment E	USACE Jurisdictional Determination letter, dated July 25, 2008

Thank you for your cooperation in this matter. If additional information is required, or should you have any questions, please do not hesitate to contact me directly at 914.467.6614.

Sincerely,

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

Amanda DeCesare, P.E.
Senior Project Manager
AD/ba
cc: David R. Everett, Esq.
Mary Ann Johnson, AICP
Julie Mangarillo, P.E.
Michael Dignacco
Peter J. Wise, Esq.
David Kennedy

Attachment A

JOINT APPLICATION FORM

For Permits/Determinations to undertake activities affecting streams, waterways, waterbodies, wetlands, coastal areas and sources of water supply.

New York State

You must separately apply for and obtain separate Permits/Determinations from each involved agency prior to proceeding with work. Please read all instructions.

US Army Corps of Engineers (USACE)

APPLICATIONS TO

1. NYS Department of Environmental Conservation

Check all permits that apply:

- ☐ Stream Disturbance
- ☐ Excavation and Fill in Navigable Waters
- ☐ Docks, Moorings or Platforms
- ☐ Dams and Impoundment Structures
- ☐ 401 Water Quality Certification
- ☐ Freshwater Wetlands
- ☐ Tidal Wetlands
- ☐ Coastal Erosion Management
- ☐ Wild, Scenic and Recreational Rivers
- ☐ Water Supply
- ☐ Long Island Well
- ☐ Aquatic Vegetation Control
- ☐ Aquatic Insect Control
- ☐ Fish Control
- ☐ Incidental Take of Endangered/Threatened Species

☐ I am sending this application to this agency.

2. US Army Corps of Engineers

Check all permits that apply:

- ☑ Section 404 Clean Water Act
- ☐ Section 10 Rivers and Harbors Act
- ☑ Nationwide Permit(s) - Identify Number(s): Nationwide Permit Nos. 29 39 and/or 42

Preconstruction Notification - ☑ Y / ☐ N

☑ I am sending this application to this agency.

3. NYS Office of General Services

Check all permits that apply:

- ☐ State Owned Lands Under Water
  - ☐ Utility Easement (pipelines, conduits, cables, etc.)
  - ☐ Docks, Moorings or Platforms

☐ I am sending this application to this agency.

4. NYS Department of State

Check if this applies:

- ☐ Coastal Consistency Concurrence

☐ I am sending this application to this agency.

5. Name of Applicant (use full name)

Silo Ridge Ventures, LLC c/o Mr. Pedro Torres

Mailing Address: 5021 Route 44

Post Office City: Amenia

State: NY Zip Code: 12501

Telephone (daytime): 845-373-8020

Email: ptorres@siloridge.com

Applicant must be:

- ☑ Owner
- ☐ Operator
- ☐ Lessee

(check all that apply)

Taxpayer ID (If applicant is NOT an individual): 13-4139599

6. Name of Facility or Property Owner (if different than Applicant)

Mailing Address:

Post Office City:

State: Zip Code:

Telephone (daytime): Email:

7. Contact/Agent Name

Amanda C. DeCesare, P.E.

Company Name: VHB Engineering, Suveying and Landscape Architecture, PC

Mailing Address: 50 Main Street

Post Office City: White Plains

State: NY Zip Code: 10606

Telephone (daytime): 914-467-6600

Email: adecesare@vhb.com

8. Project / Facility Name

Silo Ridge Resort Community

Property Tax Map Section / Block / Lot Number: Multiple tax parcels - see attached.

Project Location - Provide directions and distances to roads, bridges and bodies of waters:

The site entrance is located adjacent to the west of NYS Route 22, approximately 0.2 miles south of Lake Amenia Road.

Street Address, if applicable: 4651 Route 22

Post Office City: Amenia State: NY Zip Code: 12501

Town / Village / City: Town of Amenia

County: Dutchess

Name of USGS Quadrangle Map: Amenia, NY

Stream/Water Body Name: Amenia Brook and associated wetlands

Location Coordinates: Enter NYTMs in kilometers, **OR** Latitude/Longitude

NYTM-E	NYTM-N	Latitude	Longitude
		41.834674	-73.566608

For Agency Use Only DEC Application Number: USACE Number:

JOINT APPLICATION FORM - PAGE 2 OF 2

Submit this completed page as part of your Application.

9. **Project Description and Purpose:** Provide a complete narrative description of the proposed work and its purpose. Attach additional page(s) if necessary. Include: description of current site conditions and how the site will be modified by the proposed project; structures and fill materials to be installed; type and quantity of materials to be used (i.e., square ft of coverage and cubic yds of fill material and/or structures below ordinary/mean high water) area of excavation or dredging, volumes of material to be removed and location of dredged material disposal or use; work methods and type of equipment to be used; pollution control methods and mitigation activities proposed to compensate for resource impacts; and where applicable, the phasing of activities. **ATTACH PLANS ON SEPARATE PAGES.**

See attached.

Proposed Use: ☑ Private ☐ Public ☐ Commercial	Proposed Start Date: September 2014	Estimated Completion Date: August 2021
Has Work Begun on Project? ☐ Yes ☑ No If Yes, explain.		
Will Project Occupy Federal, State or Municipal Land? ☐ Yes ☑ No If Yes, please specify.		

10. List Previous Permit / Application Numbers (if any) and Dates:

11. Will this project require additional Federal, State, or Local Permits including zoning changes? ☑ Yes ☐ No If yes, please list:

See attached.

12. **Signatures.** If applicant is not the owner, both must sign the application.

I hereby affirm that information provided on this form and all attachments submitted herewith is true to the best of my knowledge and belief. False statements made herein are punishable as a Class A misdemeanor pursuant to Section 210.45 of the Penal Law. Further, the applicant accepts full responsibility for all damage, direct or indirect, of whatever nature, and by whomever suffered, arising out of the project described herein and agrees to indemnify and save harmless the State from suits, actions, damages and costs of every name and description resulting from said project. In addition, Federal Law, 18 U.S.C., Section 1001 provides for a fine of not more than $10,000 or imprisonment for not more than 5 years, or both where an applicant knowingly and willingly falsifies, conceals, or covers up a material fact; or knowingly makes or uses a false, fictitious or fraudulent statement.

Signature of Applicant	Printed Name	Title	Date
Signature of Owner	Printed Name	Title	Date
Amanda C. DeCesare DH	Amanda C. DeCesare, P.E.	Senior Project Manager	7/30/14
Signature of Agent	Printed Name	Title	Date

For Agency Use Only **DETERMINATION OF NO PERMIT REQUIRED**

_____ (Agency Name) has determined that No Permit is required from this Agency for the project described in this application.

Agency Project Number _____

Agency Representative: Name (printed) _____ Title _____

Signature _____ Date _____

Request for Nationwide Permit Determination
Silo Ridge Resort Community
4651 Route 22
Town of Amenia
Dutchess County, New York

Joint Application for Permit Form Attachment

Page 1, Item 8 – Property Tax Map Numbers

The subject property is comprised of the following six Town of Amenia tax parcels: 7066-00-732810, 7066-00-860725, 7067-00-742300, 7066-00-670717, 7067-00-709177 and 7066-00-870350.

Page 2, Item 9 – Project Description and Purpose:

The proposed action consists of the construction of the Silo Ridge Resort Community (the "proposed action") at the above-referenced 682.5±-acre property and within a 6.6±-acre easement located at the southern adjoining property (the "subject property") (site location maps included in Attachment B, *Overall Existing Conditions Plan* [Sheet C2.00] included in Attachment C).

More specifically, the applicant is proposing to construct three lodging (hotel/condominium) buildings and a total of 224 residences, including town homes, single-family homes and condominiums at the subject property, in conjunction with the redesigning of the existing golf course located at the site (Attachment C, Sheet C5.00). Additional proposed amenities include a clubhouse/lodge, restaurant, lounge, golf pro shop, golf academy, pavilion, family activity barn, gatehouse, sales center, fitness spa, below-ground parking and a maintenance facility. Project-related ground disturbance would occur within a 269.3 acre project area. The proposed action would occur during three construction phases, which would take place over the course of approximately seven years.

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Implementation of the proposed action would result in a minimal loss of area to on-site waters of the United States, due primarily to the construction of vegetated stormwater management basins (SWMs) at various locations (Attachment C, Sheet C7.00). As shown on Table 1 below, minimal losses would occur within Wetlands E-1, E-2, G-2, O, OO, and QQ. However, as further detailed on Table 1, expansions to existing waters of the United States would occur within Wetlands A, B, D, J-1, K, N and Z as a result of the proposed action.

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Wetland Feature	Existing Area (acres)	Loss (acres)	Gain (acres)	Post-Construction Area (acres)
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C-2	0.38	-	-	0.38
C-3	0.12	-	-	0.12
D	0.43	-	0.24	0.67
E-1	0.05	0.05	-	0.00
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G-2	0.01	0.01	-	0.00
H	0.51	-	-	0.51
J	2.06	-	-	2.06
J-1	0.40	-	0.08	0.48
K & Z	7.59	-	0.65	8.24
L	26.19	-	-	26.19
N	0.15	-	0.44	0.59
O	0.03	0.03	-	0.00
OO	0.01	0.01	-	0.00
P	0.06	-	-	0.06
QQ	0.02	0.02	-	0.00
U	2.78	-	-	2.78
V	0.35	-	-	0.35
W	1.30	-	-	1.30
X	0.25	-	-	0.25
Total	45.57	0.13	1.78	47.22

In total, the proposed action would result in the loss of 0.13 acres of waters of the United States, while 1.78 acres of additional area would be added to existing waters of the United States. As such, a net increase of 1.65 acres of waters of the United States would be achieved, resulting in a 13.7:1 replacement ratio. Additional minimal loss of wetland area would occur within Wetlands I and R as a result of the proposed action, however, pursuant to the aforementioned USACE correspondence (Attachment E), these two features have been determined to be non-jurisdictional waters by the USACE.

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Additionally, the aforementioned habitat management plan also includes the following additional mitigation measures:

- All on-site pond habitats have been targeted for aquatic habitat enhancement plantings, including littoral shelf aquatic plant communities and shoreline communities.
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- A highly degraded 150-foot reach of Wetland (Stream) V immediately upstream and inclusive of its confluence with Amenia Brook, is targeted for a streambed restoration effort, which will including bank and shoreline plantings, installation of large cobble and water bars, and widening of the stream channel, in order to reduce flow velocities.
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Finally, it is important to note that stormwater management practices for the proposed action have been prepared in accordance with the *New York State Stormwater Management Design Manual* (August 2010).

In summary, based upon the foregoing design features, mitigation measures and stormwater management practices, no significant adverse impacts to jurisdictional waters of the United States are anticipated, and a net increase of 1.65 acre of jurisdictional waters of the United States would occur. Moreover, it is anticipated that any decreases in net ecological services precipitated by the minimal loss of existing wetland area will be compensated for many-times over by the net increase in waters of the United States, as well as the aforementioned shoreline/water quality buffers and wetland restoration projects proposed for Wetlands P, V and Amenia Brook.

As the proposed action would involve the filling of less than 0.50 acre of non-tidal jurisdictional waters of the United States (0.13 acre of filling is proposed), it appears that the proposed action could be accomplished under United States Army Corps of Engineers (USACE) Nationwide Permit Nos. 29 (Residential Developments), 39 (Commercial and Institutional Developments) and/or 42 (Recreational Facilities). Accordingly, the applicant respectfully requests that a Nationwide Permit determination be issued for the proposed action.

Page 2, Item 11 – Additional Federal, State or Local Permits Required:

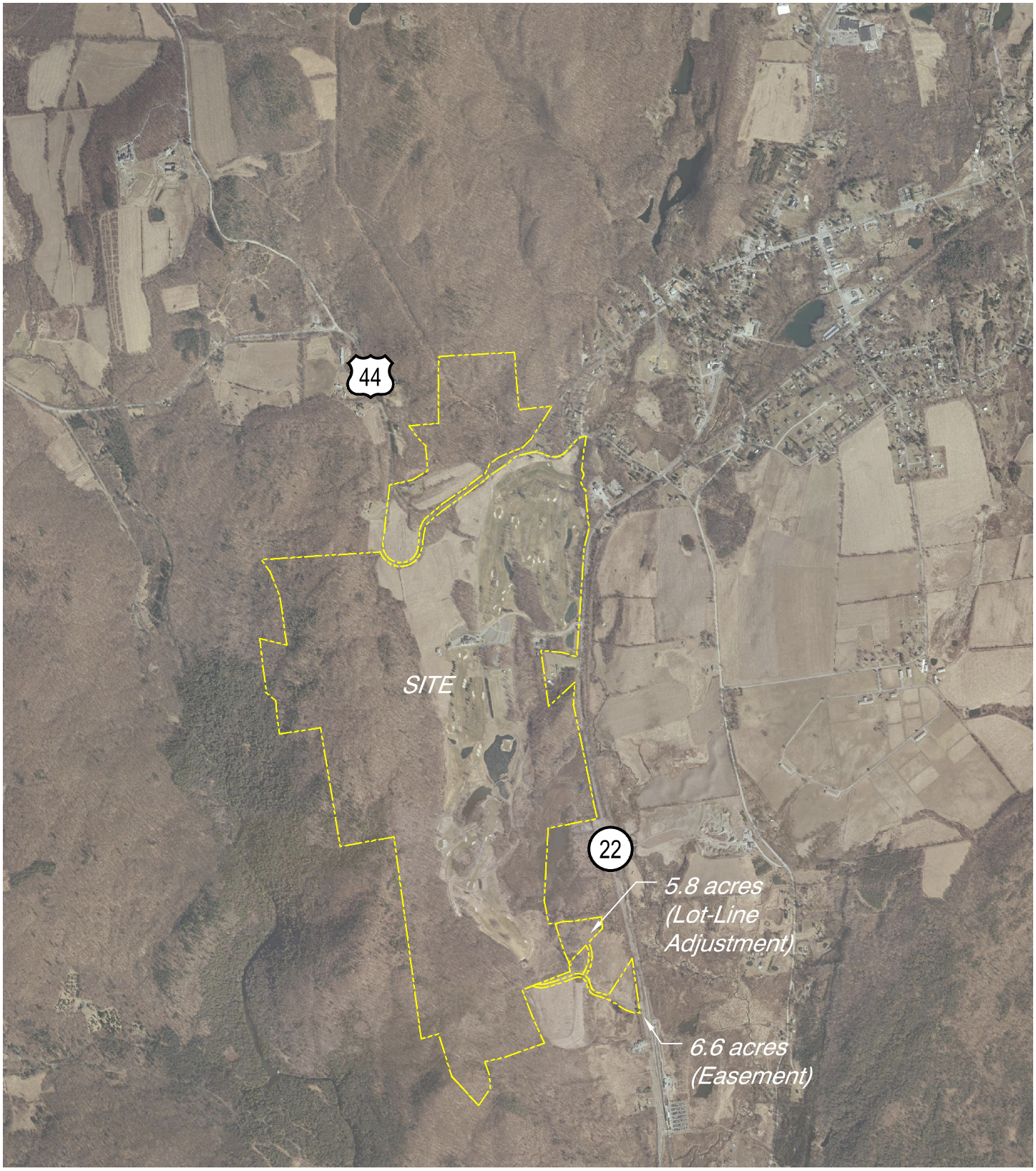
- Town of Amenia: site plan approval, subdivision approval, amended special use permit sewer and water district connections.
- Dutchess County Health Department: water and sewer.

- Dutchess County Department of Public Works: highway work permit.
- New York State Department of Environmental Conservation: SPEDES public water/sewer and general permit, protection of waters permit.
- New York State Department of Health: public water/sewer.
- New York State Department of Transportation: highway access permit.

- New York State Department of State: sewer and water works.

Attachment B

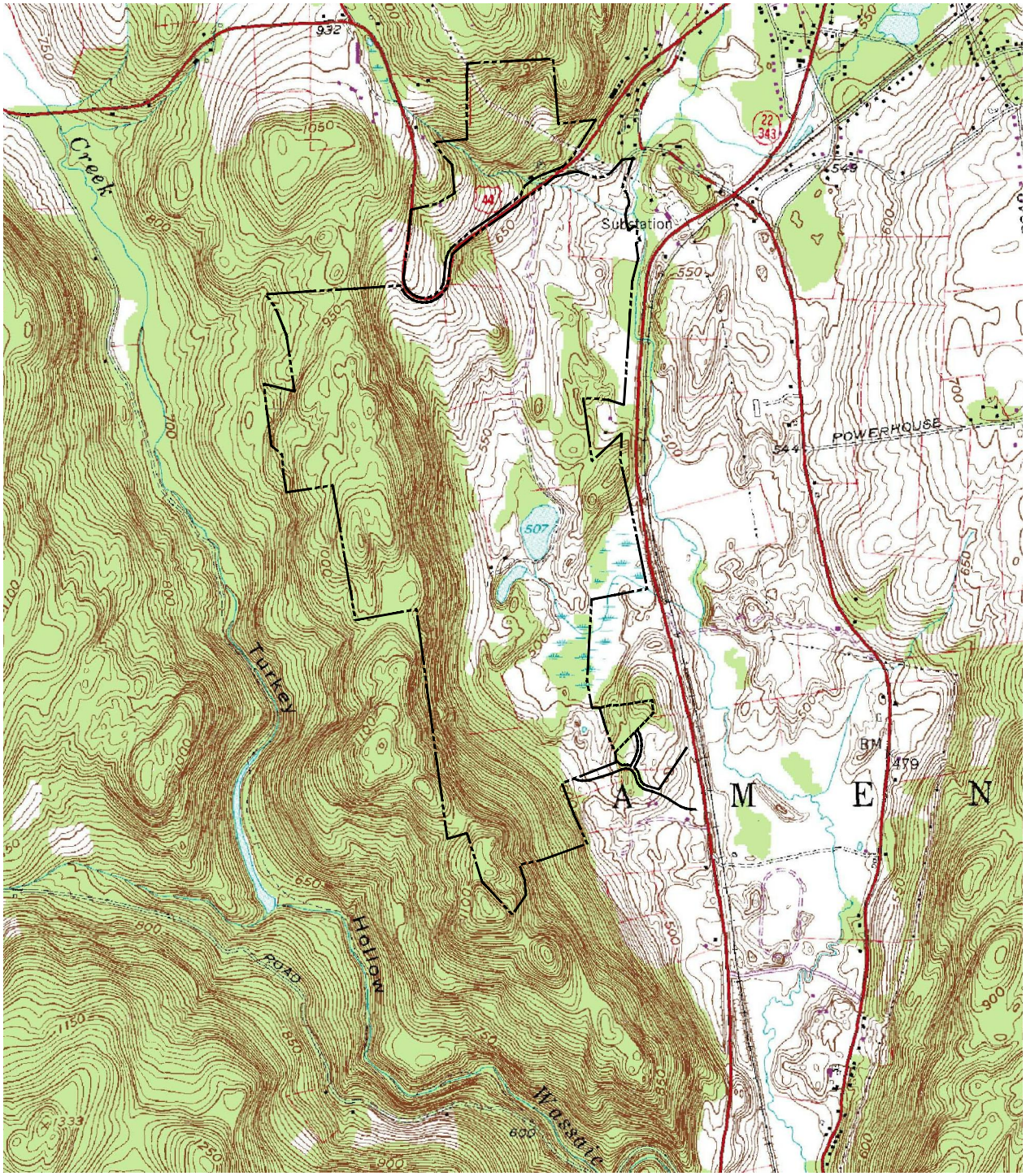
\\vhb\proj\WhitePlains\29011.00 APWAN\reports\NYSDEC\29011.00-Site Location.dwg



Vanasse Hangen Brustlin, Inc.

0 1000 2000 Feet

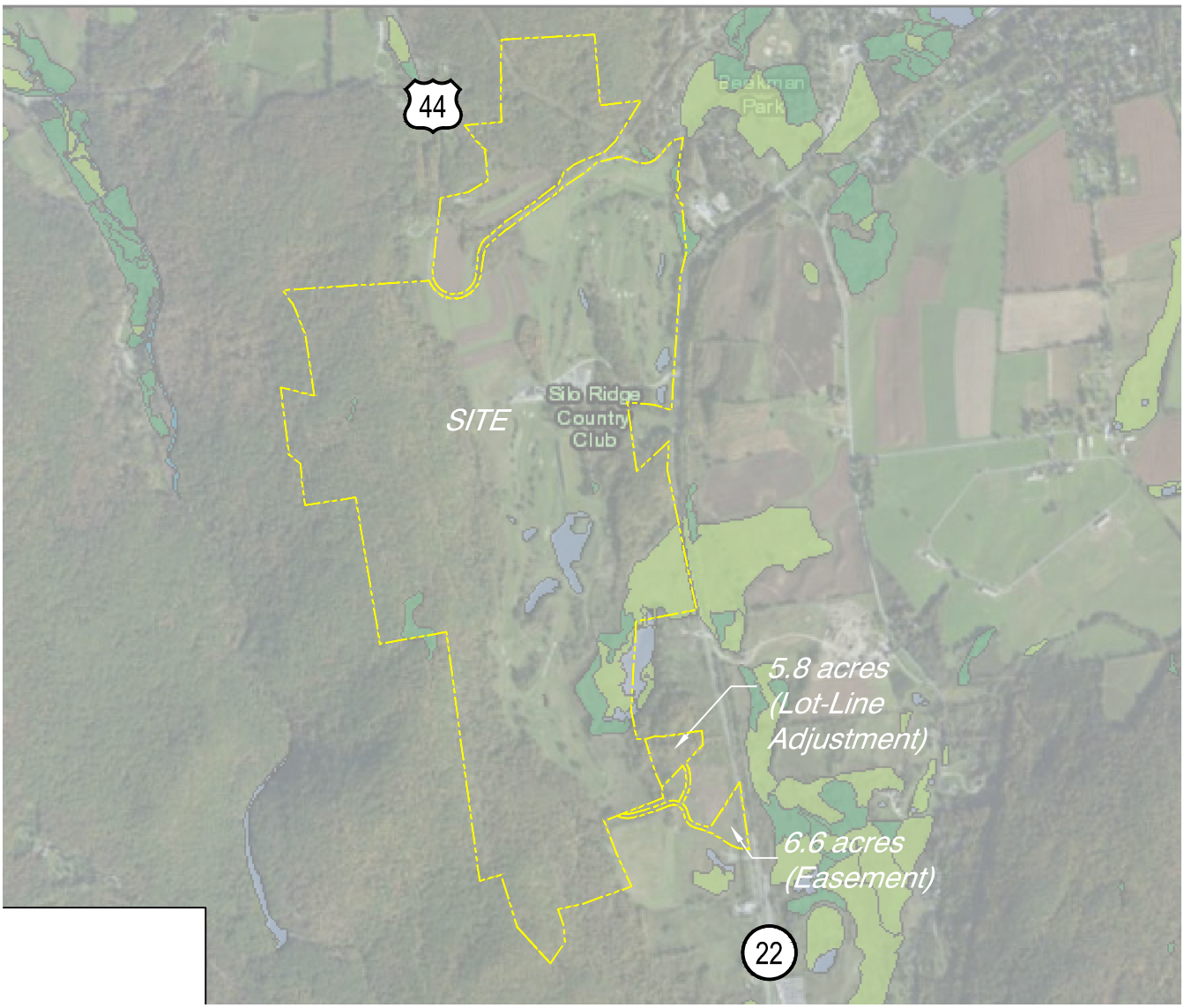
Site Location Map
Silo Ridge Resort Community
Route 22 & 44
Amenia, New York 12501



Vanasse Hangen Brustlin, Inc.

0 1000 2000 Feet

Site Location Map
Silo Ridge Resort Community
Route 22 & 44
Amenia, New York 12501

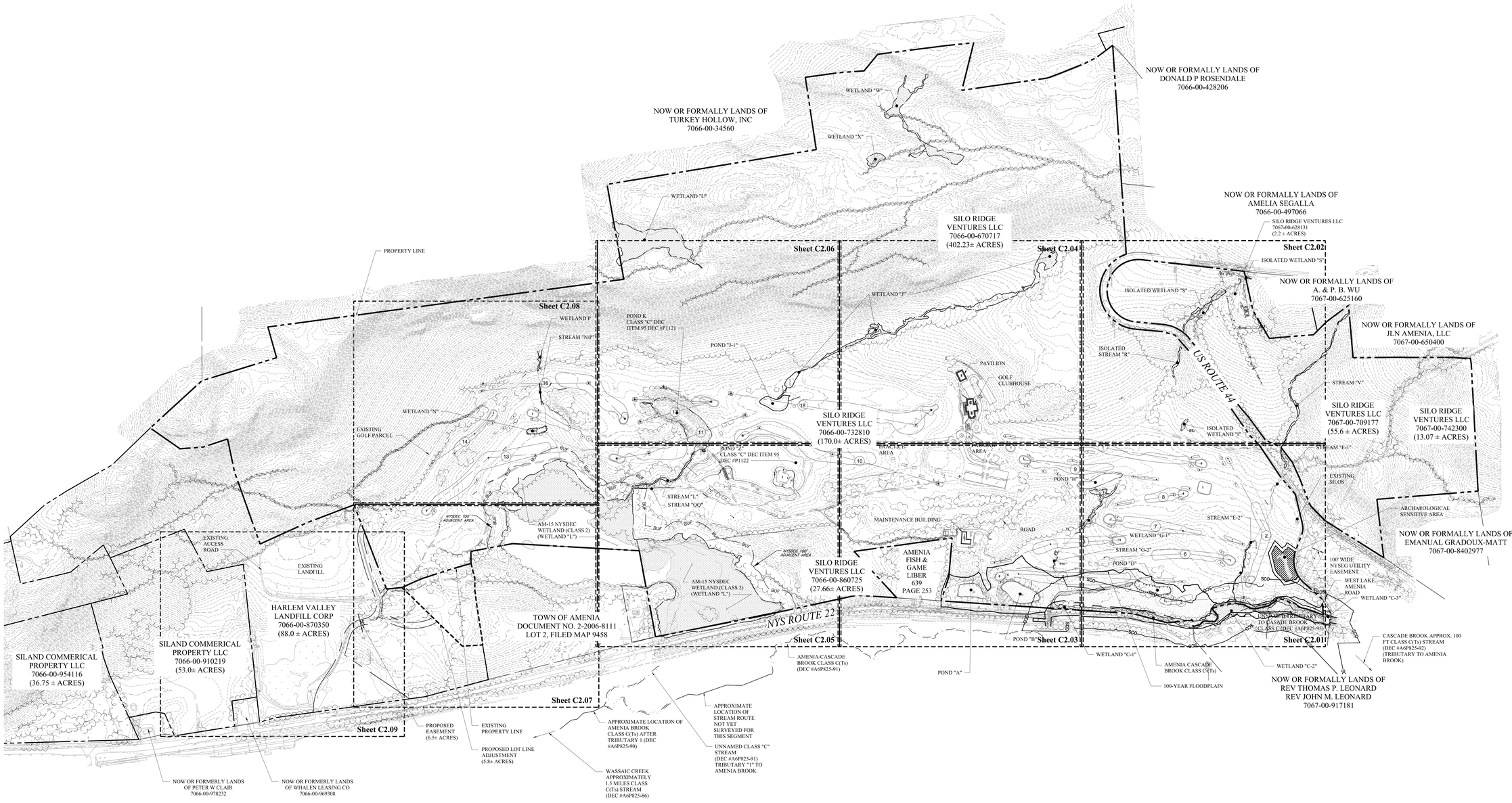


Vanasse Hangen Brustlin, Inc.

0 1000 2000 Feet

Site Location Map (NWI)
Silo Ridge Resort Community
Route 22 & 44
Amenia, New York 12501

Attachment C

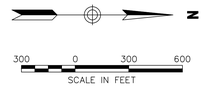


Natural Waterbody	Acreage
Wetland C-1	1.12 AC
Wetland C-2	0.38 AC
Wetland C-3	0.12 AC
Wetland J	2.06 AC
Wetland L	26.03 AC
Stream L	0.16 AC
Wetland P	0.06 AC
Stream QQ	0.02 AC
Wetland S (Isolated)	0.34 AC
Wetland U	2.78 AC
Stream V	0.35 AC
Wetland W	1.30 AC
Wetland X	0.25 AC

Constructed Waterbody	Acreage
Pond A	0.52 AC
Pond B	0.87 AC
Pond D	0.43 AC
Stream E-1	0.05 AC
Stream E-2	0.04 AC
Wetland G-1	0.33 AC
Stream G-2	0.01 AC
Pond H	0.51 AC
Wetland I (Isolated)	0.08 AC
Pond J-1	0.48 AC
Pond K	2.06 AC
Wetland N	0.15 AC
Stream N/P	0.01 AC
Stream R (Isolated)	0.10 AC
Pond Z	5.53 AC

Existing Conditions Notes:

1. EARLY GOLF CONSTRUCTION OF HOLES 10, 11, 16, 17, 18 AND DRIVING RANGE ARE SHOWN AS EXISTING CONDITIONS.



OWNER:
Silo Ridge Ventures, LLC
5021 Route 44
Amenia, New York 12501
845.373.8020

ARCHITECTS, PLANNERS, LANDSCAPE ARCHITECTS:
HART | HOWERTON
10 East 40th Street New York, NY 10016
Tel: 212 683 5631 Fax: 212 481 3768
E-mail: NY@harthowerton.com

GOLF COURSE DESIGNERS:
FAZIO DESIGN
401 N. Main St., Ste. 400
Hendersonville, North Carolina 28792
828.693.0052 • FAX 828.693.0071

ENVIRONMENTAL PLANNING & CIVIL ENGINEERING:
VHB
Engineering, Surveying & Landscape Architecture, PC
Planning
Transportation
Land Development
Environmental Services
50 Main Street, Suite 360
White Plains, New York 10606
914.467.6600 • FAX 914.761.3759

WASTEWATER AND WATER DESIGN:
CEDARWOOD ENGINEERING SERVICES, PLLC
CIVIL & ENVIRONMENTAL ENGINEERING
8-12 Dietz St., Suite 303
Oneonta, NY 607.432.8073
248 Main St., PO Box 203
North Creek, NY 518.251.5160

PROJECT SURVEYOR:
Kirk K. Horton, Land Surveyor
NYS License No. 049954
9 Broadway
Amenia, New York 12501
845.373.7809

KEY MAP:

No.	Revision	Date	Appvd
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

4651 Route 22
Amenia, New York

Issued for
Site Plan - Phase 1

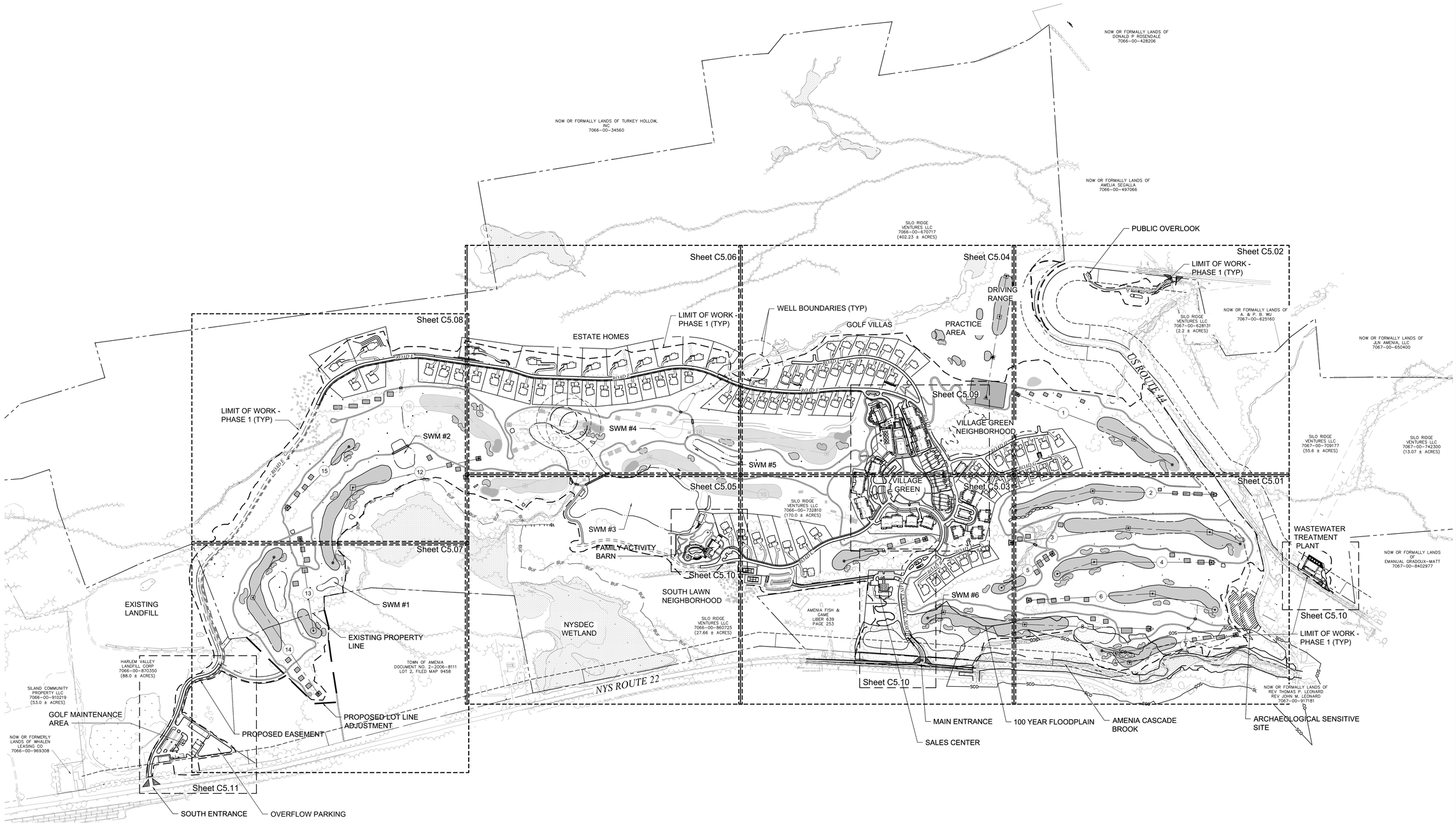
Not Issued for Construction

Drawing Title
Overall Existing
Conditions Plan

Drawing Number
C2.00

Sheet 2 of

Project Number
29011.00



Site Layout Notes:

1. ALL GOLF LANDSCAPE AND FEATURES SHOWN FOR ILLUSTRATIVE PURPOSES ONLY. REFER TO GOLF COURSE ARCHITECTS PLANS FOR LAYOUT AND DESIGN.
2. REFER TO LANDSCAPE MATERIALS PLANS AND SCHEDULE FOR HARDSCAPE ELEMENTS MATERIALS AND DESCRIPTIONS.
3. REFER TO LANDSCAPE PLANTING PLANS AND PLANTING SCHEDULE FOR TREES, PLANT, AND SEED MIXES.
4. REFER TO STRUCTURAL PLANS FOR DESIGN OF ALL WALLS/STAIRS AND OTHER LANDSCAPE ELEMENTS.
5. REFER TO ROAD GEOMETRY TABLE FOR ALIGNMENT INFORMATION.
6. BRIDGE LOCATIONS ARE AS SHOWN ON THE PLANS. DETAILED DESIGN TO BE PROVIDED BY OTHERS. REFER TO THE CIVIL SITE DETAILS FOR CONTECH DETAILS FOR THE MAIN ENTRANCE BRIDGE AND PRECEDENT IMAGES ARE PROVIDED FOR THE BRIDGE LOCATED ON ROAD E CROSSING THE STREAM SOUTH OF THE GOLF VILLAS TO THE ESTATE HOMES NEIGHBORHOOD.
7. THE ESTATE HOMES ARE CUSTOM LOTS AND THUS ARE CONCEPTUAL IN LAYOUT. THE CUSTOM LOTS SHALL COMPLY WITH THE DESIGN GUIDELINES ESTABLISHED FOR THE PROJECT.
8. REFER TO TRAFFIC CIRCULATION AND SIGNAGE PLANS FOR DESIGNATION, LOCATION, AND SPECIFICATIONS OF SIGNS.
9. REFER TO THE PROJECT HABITAT MANAGEMENT PLAN (HMP) FOR WETLAND AND WATERCOURSE BUFFERS.

OWNER:
Silo Ridge Ventures, LLC
5021 Route 44
Amenia, New York 12501
845.373.8020

ARCHITECTS, PLANNERS, LANDSCAPE ARCHITECTS:
HART | HOWERTON
10 East 40th Street New York, NY 10016
Tel: 212 683 5631 Fax: 212 481 3768
E-mail: NY@harthowerton.com

GOLF COURSE DESIGNERS:
FAZIO DESIGN
401 N. Main St., Ste. 400
Hendersonville, North Carolina 28792
828.693.0052 • FAX 828.693.0071

ENVIRONMENTAL PLANNING & CIVIL ENGINEERING:
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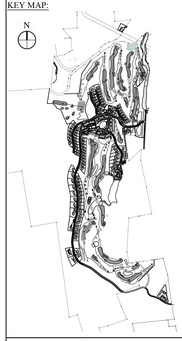
Planning
Transportation
Land Development
Environmental Services
50 Main Street, Suite 360
White Plains, New York 10606
914.467.6600 • FAX 914.761.3759

WASTEWATER AND WATER DESIGN:
CEDARWOOD ENGINEERING SERVICES, PLLC
CIVIL & ENVIRONMENTAL ENGINEERING
8-12 Dietz St., Suite 303
Oneonta, NY 607.432.8073
248 Main St., PO Box 203
North Creek, NY 518.251.5160

PROJECT SURVEYOR:
Kirk K. Horton, Land Surveyor
NYS License No. 049954
9 Broadway
Amenia, New York 12501
845.373.7809

KEY MAP:



250 0 250 500
SCALE IN FEET

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Project Title
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Resort Community

4651 Route 22
Amenia, New York

Issued for
Site Plan - Phase 1

Not Issued for Construction

Drawing Title
Overall Site
Layout Plan

Drawing Number
C5.00

Sheet of
25

Project Number
29011.00

NOW OR FORMALLY LANDS OF DONALD P ROSENDALE 7066-00-428206

NOW OR FORMALLY LANDS OF TURKEY HOLLOW, INC 7066-00-34560

NOW OR FORMALLY LANDS OF AMELIA SEGALLA 7066-00-497066

SILO RIDGE VENTURES LLC 7066-00-670717 (402.23 ± ACRES)

Sheet C7.06

Sheet C7.04

PUBLIC OVERLOOK

Sheet C7.02

LIMIT OF WORK - PHASE 1

SWM #7A

SILO RIDGE VENTURES LLC 7067-00-628131 (2.2 ± ACRES)

NOW OR FORMALLY LANDS OF A. & P. B. WU 7067-00-625160

NOW OR FORMALLY LANDS JLN AMENIA, LLC 7067-00-650400

Sheet C7.08

LIMIT OF WORK

ESTATE HOMES

GOLF VILLAS

PRACTICE AREA

ROAD E

ROAD F

ROAD G

ROAD H

Sheet C7.09

US ROUTE 44

LIMIT OF WORK - PHASE 1

SWM #2

SWM #4

SWM #5

VILLAGE GREEN NEIGHBORHOOD

SILO RIDGE VENTURES LLC 7067-00-709177 (55.6 ± ACRES)

Sheet C7.05

SWM #11

SILO RIDGE VENTURES LLC 7066-00-732810 (170.0 ± ACRES)

VILLAGE GREEN

Sheet C7.03

Sheet C7.01

Sheet C7.10

SWM #3

WASTEWATER TREATMENT PLANT

SWM #9

SWM #10

Sheet C7.07

FAMILY ACTIVITY BARN

SOUTH LAWN NEIGHBORHOOD

SWM #6

AMENIA FISH & GAME LIBER 639 PAGE 253

SWM #1

HARLEM VALLEY LANDFILL CORP 7066-00-870350 (88.0 ± ACRES)

EXISTING PROPERTY LINE

NYSDEC AM-15 WETLAND

SILO RIDGE VENTURES LLC 7066-00-860725 (27.66 ± ACRES)

Sheet C7.11

TOWN OF AMENIA DOCUMENT NO. 2-2006-8111 LOT 2, FILED MAP 9458

NYS ROUTE 22

Sheet C7.10

LIMIT OF WORK - PHASE 1

WEST LAKE AMENIA ROAD

LAKE AMENIA ROAD

SILAND COMMUNITY PROPERTY LLC 7066-00-910219 (53.0 ± ACRES)

GOLF MAINTENANCE AREA

PROPOSED EASEMENT

PROPOSED LOT LINE ADJUSTMENT

100' SPO GREEN BUFFER

MAIN ENTRANCE

SALES CENTER

100 YEAR FLOODPLAIN

STREAM CORRIDOR OVERLAY DISTRICT

AMENIA CASCADE BROOK

ARCHAEOLOGICAL SENSITIVE SITE

NOW OR FORMALLY LANDS OF REV THOMAS P. LEONARD REV JOHN M. LEONARD 7067-00-917181

SWM #12

SOUTH ENTRANCE

OVERFLOW PARKING

NOW OR FORMERLY LANDS OF PETER W CLAIR 7066-00-969232

NOW OR FORMERLY LANDS OF WHALEN LEASING CO 7066-00-969308

250 0 250 500

SCALE IN FEET

Notes:

1. ALL FOUNDATION DRAINS FOR RESIDENTIAL HOMES, CONDOMINIUM UNITS, TOWNHOUSES, AND AMENITY BUILDINGS SHALL BE DAY-LIGHTED; WHILE THE DOWNSPOUT RAIN LEADERS WILL EITHER BE DAY-LIGHTED OR CONNECTED TO CLOSED DRAINAGE SYSTEM DEPENDING ON ACCESSIBILITY

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914.467.6600 • FAX 914.761.3759

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CIVIL & ENVIRONMENTAL ENGINEERING
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Oneonta, NY 607.432.8073
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PROJECT SURVEYOR:
Kirk K. Horton, Land Surveyor
NYS License No. 049954
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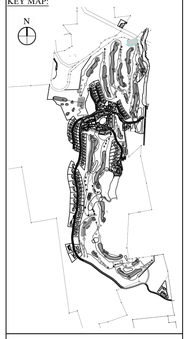
KEY MAP:



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Designed by JC | Drawn by CMG | Checked by MWJ
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4651 Route 22
Amenia, New York

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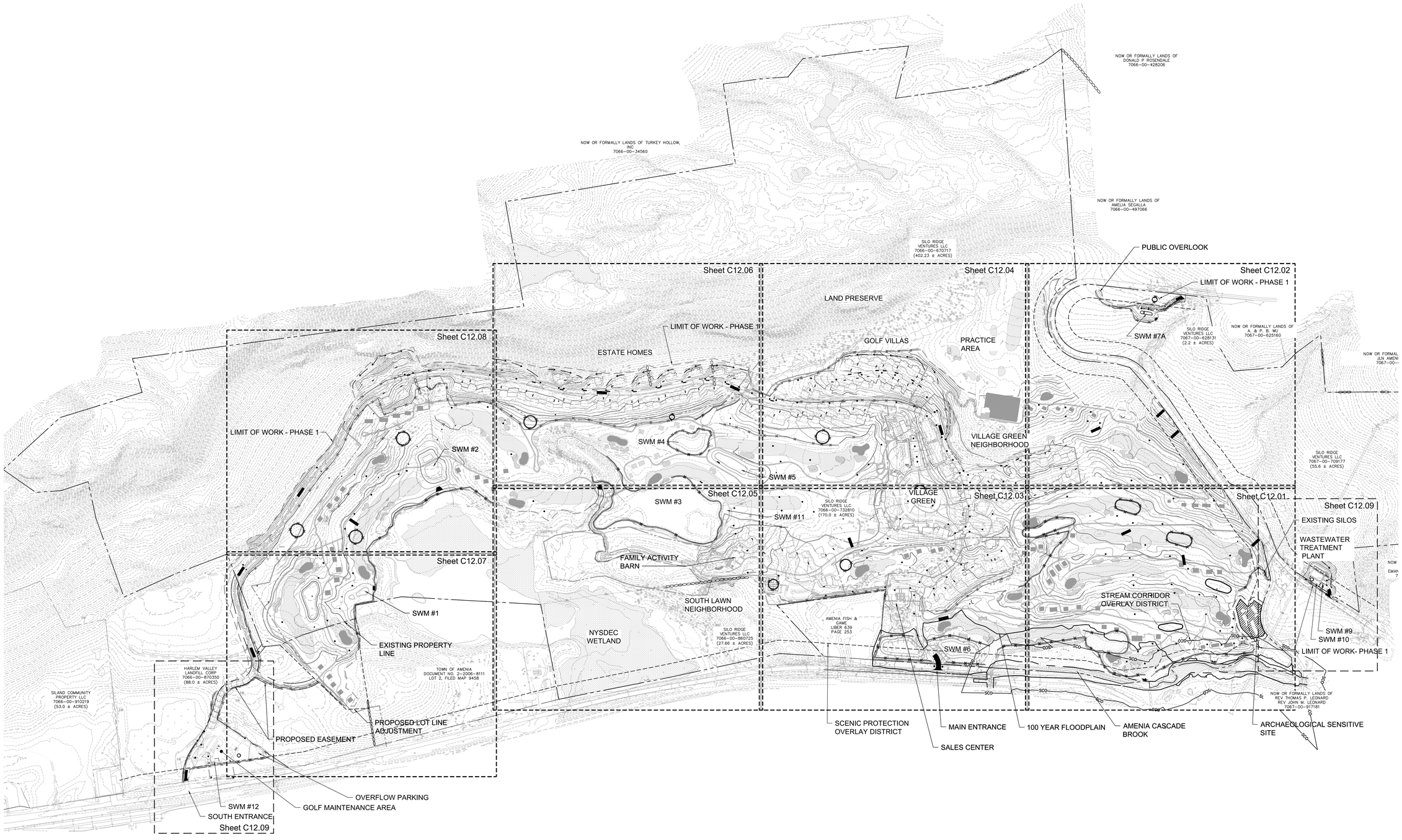
Drawing Title
Overall Grading and Drainage Plan

Drawing Number
C7.00

Sheet of
48

Project Number
29011.00



Notes:

1. REFER TO CIVIL SITE DETAILS FOR EROSION AND SEDIMENT CONTROL DETAILS.
2. REFER TO TEMPORARY SEDIMENT BASIN PLANS FOR ENLARGEMENTS OF EACH BASIN GRADING.
3. REFER TO CONSTRUCTION SEQUENCING PLANS AND NOTES FOR DETAILS OF CONSTRUCTION PHASING. ADDITIONAL EROSION CONTROL MEASURES SHALL BE IMPLEMENTED AS NECESSARY AND IN ACCORDANCE WITH EROSION CONTROL NOTES AND SEDIMENT CONTRACTOR IS RESPONSIBLE TO MAINTAIN EROSIONS CONTROL MEASURES PER PHASE.
4. TEMPORARY SILT FENCE IS SHOWN AS APPROXIMATE; CONTRACTOR TO INSTALL AT TOE OF SLOPES IN ORDER TO MAINTAIN EROSION AND SEDIMENT CONTROL. ALL EXISTING WATER BODIES SHALL BE PROTECTED BY DOUBLE ROW SILT FENCE.
5. TREE PROTECTION SHALL BE INSTALLED AT ALL TREES TO REMAIN WITHIN PROJECT LIMITS.
6. EROSION BLANKET SHALL APPLY TO SLOPE GREATER THAN 4:1.

E&SC Legend:

- STORM DRAIN INLET PROTECTION AS PER APPROVED NYS STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL
- STORM DRAIN INLET PROTECTION AS PER APPROVED NYS STANDARDS AND SPECIFICATIONS FOR EROSION AND SEDIMENT CONTROL
- SILT FENCE
- STRAW BALE
- SOIL STOCKPILE AREA
- TEMPORARY DIVERSION SWALE
- RIPRAP PROTECTION
- STABILIZED CONSTRUCTION ENTRANCE

OWNER:
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Amenia, New York 12501
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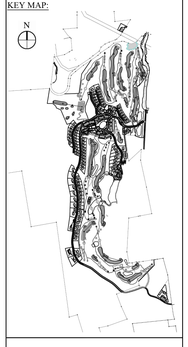

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Project Title
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Resort Community

4651 Route 22
Amenia, New York

Issued for
Site Plan - Phase 1

Not Issued for Construction

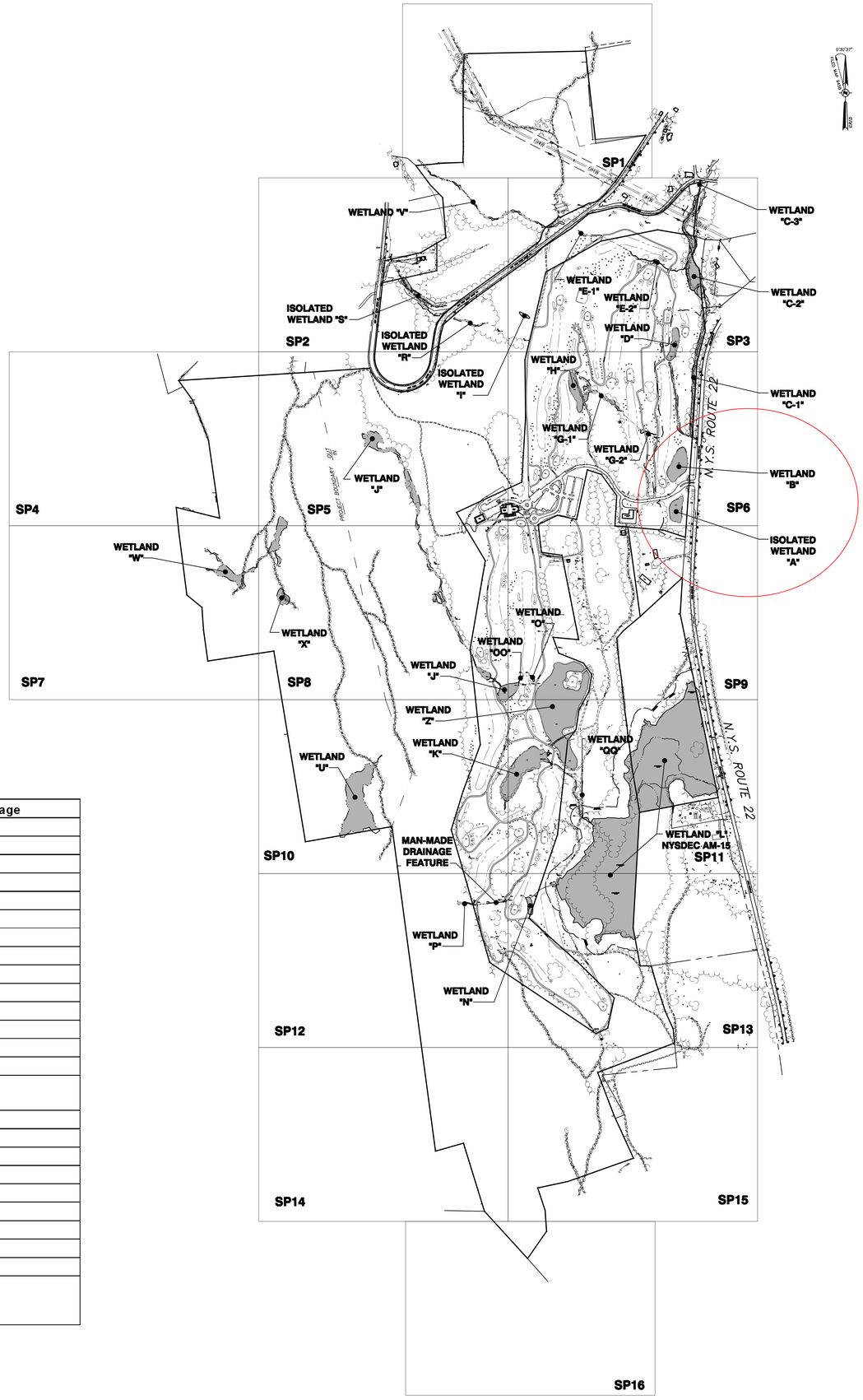
Drawing Title
Overall Erosion and Sediment Control Plan

Drawing Number
C12.00

Sheet of
118

Project Number
29011.00

Attachment D



Wetland	Acreage
A (Isolated)	0.52
B	0.87
C-1	1.12
C-2	1.31
C-3	0.02
D	0.43
E-1	0.05
E-2	0.04
G-1	0.33
G-2	0.01
H	0.51
I (Isolated)	0.06
J	2.46
K	2.06
L NYSDEC Wetland AM-15	26.03
N	0.15
O	0.03
OO	0.01
P	0.06
QQ	0.02
R (Isolated)	0.10
S (Isolated)	0.34
V	0.35
Z	5.53
Total Jurisdictional Acreage (Excludes acreage of Isolated Wetlands A, I, R & S)	41.39

400 0 400
SCALE IN FEET
1"=400'

NOTES

UNAUTHORIZED ALTERATION OR ADDITION TO A SURVEY MAP BEARING A LICENSED LAND SURVEYOR'S SEAL IS A VIOLATION OF SECTION 7209, SUBDIVISION 2 OF THE NEW YORK STATE EDUCATION LAW.

ONLY COPIES FROM THE ORIGINAL OF THIS SURVEY MARKED WITH AN ORIGINAL OF THE LAND SURVEYOR'S INKED SEAL OR HIS EMBOSSED SEAL SHALL BE CONSIDERED TO BE VALID TRUE COPIES.

ONLY BOUNDARY SURVEY MAPS WITH THE SURVEYOR'S EMBOSSED SEAL ARE GENUINE TRUE AND CORRECT COPIES OF THE SURVEYOR'S ORIGINAL WORK AND OPINION.

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SURVEYED WITHOUT THE BENEFIT OF A TITLE SEARCH. SURVEYED PER FILED MAP No. 9458, RECORD DESCRIPTIONS, AND PHYSICAL EVIDENCE FOUND. OWNER INFORMATION AS PER DUTCHESS COUNTY TAX MAP APRIL, 2005. SUBJECT TO WHATEVER FACTS A COMPLETE SEARCH OF TITLE MAY SHOW. SUBJECT TO COVENANTS, EASEMENTS, RESTRICTIONS, CONDITIONS AND AGREEMENTS OF RECORD.

SUBJECT TO EASEMENTS GRANTED TO NEW YORK STATE ELECTRIC & GAS CORP. INCLUDING LIBER 877 PAGE 441, LIBER 1904 PAGE 279, LIBER 1904 PAGE 280, & LIBER 1904 PAGE 281.

SUBJECT TO RIGHTS OF THE PUBLIC IN AND TO N.Y.S. ROUTE 44, N.Y.S. ROUTE 22 AND WEST AMENIA ROAD.

THE LOCATION OF UNDERGROUND IMPROVEMENTS OR ENCROACHMENTS ARE NOT ALWAYS KNOWN AND OFTEN MUST BE ESTIMATED. SUBSURFACE STRUCTURES NOT VISIBLE OR READILY APPARENT ARE NOT SHOWN AND THEIR LOCATION AND EXTENT ARE NOT CERTIFIED.

SURVEY COMPLETED WITH SNOW CONDITIONS OF 12 INCHES OF COVER.

GRID NORTH, NYS PLANE COORDINATE SYSTEM, EAST ZONE, NAD 1983 BASED ON DUAL FREQUENCY GPS OBSERVATION.

TOPOGRAPHY SHOWN HEREON WAS COMPILED FROM AERIAL PHOTOGRAMMETRIC METHODS BY GOLDEN AERIAL SURVEYS, INC., PHOTO DATE APRIL 29, 2004, AND PARTIAL FIELD SURVEY COMPLETED BY CELS ON JUNE 16, 2005. VERTICAL DATUM NGVD 29 PER BM ALBANY 537. CONTOUR INTERVAL = 2 FOOT.

PLANIMETRIC FEATURES (BUILDINGS, ROADS, TREELINES) SHOWN HEREON LOCATED BY AERIAL PHOTOGRAMMETRIC METHODS UNLESS OTHERWISE INDICATED.

WETLAND NOTES

WETLANDS SHOWN HEREON AS PER FIELD DELINEATION MAY 26, 2005 BY CELS AND SURVEY LOCATION COMPLETED BY THIS OFFICE ON JUNE 7, 2005 AND NOVEMBER 3, 2005. ADDITIONAL WETLANDS DELINEATED BY THIS OFFICE ON NOVEMBER 3, 2005 WITH SURVEY LOCATION COMPLETED BY THIS OFFICE DECEMBER 29, 2005.

WETLANDS SHOWN WITHIN THE PROJECT BOUNDARY WERE REVIEWED BY BRIAN ORZEL OF THE U.S. ARMY CORPS OF ENGINEERS ON SEPTEMBER 12, 2006.

FILED MAP REFERENCE

REFER TO MAP ENTITLED "FINAL SUBDIVISION OF LANDS OF JOHN SEGALLA", RECORDED IN THE DUTCHESS COUNTY CLERK'S OFFICE ON APRIL 15, 1992, AS FILED MAP NO. 9458.

FLOOD ZONE NOTE

A PORTION OF TAX PARCEL 132000-7066-00-670717 AND TAX PARCEL 132000-7066-00-732810 AS SHOWN HEREON LIE WITHIN FLOOD ZONE "AE" AND ZONE "X" AS SHOWN ON FLOOD INSURANCE RATE MAP FOR THE TOWN OF AMENIA, NY, COMMUNITY PANEL #361332-0006D REVISED NOVEMBER 15, 1989.

DEED REFERENCES

132000-7066-00-732810
COUNTRY CLUB FUNDING, LLC TO
HIGHER GROUND COUNTRY CLUB, LLC
DEED DOCUMENT 02-2000-10224, RECORDED NOV. 14, 2000.

132000-7066-00-670717
COUNTRY CLUB FUNDING, LLC TO
HIGHER GROUND COUNTRY CLUB, LLC
DEED DOCUMENT 02-2000-10224, RECORDED NOV. 14, 2000.
&
BOUNDARY AGREEMENT:
HARLEM VALLEY LANDFILL CORP. TO
JOHN SEGALA
DEED LIBER 1998, PAGE 700 RECORDED SEPT. 8, 1997.

132000-7067-00-709177
COUNTRY CLUB FUNDING, LLC TO
HIGHER GROUND COUNTRY CLUB, LLC
DEED DOCUMENT 02-2000-10224, RECORDED NOV. 14, 2000.

132000-7067-00-742300
COUNTRY CLUB FUNDING, LLC TO
HIGHER GROUND COUNTRY CLUB, LLC
DEED DOCUMENT 02-2000-10224, RECORDED NOV. 14, 2000.

132000-7066-00-860725
WALTER & ELEANOR CULVER TO
HIGHER GROUND COUNTRY CLUB, LLC
DEED DOCUMENT 02-2004-9417, RECORDED SEPT. 13, 2004.

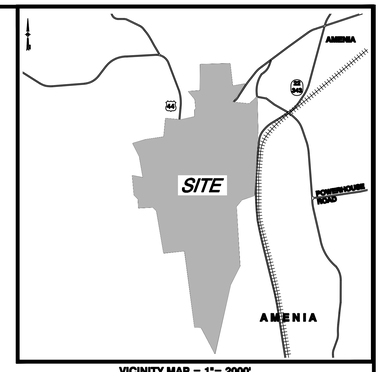
132000-7067-00-628131
RAYMOND F. POWERS, AS EXECUTOR OF
THE ESTATE OF PAULINE M. MILLER A/K/A
PAULINE L. MILLER TO
HIGHER GROUND COUNTRY CLUB, LLC
DEED DOCUMENT 02-2007-1968, RECORDED MARCH 19, 2007.

TAX PARCEL NUMBERS

TOWN OF AMENIA, DUTCHESS COUNTY, NEW YORK
132000-7066-00-732810
132000-7066-00-670717
132000-7066-00-860725
132000-7067-00-709177
132000-7067-00-742300
132000-7067-00-628131

TABLE OF AREAS

TAX PARCELS:	
132000-7066-00-732810	170.00 ACRES
-670717	402.20 ACRES
-860725	27.52 ACRES
132000-7067-00-709177 & -742300	68.71 ACRES
-628131	2.24 ACRES
TOTAL SITE ACREAGE =	670.67 ACRES



VICINITY MAP = 1"= 2000'

LEGEND:

- NO PHYSICAL BOUNDS
- ADJACENT PROPERTY LINE
- ACOE WETLANDS LINE
- NYSDEC 100' WETLAND BUFFER LINE
- FLOOD ZONE
- 110 — EXISTING MAJOR CONTOUR
- EXISTING MINOR CONTOUR
- 100.5 — EXISTING SPOT GRADE
- EXISTING FENCE
- EXISTING STONE WALL
- EXISTING GUIDERAIL
- EXISTING TREE LINE
- OHW — EXISTING OVERHEAD WIRES
- W — EXISTING WATER LINE
- G — EXISTING GAS LINE
- UE — EXISTING UNDERGROUND ELECTRIC LINE
- 8" SAN — EXISTING UNDERGROUND SEWER LINE
- 15" RCP — EXISTING UNDERGROUND STORM LINE
- EXISTING BUILDING
- EXISTING BUILDING FOUNDATION
- SIZE & TYPE — EXISTING CULVERT W/ END SECTION
- SIZE & TYPE — EXISTING CULVERT W/ PLAIN END
- SIZE & TYPE — EXISTING W/ HEADWALL
- ROAD — EXISTING ROAD
- SIDEWALK — EXISTING SIDEWALK
- ASPHALT — EXISTING ASPHALT DRIVEWAY
- CONC. CURB — EXISTING CURB/GUTTER
- GRAVEL — EXISTING GRAVEL DRIVEWAY
- EXISTING SIGN
- EXISTING SIGN
- BENCHMARK HYD-NHOA ELEV = xxx.xx — EXISTING BENCHMARK
- EXISTING CATCH BASIN
- EXISTING CAPPED IRON ROD
- EXISTING CABLE TV PEDESTAL
- EXISTING CONIFEROUS TREE
- EXISTING DRAINAGE MANHOLE
- EXISTING DECIDUOUS TREE
- EXISTING ELECTRIC BOX
- EXISTING ELECTRIC MANHOLE
- EXISTING END SECTION
- EXISTING FLAGPOLE
- EXISTING GAS STRUCTURE
- EXISTING GAS STRUCTURE
- EXISTING GUY WIRE
- EXISTING GAS VALVE
- EXISTING HYDRANT
- EXISTING IRON PIPE
- EXISTING IRON ROD
- EXISTING LIGHT POLE
- EXISTING MAILBOX
- EXISTING MILE MARKER
- EXISTING MONUMENT
- EXISTING POST
- EXISTING PERC TEST
- EXISTING REFLECTOR MARKER
- EXISTING SOIL BORING
- EXISTING SANITARY MANHOLE
- EXISTING SPRINKLER HEAD
- EXISTING TELEPHONE MANHOLE
- EXISTING TEST PIT
- EXISTING TELEPHONE PEDESTAL
- EXISTING ELECTRIC TRANSFORMER
- EXISTING TRAFFIC SIGNAL CONTROL BOX
- EXISTING TRAFFIC SIGNAL HEAD
- EXISTING TRAFFIC SIGNAL POLE
- EXISTING TREE W/ WIRE
- EXISTING UNKNOWN MANHOLE
- EXISTING UTILITY POLE
- EXISTING UTILITY POLE W/ LIGHT
- XJUNES — EXISTING WETLAND BOUNDARY FLAG
- EXISTING WELL
- EXISTING WATER SHUT OFF VALVE
- EXISTING WATER VALVE

NYSDEC FRESHWATER WETLAND BOUNDARY VALIDATION

THE FRESHWATER WETLAND BOUNDARY AS REPRESENTED ON THESE PLANS ACCURATELY DEPICTS THE LIMITS OF FRESHWATER WETLAND AM-15 (WETLAND L) AS DELINEATED BY STEVE FINCH OF THE CHAZEN COMPANIES ON MAY 26, 2005 AND NOVEMBER 3, 2005 AND FIELD VERIFIED BY HEATHER GIERLOFF OF THE NYSDEC ON APRIL 13, 2006.

DEC STAFF: _____ HEATHER GIERLOFF
SURVEYOR: _____ STEVEN J ALEX, L.S. #050016
DATE: _____
SEAL

WETLAND BOUNDARY DELINEATIONS AS VALIDATED BY THE NEW YORK STATE DEPARTMENT OF ENVIRONMENTAL CONSERVATION REMAIN VALID FOR 10 YEARS UNLESS EXISTING EXEMPT ACTIVITIES, AREA HYDROLOGY, OR LAND USE PRACTICES CHANGE (e.g., AGRICULTURAL TO RESIDENTIAL). AFTER 10 YEARS THE BOUNDARY MUST BE REVALIDATED BY DEC STAFF. REVALIDATION MAY INCLUDE A NEW DELINEATION AND SURVEY OF THE WETLAND BOUNDARY.

ANY PROPOSED CONSTRUCTION, GRADING, FILLING, EXCAVATING, CLEARING OR OTHER REGULATED ACTIVITY IN THE FRESHWATER WETLAND OR WITHIN 100 FEET OF THE WETLAND BOUNDARY AS DEPICTED ON THIS PLAN REQUIRES A PERMIT FROM THE NYS DEPARTMENT OF ENVIRONMENTAL CONSERVATION UNDER ARTICLE 24 OF THE ENVIRONMENTAL CONSERVATION LAW (FRESHWATER WETLANDS ACT) PRIOR TO COMMENCEMENT OF WORK.

Silo Ridge Country Club
Resort Community

tblk-image-1.jpg

STEVEN J ALEX, L.S. #50016

THE Chazen COMPANIES
Engineers/Surveyors
Planners
Environmental Scientists

CHAZEN ENGINEERING & LAND SURVEYING CO., P.C.

Dutchess County Office: 21 Fox Street, Poughkeepsie, New York 12601, Phone: (845) 454-3980
Capital District Office: 547 River Street, Troy, New York 12180, Phone: (518) 273-0055
Orange County Office: 356 Meadow Avenue, Newburgh, New York 12550, Phone: (845) 567-1133
North Country Office: 100 Glen Street, Glens Falls, New York 12801, Phone: (518) 812-0053

rev.	date	description
5	5/30/07	TAX LOT 7067-00-628131 (SP2)
4	10/12/06	REVISIONS PER ACOE
3	4/20/06	REVISIONS PER NYSDEC
2	4/11/06	GENERAL REVISIONS
1	2/8/06	GENERAL REVISIONS

SILO RIDGE

MAP OF WETLAND SURVEY PREPARED FOR HIGHER GROUND COUNTRY CLUB MANAGEMENT CO., LLC

TOWN OF AMENIA, DUTCHESS COUNTY, NEW YORK

drawn M.C. | checked MM
date 1/13/06 | scale 1" = 400'
project no. 10454
sheet no. T1
1 OF 17

Drawing Name: X:\1\10400-10500\10454\Survey\dwg\ARCHIVE\ARCHIVE_WETLANDS_REV-5_20070530\T1-OVERALL-WETLANDS-10454.dwg
Xref's Attached: XTB-WETLANDS-10454; 10454bm
Date Printed: May 31, 2007, 7:59am

Attachment E

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
NEW YORK, N.Y. 10278-0090

REPLY TO
ATTENTION OF:
Regulatory Branch

JUL 25 2008

SUBJECT: Permit Application Number NAN-2006-216-WOR
by Higher Ground Country Club Management Company, Inc.

Jason Tourscher
Chazen Engineering & Land
Surveying Company, P.C.
356 Meadow Avenue
Newburgh, New York 12550

Dear Mr. Tourscher:

On January 19, 2006, the New York District Corps of Engineers received a request for a Department of the Army jurisdictional determination for the above referenced project. The area within the project boundary consists of approximately 557.31 acres, in the Long Island Sound watershed, located on New York State Route 22 in the Town of Amenia, Dutchess County, New York. The proposed project would involve the construction of a residential development to be known as Silo Ridge.

In the letter received on January 19, 2006, your office submitted a proposed delineation of the extent of waters of the United States within the project boundary. A site inspection was conducted by a representative of this office on September 12, 2006, in which it was agreed that changes would be made to the delineation and that the modified delineation would be submitted to this office. On July 21, 2008, this office received the modified delineation.

Based on the material submitted and the observations of the representative of this office during the site visit, this site has been determined to contain jurisdictional waters of the United States based on: the presence of wetlands determined by the occurrence of hydrophytic vegetation, hydric soils and wetland hydrology according to criteria established in the 1987 "Corps of Engineers Wetlands Delineation Manual," Technical Report Y-87-1 that are either adjacent to or part of a tributary system; the presence of a defined water body (e.g. stream channel, lake, pond, river, etc.) which is part of a tributary system; and the fact that the location includes property below the ordinary high water mark, high tide line or mean high water mark of a water body as determined by known gage data or by the presence of physical markings including, but not limited to, shelving, changes in the character of soil, destruction of terrestrial vegetation, the presence of litter or debris or other characteristics of the surrounding area.

These jurisdictional waters of the United States are shown on the drawings entitled "Silo Ridge Map of Wetland Survey Prepared For Higher Ground Country Club Management Co., LLC Town of Amenia, Dutchess County, New York", Sheet Nos. T1 and SP1 through SP16, prepared by Chazen Engineering & Land Surveying Co., P.C., all dated January 13, 2006, Sheet No. T1 last revised July 11, 2008, Sheet No. SP2 last revised May 30, 2007, and Sheet Nos. SP1 and SP3 through SP16 last revised October 12, 2006. These drawings indicate that there are fourteen (14) principal wetland areas within the project boundary which are part of a tributary system, and are considered to be waters of the United States. The project boundary consists of the portion of the property located east of the "Project Boundary" line, as shown on Sheet No. T1.

The first wetland (Wetland "B") is located on the east-central portion of the project boundary and is approximately 0.87 acres. The second wetland (Wetland "C-1", "C-2" and "C-3") is located on the northeastern portion of the project boundary and is approximately 2.45 acres within the project boundary. The third wetland (Wetland "D") is located just north of the western portion of Wetland C and is approximately 0.43 acres. The fourth wetland (Wetland "E-1" and "E-2") is located just west of the northern portion of Wetland C and is approximately 0.09 acres. The fifth wetland (Wetland "G-1" and "G-2") is located approximately 200 feet west of Wetland C and is approximately 0.34 acres. The sixth wetland (Wetland "H") is located just west of Wetland G and is approximately 0.51 acres.

The seventh wetland (Wetland "J" and "OO") is located on the central and northwestern portions of the project boundary and is approximately 2.47 acres. The eighth wetland (Wetland "K") is located on the central portion of the project boundary and is approximately 2.06 acres. The ninth wetland (Wetland "L" and "QQ") is located on the southeastern portion of the project boundary and is approximately 26.05 acres within the project boundary. The tenth wetland (flag numbers M1 through M14) is located on the southwestern portion of the project boundary and is approximately 0.01 acres. The eleventh wetland (Wetland "N") is located between Wetlands L and M and is approximately 0.15 acres. The twelfth wetland (Wetland "O") is located approximately 50 feet east of Wetland JOO and is approximately 0.03 acres.

The twelfth wetland (Wetland "P") is located approximately 100 feet west of Wetland M and is approximately 0.06 acres. The thirteenth wetland (Wetland "V") is located on the northern portion of the project boundary and is approximately 0.35 acres within the project boundary. The fourteenth wetland (Wetland "Z") is located between Wetlands L and O and is approximately 5.53 acres.

It should be noted that, in light of the U.S. Supreme Court decision (Solid Waste Agency of Northern Cook County v. U.S. Army Corps of Engineers, No. 99-1178, January 9, 2001), the remainder of the wetlands shown on the above referenced drawing (Wetlands A, I, R and S) do not meet the current criteria of waters of the United States under Section 404 of the Clean Water Act. The Court ruled that isolated, intrastate waters can no longer be considered waters of the United States, based solely upon their use by migratory birds.

This determination regarding the delineation shall be considered valid for a period of five years from the date of this letter unless new information warrants revision of the determination before the expiration date.

This delineation/determination has been conducted to identify the limits of the Corps Clean Water Act jurisdiction for the particular site identified in this request. If you object to this determination, you may request an administrative appeal under Corps regulations at 33 CFR Part 331. Enclosed is a combined Notification of Appeal Process (NAP) and Request For Appeal (RFA) form. If you request to appeal this determination you must submit a completed RFA form to the North Atlantic Division Office at the following address:

Michael G. Vissichelli, Administrative Appeals Review Officer
North Atlantic Division, U.S. Army Engineer Division
Fort Hamilton Military Community
General Lee Avenue, Building 301
Brooklyn, New York 11252-6700

In order for an RFA to be accepted by the Corps, the Corps must determine that it is complete, that it meets the criteria for appeal under 33 CFR Park 331.5, and that it has been received by the Division Office within 60 days of the date of the NAP. Should you decide to submit an RFA form, it must be received at the above address by SEP 2 3 2008. It is not necessary to submit an RFA form to the Division Office if you do not object to the determination in this letter.

This delineation/determination may not be valid for the wetland conservation provisions of the Food Security Act of 1985, as amended. If you or your tenant are USDA program participants, or anticipate participation in USDA programs, you should request a certified wetland determination from the local office of the Natural Resources Conservation Service prior to starting work.

It is strongly recommended that the development of the site be carried out in such a manner as to avoid as much as possible the discharge of dredged or fill material into the delineated waters of the United States. If the activities proposed for the site involve such discharges, authorization from this office may be necessary prior to the initiation of the proposed work. The extent of such discharge of fill will determine the level of authorization that would be required.

If any questions should arise concerning this matter, please contact Brian A. Orzel, of my staff, at (917) 790-8413.

Sincerely,

Steven A. Schumach
Acting Chief, Western Permits Section

Enclosures

Attachment F

Revised Habitat Management Plan

Silo Ridge Resort Community

Town of Amenia
Dutchess County, New York

July 1, 2014

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.

Prepared for:

Silo Ridge Ventures, LLC
5021 Route 44
Amenia, New York 12501

Prepared by:

VHB Engineering, Surveying and Landscape Architecture, P.C.
50 Main Street
White Plains, New York 10606

This HMP is an update to the original HMP prepared by Karl Strause PhD & Jason Tourscher of The Chazen Companies for HGCC
June 6, 2008
Revised by Lisa Standley, PhD of VHB

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LIST OF APPENDICES

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 (March, 2014) 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 and 126 man-hours 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. A total of 16 days and 244 man-hours were logged on-site during these supplementary studies (See Appendix 9.7.2 to the FEIS). 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.

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

[1] Habitat Management is defined by TCC 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.

and hydrologic controls at the Site will also cross over into the habitat management sphere. These include the Surface Water Pollution Prevention Program (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). These objectives are intertwined but not indistinguishable. Good buffers will provide protections 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.

[3] Buffer Management is defined by TCC 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. **Forest Habitat –** all upland forested habitats.

2. **Grassland and Scrub/Shrub**

Native Fescue 6" to 1'

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

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

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

3. **Wetlands –** includes all wetland aquatic, semi-aquatic, and forest habitats.

4. **Aquatic Habitats**

P1 Shoreline Group

Aquatic Habitat

A, AQ – Ponds and Streams.

SWM – Storm Water Management Basins.

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

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 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 ETS 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).

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 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.

2.2.2 Sensitive Habitats that may be Degraded by Development at the Site

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 Habitat

Existing high quality and critical habitats on-site include woodland vernal pools, 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 three significant aquatic habitat restoration projects. These include a stream bed restoration, stream bank stabilization, and erosion control project on a tributary to Amenia Brook; a floodplain restoration project in the 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. Six 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. Seven planting palettes of native species have been assembled for use in conjunction with aquatic and upland habitat enhancement efforts. An eighth 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. Table 1 in 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). All plantings will be supervised by a certified horticulturist. 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 three basic mitigation schemes and two simple habitat enhancement approaches to provide protections and enhancements to sensitive on-site habitats. These schemes/approaches include:

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). Without in-depth site-specific studies to evaluate the effects of these variables on buffer performance, general standards must be referenced for buffer design. 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

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. Examples of these include:

Wet – for existing wetlands and streams.

Dry – for intermittent flows and ephemeral waterways.

Oversized box culverts provide the most conducive environment for animal movements by eliminating the confusion that some species encounter with curved walls and by allowing greater amounts of light and air flow into the structure, as well as maximizing available habitat of the open bottom (natural substrate). For these reasons, oversized box culverts will be utilized as the preferred mitigation structure at each wet/dry road crossing on the Site. The design of each culvert at any given location will be evaluated on a case-by-case basis. In some instances, the applicant may seek Planning Board approval to use an oversized bottomless arched culvert based on engineering and cost considerations. The Planning Board may approve such a request if the arched culvert is appropriate under the circumstances. Another consideration will be the types of species

that are anticipated to use any particular underpass, i.e. the target species, and their sensitivities to arched versus box culverts. Regardless of the construction design and form, both types (boxed or arched) will be sized to a minimum standard so as to provide sufficient space for unrestricted movement along aquatic corridors by the largest native mammals resident at the site or its immediate environs. These species could include black bear (*Ursus americanus*) and bobcat (*Lynx rufus*). Case by case evaluations of the appropriate type of construction to use at each culvert/mitigation structure location will be completed as part of the Site Plan Review and Approval Phase of the project.

Golf Course Foot/Cart Bridges: These 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 conductive to unrestricted animal movements along aquatic corridors.

Wildlife Tunnels**:** These include roadway passages placed in known or potential routes of on-site animal movements to link critical habitat features that are bisected by roadway construction and/or residential development.

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. Aquatic habitat enhancements will provide significant functional value for aquatic and semi-aquatic wildlife species, including birds, mammals, herpetofauna, and fish. In instances where these newly established aquatic vegetative communities develop a diverse species composition and become integrated into a functional littoral or riparian community, then these enhancements may also eventually provide a limited range of wetland ecological services in terms

of habitat provision and nutrient uptake. However, in most instances, the limited area and biomass of these newly created communities will provide only a negligible functional attenuation of overland nutrient and contaminant transport loadings to surface waters and wetland habitats.

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. 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 289.5 acres of upland forested habitat present, the majority of which extends in a continuous 228 acre unit extending along the north-south ridgeline on the western border (Figure ENV-3, Appendix C). 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 41 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 6 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 where historical observations of wood turtles (a NYS species of special concern) have been reported. 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 extent 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 96.8 acres of grassland habitats present for use by resident and transient wildlife (Figure ENV-3, Appendix C). The redesign of the golf course into a championship venue will provide a boon to grassland birds and other species that utilize meadowlands and open-canopy habitats. 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 grassland will be planted around margins of exiting 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). By providing a rich diversity of possible nesting, foraging and shelter habitats, all of these areas are expected to be utilized extensively by grassland bird species.

Establishment and management of grassland areas will be coordinated with the reconstruction schedule for the redesigned golf course. To enable the quickest establishment of high quality turf in newly constructed golf course areas, maintenance schedules for short, tall and transitional grassland areas (described below) will not be initiated until after the golf course superintendent has determined that turf set and root densities are adequate to protect against colonization by grassland grasses and forbs.

At present, the site management plan prescribes maintenance of site grassland areas into perpetuity. However, the applicant maintains the option to establish one or two small areas of fruit (e.g., grapes, tree stock) or vegetable (organic garden) production in the northern grassland areas of the site with southern and southwest exposure, adjacent to the Route 44 corridor.

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.

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.

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.

3.1.3 Wetlands

The site includes discrete wetland areas totaling a combined 37.4 (updated from 36.2) acres in area (see DEIS Figure). The vast majority of functional on-site wetland habitat is contained within the NWI and NYSDEC mapped 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 3.1.3.1 below. With regard to the remaining wetland units on the site, site development impacts will be limited to the loss of a small (0.06-acre) and isolated (on outflow) wetland in the vicinity of Hole 1 (See DEIS Table 5-4). Wetland I will be filled during construction of the new Hole 1 fairway. In its present condition, Wetland I is surrounded by managed turf of adjacent in-play areas of the existing golf course. The vegetative community of this wetland is dominated by cattail (*Typha latifolia*), purple loosestrife (*Lythrum salicaria*), soft rush (*Juncus effusus*), tear-thumb (*Polygonum sagittatum*) and duckweed (*Lemna minor*). In the Applicant's opinion, Wetland I's small size, isolated nature, and dominant vegetative communities do not combine to promote high functional quality and at best it's potential for the production of effective wetland services (e.g., flood flow alteration, sediment stabilization, nutrient removal/transformation, etc.) is extremely limited. Aside from the potential loss of its limited groundwater recharge/discharge services, the loss of this wetland and associated impacts to cumulative wetland-derived ecological services for the site are likely to be negligible. Any decreases in net wetland ecological services precipitated by the loss of this small wetland area will be compensated many-times over by the stream and floodplain habitat restoration projects identified for Streams V, P and Amenia Brook described in Section 5 of this HMP. Efforts to daylight over 350 linear feet of stream bed and reestablish over 1.5 acres of riparian habitat will more than compensate for the limited services previously provided by Wetland I. Additionally, the establishment of newly created aquatic habitat and Aquatic Habitat Enhancements (AQ2, and AQ5) in over 800 feet of constructed stream bed (see Maps ENV-4 and ENV-5) will provide additional compensatory increases in on-site wetland-derived ecological services.

3.1.4 Wetland AM-15

Management activities within Wetland AM-15 will include a limited restoration effort to remove a small patch of invasive Common Reed (*Phragmites australis*). These plants will be excavated from the wetland, and the excavated area will be restored with a seeding of native vegetation. 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 Aquatic Habitats

Prior to development there were approximately 16 acres of impounded water on the Site. The development plan includes approximately 2 acres of expansion to four of these original impoundments. New surface water features will include roughly 3 acres of impounded waters in four Storm Water Management Basins and ten Aquatic Habitat waters (A and AQ, existing streams and ponds, enhanced for habitat and stormwater functions). Perennially flowing streams at the Site include Amenia Brook, Stream J, and the unnamed drainage originating from the Irrigation Pond (A8). The remaining waters are reported as supporting only intermittent flows. The total proposed Aquatic Habitat is 20.3 acres, with an additional 2.3 acres of P1 Shoreline plantings.

3.1.5.1 Streams

All flowing waters on-site have been targeted for the establishment of either stream-side 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).

3.1.5.2 Ponds

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.

3.1.6 Storm Water Management Basins

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). SWM locations are still approximate pending completion of the final SWMPP and modifications to the placement of these structures are expected to occur during finalization of the Master Development Plan (MDP) for the site. These modifications will be made to insure an adequate level of protection is provided to onsite surface waters and wetlands in the unlikely event of stormwater overflow from these structures. Modifications to the placement of SWMs and subsequent adjustments to the BMP will be incorporated into the MDP during the special permit process.

Select SWMs at the Site will be included in an effort to enhance on-site habitat for resident turtles and snakes. SWMs to be located in close proximity to existing water impoundments where healthy turtle and snake populations are known to be present will include a modified design along the southern- and western-oriented facings of the berms. Modifications will include a top layer of sandy soil up to 18 inches deep in an effort to provide nesting habitat for turtles and ground nesting snakes. At this time, SWMs #1 and 2 and AQ 9 (see Maps ENV-5 and ENV-6, Appendix C) have been identified as likely candidates for these enhancements based on their proximity to Ponds A7 and Wetland AM-15. A second enhancement feature will be added to provide basking and foraging habitat for resident snakes. This feature will include the placement of large cobble and/or stone along the lower margins of southern- and western-facing berms. Seed yielding grasses and forbs selected from the P1 planting palette will be established above these cobble/rock abutments to attract the insect, bird and small mammal prey favored by snakes. At this time SWM 1 and 2 (Maps ENV-5 and ENV-6, Appendix C) has been identified as a candidate for these enhancements.

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. Aside from the P5 plantings and berm enhancements

described above, there are no plans to actively manage the habitat enhancement area surrounding each SWM. However, the modified pesticide spraying schedule described previously for riparian buffers and habitat enhancements will be implemented where SWMs are constructed with retaining berms at the same grade to the surrounding land (e.g., in instances where a SWM is built into a hill side).

3.1.7 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.

3.1.8 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. A second approach toward maintaining connectivity is the establishment of riparian and shoreline buffers and terrestrial habitat enhancement areas in combination with the removal of culverts and the redesign of bridges. These efforts provide extremely valuable riparian routes for animal movements. A third approach addresses the consequences of road construction at the Site. Attempts to facilitate safe passage between habitat units fragmented by roadway construction include the use of oversized bottomless arched culverts at "wet" road crossings over existing streams and "dry" crossings over stormwater management swales. Where the establishment of safe road crossings cannot be combined with the design/location of conduits for routing stormwater runoff, special wildlife "migration" tunnels will be incorporated into roadway design and construction to aid small animals in their movements.

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 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. In total, the project will include the creation of over 5,472 feet of new water quality buffers at existing natural sensitive aquatic habitats throughout the site. The project proposes to increase the buffer coverage by 18% for the natural habitat units (existing coverage of 81% versus proposed coverage of 99%). Table 1, Part 2 includes a summary of the buffer locations and buffering quality at each of the project's constructed habitats, including all on-site storm water management basins. Many of these constructed habitats will serve double duty as both aquatic hazards (golf course) and storm water management basins. Use as aquatic hazards does, in some instances, significantly reduce opportunities to establish water quality buffers along the majority of the aquatic edge at a few newly created locations. In total, the project will include the creation of over 7,154 feet of new water quality buffers at new and existing constructed sensitive aquatic habitats throughout the site. The project proposes to increase the buffer coverage by 40% for the constructed habitat units (existing coverage of 28% versus proposed coverage of 68%). All buffers and aquatic habitat enhancements are cross referenced between the Figures ENV-4, 5, 6 and Tables D-1, parts 1 and 2 to facilitate review of buffer location at each habitat and storm water management unit on 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. The BMP includes over 43,491 linear feet (33,186 natural and 10,305 constructed) of water quality buffers comprising of a minimum 30 feet in width. This includes the preservation of 30,865 linear feet of existing buffers (27,714 natural and 3,151 constructed) and the creation of an additional 5,472 linear feet () of new water quality buffers around existing natural sensitive habitats and 7,154 linear feet of buffers around newly constructed aquatic habitat and SWM basins. (See Table 1, Parts 1 and 2, Appendix D). Many of these buffers exceed the minimum criteria of 30 feet in width and extend up to 100 feet from edge habitats to provide a superior level of protection to sensitive aquatic and wetland habitats. Assuming just 30 feet in width, the 43,491 linear feet of terrestrial water quality buffers present on site are equivalent to approximately 30 acres of buffering habitat. These buffers are supplemented by over 13,000 additional linear feet of functional terrestrial and aquatic habitat enhancements. The site design includes six mitigation structures (oversized culverts, wildlife tunnels) with design and location constraints prescribed toward facilitating wildlife movements and maintaining connectivity and access between adjacent habitat units, most specifically in efforts to maintain movement corridors between upland and aquatic habitats. Considerations for ecological health at the site are even reflected in the design of golf cart bridges that will be constructed with abutments and approaches that do not degrade the quality of in-stream aquatic habitats and facilitate wildlife utilization of aquatic habitats throughout the site. Aside from the wetlands regulation-mandated 100 foot wide administrative area protection adjacent to NYDEC Wetland AM-15, the substantial effort to modify the golf course design and preserve/create the proposed extensive network of water quality buffers, terrestrial/aquatic enhancements, and wildlife-friendly mitigation structures at the site has been undertaken on a voluntary basis by the Applicant. These efforts exceed the regulatory requirements of the NHSDEC and ACOE and area consistent with Town of Amenia mandates for enhanced environmental protections under the Section 121-35 Wetland and Watercourse Protection of the Town of Amenia, New York, Zoning Law.

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, all plantings will be supervised by a certified horticulturist, and 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 V

A highly degraded reach of Stream V, immediately upstream and inclusive of its confluence with 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. A draft schematic of the restoration plantings and in-stream additions can be viewed in Figure 3.2-2 of the FEIS.

5.2 Amenia Brook Floodplain

An effort will be undertaken to restore the flood plain adjacent to Amenia Creek. The restoration area for this project will include approximately 1.5 acres of land between Pond A3 and the Hole 8 fairway, and approximately 300 feet of linear bank-side habitat along Amenia Brook (See Map ENV-4 for approximate location). A draft schematic of the restoration plantings can be viewed in Figure 3.2-2 of the FEIS.

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.

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 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 P

Stream P is a lengthy stretch of below-ground culverted stream that drains Wetland P and its headwater spring. Approximately 250 feet of Stream P drainage, bisecting the Hole 16 tee area, will be addressed in a restoration project to "daylight" the stream bed. (See Map ENV-5, Appendix C). This project will be consistent with efforts for Stream V above. 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. .

6.0 CONCLUSION

A review of the existing and proposed conditions maps (Maps ENV2 and ENV-3, Appendix C) shows that the projected development at the Site will create an additional 80 acres of residential and commercial land use. The actual acreage of in-play areas on the golf course will decrease by over 30%, from an existing 138 acres to 93 acres. The 45 acres recovered for conversion into quality wildlife habitat will be reestablished as short grass, tall grass and transitional grassland habitat. After combining the newly created grassland habitats with remaining grasslands not affected by the development plan, the net loss of grassland acreage at the Site is zero. In fact, because some of the existing grassland habitat is actually maintained as in-production agricultural fields, the proposed plan will provide a net increase in functional grassland habitat at the Site. Forest acreage will decrease by approximately 46 acres. With the possible exception of the middle and lower reaches of Stream J, this loss of forested habitat will, in the Applicant's opinion, be inconsequential to the remaining sensitive and critical habitats contained and sustained within this habitat unit. Canopy and buffering capability loss along Stream J will be mitigated in part by supplemental plantings to establish a more complete canopy along sections of the stream that are currently lacking a mature tree overstory (See Map ENV-5, Appendix C). Aquatic habitat acreage will increase by 4 acres as a result of expansions to three existing impoundments (A1, A3, A4) and the creation of 4 SWMs. Impacts to wetland habitats are limited to the loss of 0.06 acres of wetland habitat (Wetland I). In the Applicant's opinion, this impact will be mitigated by the restoration projects that provide compensatory wetland-derived ecological services. These projects include the creation of more than 300 feet of functional stream bed through day-lighting proposed in Streams V and P, the creation of 800 feet of aquatic habitat enhancement areas (AQ5), with wetland qualities and function, in three SWM connecting channels, and the 1.5 acre floodplain restoration project for Amenia Brook. The supplemental Ecological Assessment that was completed in 2007 and presented as Appendix 9.7.2 to the DEIS concluded by presenting the following specific recommendations to maintain the Site's ecological viability:

- Preserve the cluster of shagbark hickories located along the edge of the golf course above the southwest bank of wetland L.

- Preserve the gravelly/sandy bank along the southwest edge of wetland L (AM15) as this area serves as a nesting area for turtle and snake species.

- Maintain a 50-foot buffer around the springhead (Stream P) located on the west side of the golf course.

- If tree cutting must occur, generally cut trees between the period of October and March to avoid potential impacts to bats and other nesting birds.

- Maintain the island forest habitats on the south end of the Site to allow habitat connectivity between wetland L (AM15) and the western slopes.

- The HMP and BMP for the Site have incorporated each of these recommendations into plans to create and maintain healthy and productive habitats for resident and transient wildlife populations at the Site.

On a Site-wide basis, the significant increase in grassland diversity and quality, and considerable areas of improved riparian and aquatic edge habitat will, in the Applicant's opinion, more than offset the small loss of forest cover and moderate degree of impact to Stream J, and loss of the small isolated Wetland I. The golf course has been extensively redesigned and will include the creation of over 9,620 linear feet of new water quality buffers to protect sensitive habitats from the damaging effects of sediment and contaminant loadings. An additional 2,786 linear feet of quality (e.g., $\geq$15 feet in width) terrestrial habitat enhancements and 6,789 linear feet of aquatic habitat enhancements will be created along sensitive aquatic edge habitats at the site. The redesigned golf course has decreased the in-play requirements of the existing course, and contributed toward the establishment of varied, connected and productive terrestrial and aquatic habitat units throughout the site. Elsewhere on the site, out-of-play areas have been dedicated for perpetual maintenance in undisturbed conditions (i.e., large forest tracts) or with very limited levels of disturbance (i.e., tall and transitional grasslands). Restoration activities at the site include a stream-bed restoration (Stream P), an erosion control project (Stream V), a wetlands restoration and invasive species monitoring and control project (Wetland AM-15), and a floodplain/riparian habitat restoration project (Amenia/Cascade Book). Substantial efforts have been put forth to design a project that provides a net gain in ecological functions and values that would outweigh any functional losses associated with development at the site. Acknowledging the absence of a quantitative "before vs. after" assessment of the site ecological service metrics, it is the Applicant's opinion that the significant efforts to avoid and minimize impacts, and alternatively protect and enhance existing resources, are unlikely to result in significant and irreparable negative impacts to the Site's ecological resources and the services these resources provide to on-site and off-site flora and fauna.

7.0 BIBLIOGRAPHY

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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

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
American Woodcock	Charadriiformes	*Scolopax minor*	X		X
Rock Pigeon	Columbiformes	*Columba livia*	X	X	X
Mourning Dove	Columbiformes	*Zenaida macroura*	X	X	X

Common Name	Order	Scientific Name	Breeding Habitat	Wintering Habitat	Foraging Habitat
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 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 Raven	Passeriformes	*Corvus corax*	X	X	X
Tree Swallow	Passeriformes	*Tachycineta bicolor*	X		X
Bank Swallow	Passeriformes	*Riparia riparia*	X		X

Common Name	Order	Scientific Name	Breeding Habitat	Wintering Habitat	Foraging Habitat
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
Black-and-White Warbler	Passeriformes	*Mniotilta varia*	X		X
American Redstart	Passeriformes	*Setophaga ruticilla*	X		X
Worm-eating Warbler	Passeriformes	*Helmitheros vermivorus*	X		X

Common Name	Order	Scientific Name	Breeding Habitat	Wintering Habitat	Foraging Habitat
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 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 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
Northern-two-lined salamander	Caudata	Plethodontidae	*Eurycea bislineata bislineata*	X	X	X
Redback salamander	Caudata	Plethodontidae	*Plethodon cinereus*	X	X	X
Red-spotted newt	Caudata	Salamandridae	*Notophthalmus viridescens viridescens*	X	X	X
Eastern painted turtle	Cryptodeira	Emydidae	*Chrysemys picta picta*	X	X	X
Eastern garter snake	Squamata	Columbridae	*Thamnophis sirtalis sirtalis*	X	X	X

Common Name	Order	Family	Scientific Name	Breeding Habitat	Wintering Habitat	Foraging Habitat
Snapping turtle	Testudines	Chelydridae	*Chelydra serpentine*	X	X	X
Wood turtle	Testudines	Emydidae	*Clemmys insculpta*	X	X	X
Black racer	Squamata	Columbridae	*Coluber constrictor*	X	X	X
Northern water snake	Squamata	Columbridae	*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

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
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

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

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

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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 West Chester 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 bog turtle has been observed overwintering in large congregations (over 140 individuals) or with spotted turtles. 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

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

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*)

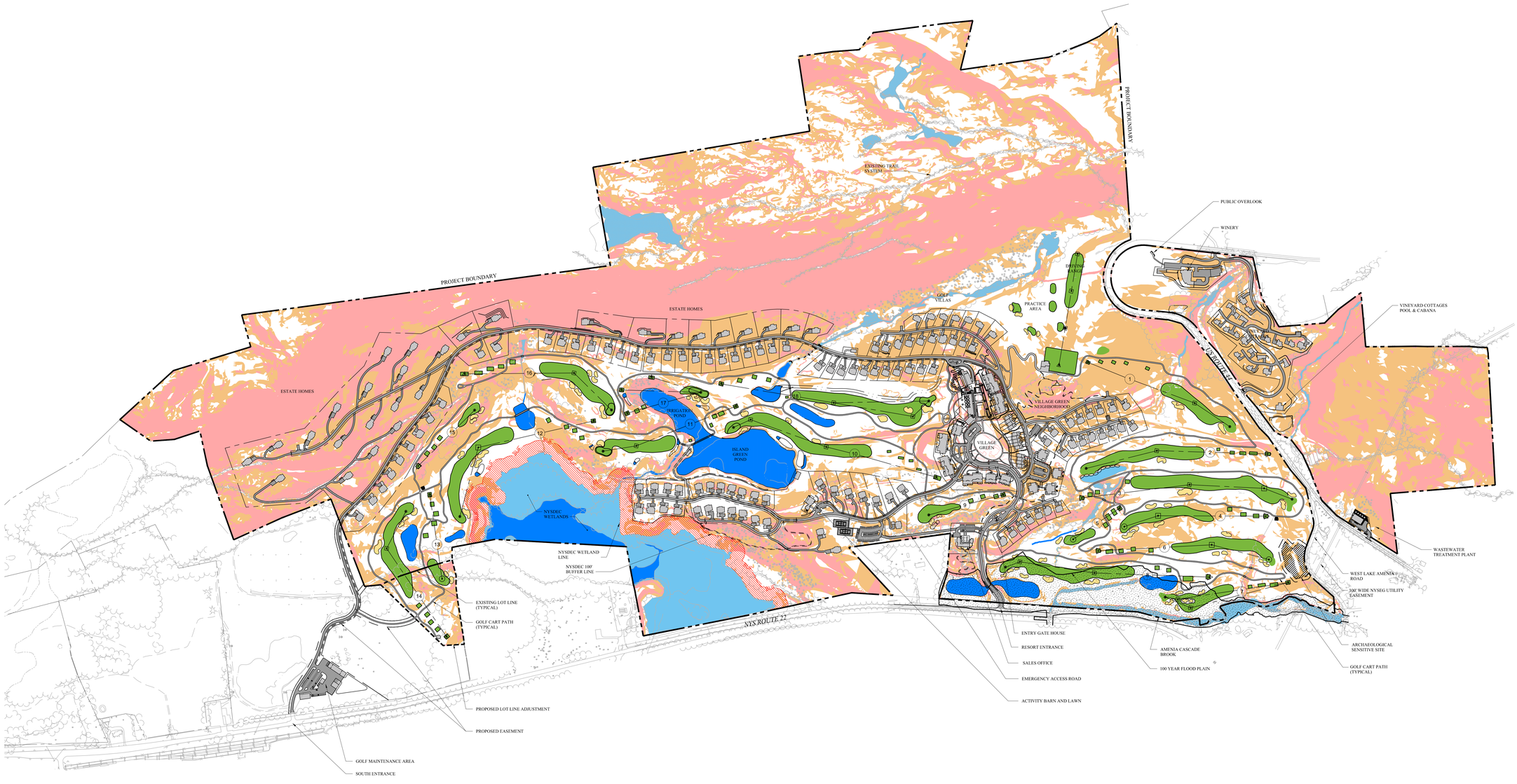
Shrubs and Ferns
Sweet Pepperbrush (*Clethra alnifolia*)
Silky Dogwood (*Cornus amomum*)
Gray Dogwood (*Cornus racemosa*)
American Hazelnut (*Corylus americana*)

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

Appendix C:
Figures

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



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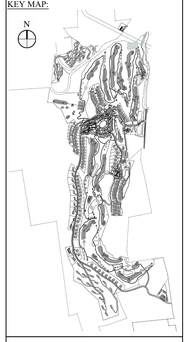
KEY MAP:



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SCALE IN FEET

No.	Revision	Date	Appvd
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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

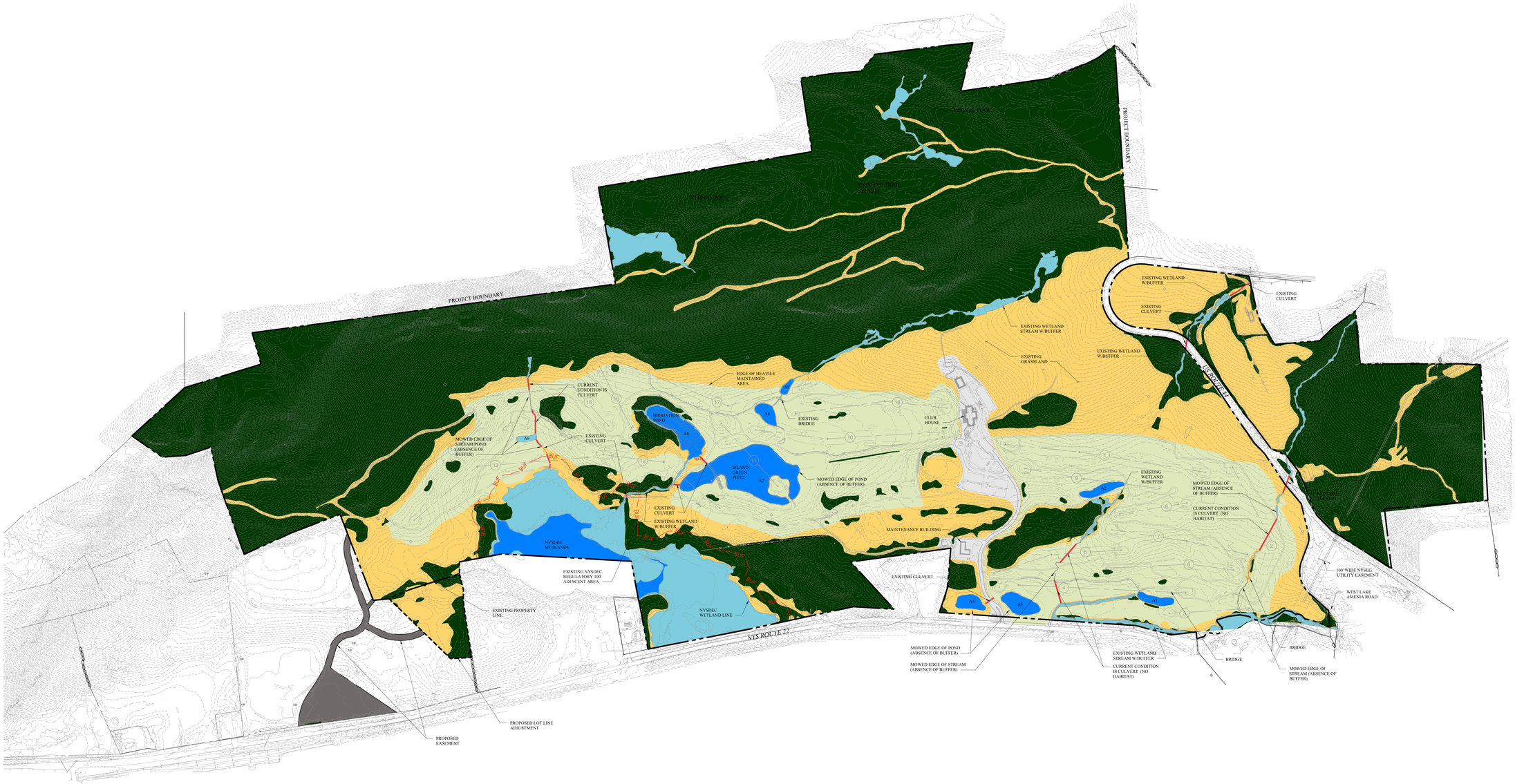
Sheet 36 of 41

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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PROJECT SURVEYOR:
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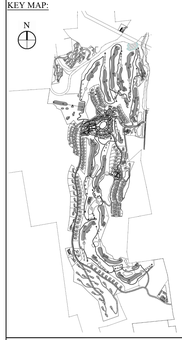
KEY MAP:



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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
Habitat Management Plan
Existing Conditions

Drawing Number
ENV-2

Sheet 37 of 41

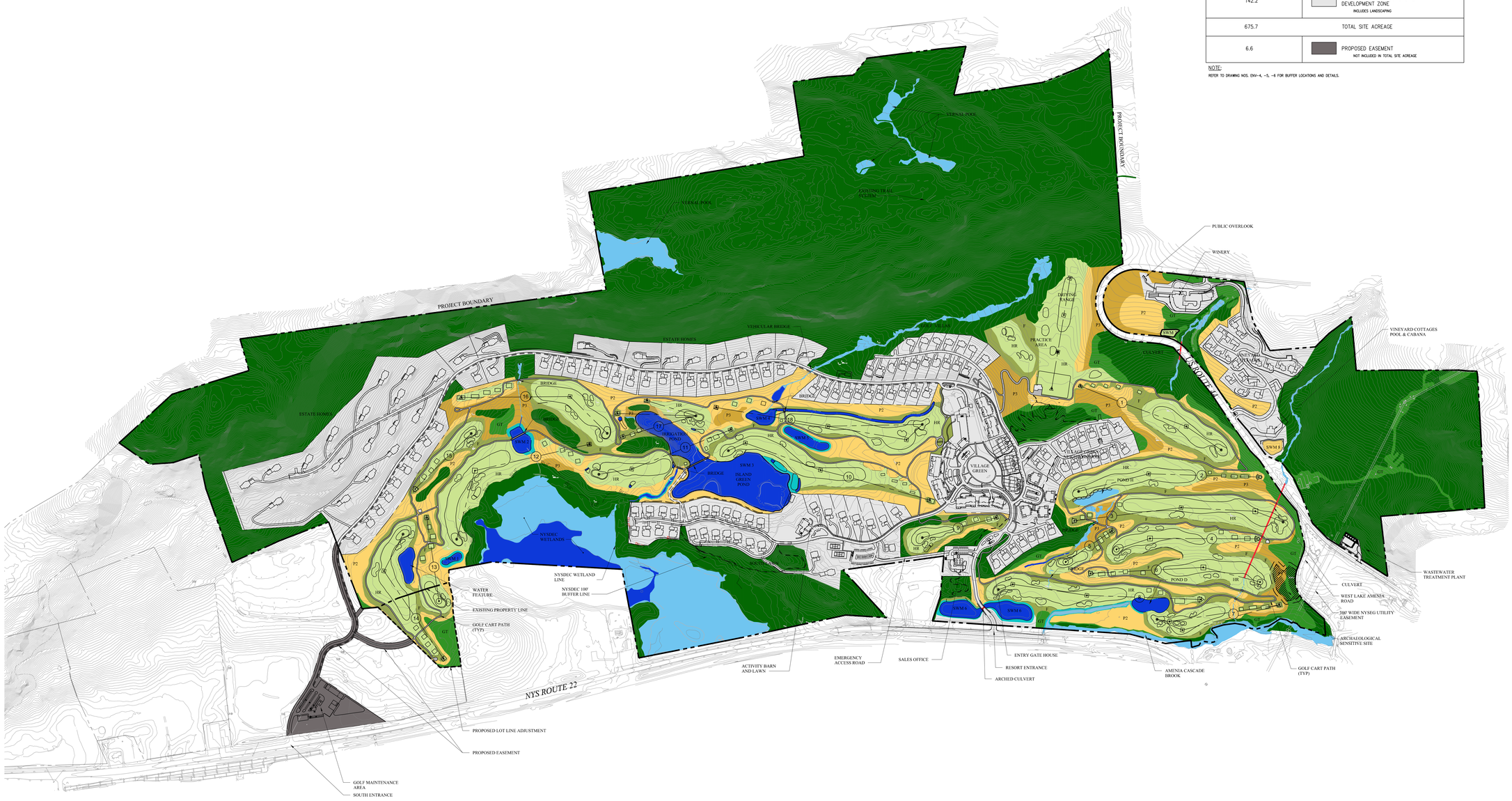
Project Number
29011.00

Legend

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

Proposed Acreage	Habitat Classification Legend
91.1	GOLF COURSE – IN PLAY ALL IN PLAY TEES, FAIRWAYS, ROUGHS, BUNKERS, AND GREENS
23.9	NATIVE FESCUE 6" – 1'
2.3	P1, SHORELINE GROUP
43.9	P2, NATIVE SHORT GRASS ±1'
14.4	P3, NATIVE TALL GRASS >1'
14.3	GT, TRANSITIONAL GRASSES
292.8	FOREST HABITAT
19.4	AQUATIC HABITAT (INCLUDES PO) SWM – CONSTRUCTED STORMWATER MANAGEMENT PRACTICES Aq – CURRENT ON-SITE IMPOUNDMENTS AND STREAMS
31.4	WETLANDS
142.2	RESIDENTIAL AND COMMERCIAL DEVELOPMENT ZONE INCLUDES LANDSCAPING
675.7	TOTAL SITE ACREAGE
6.6	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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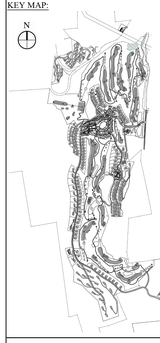

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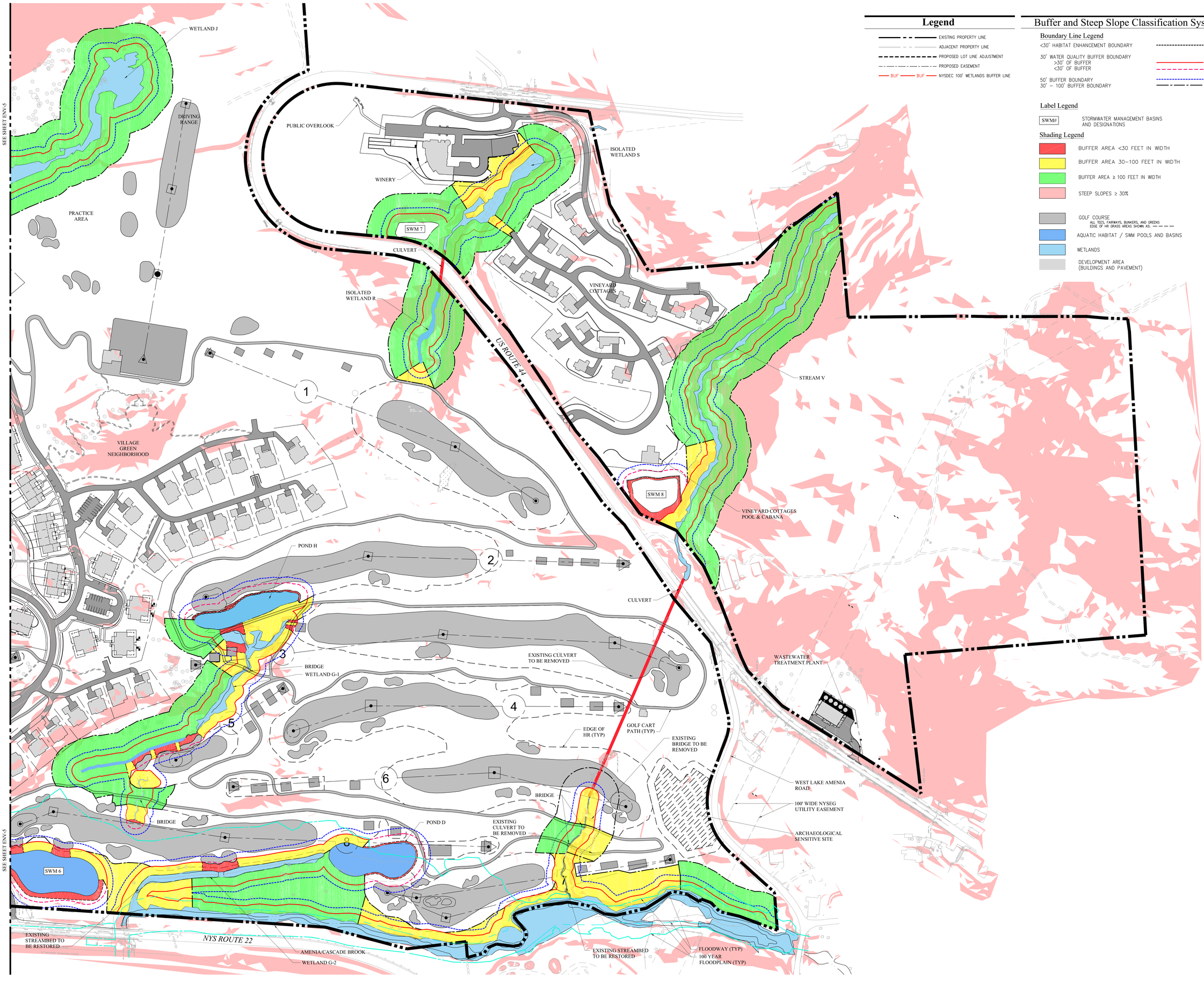
Drawing Title
Habitat Management Plan
Proposed Conditions

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)

OWNER:
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5021 Route 44
Amenia, New York 12501
845.373.8020

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PROJECT SURVEYOR:
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KEY MAP:

N

100 0 100 200
SCALE IN FEET

No.	Revision	Date	Appvd
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
Habitat Management Plan
Buffering Plan - North

Drawing Number
ENV-4

Sheet 39 of 41

Project Number
29011.00

Legend

- EXISTING PROPERTY LINE
- ADJACENT PROPERTY LINE
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- PROPOSED EASEMENT
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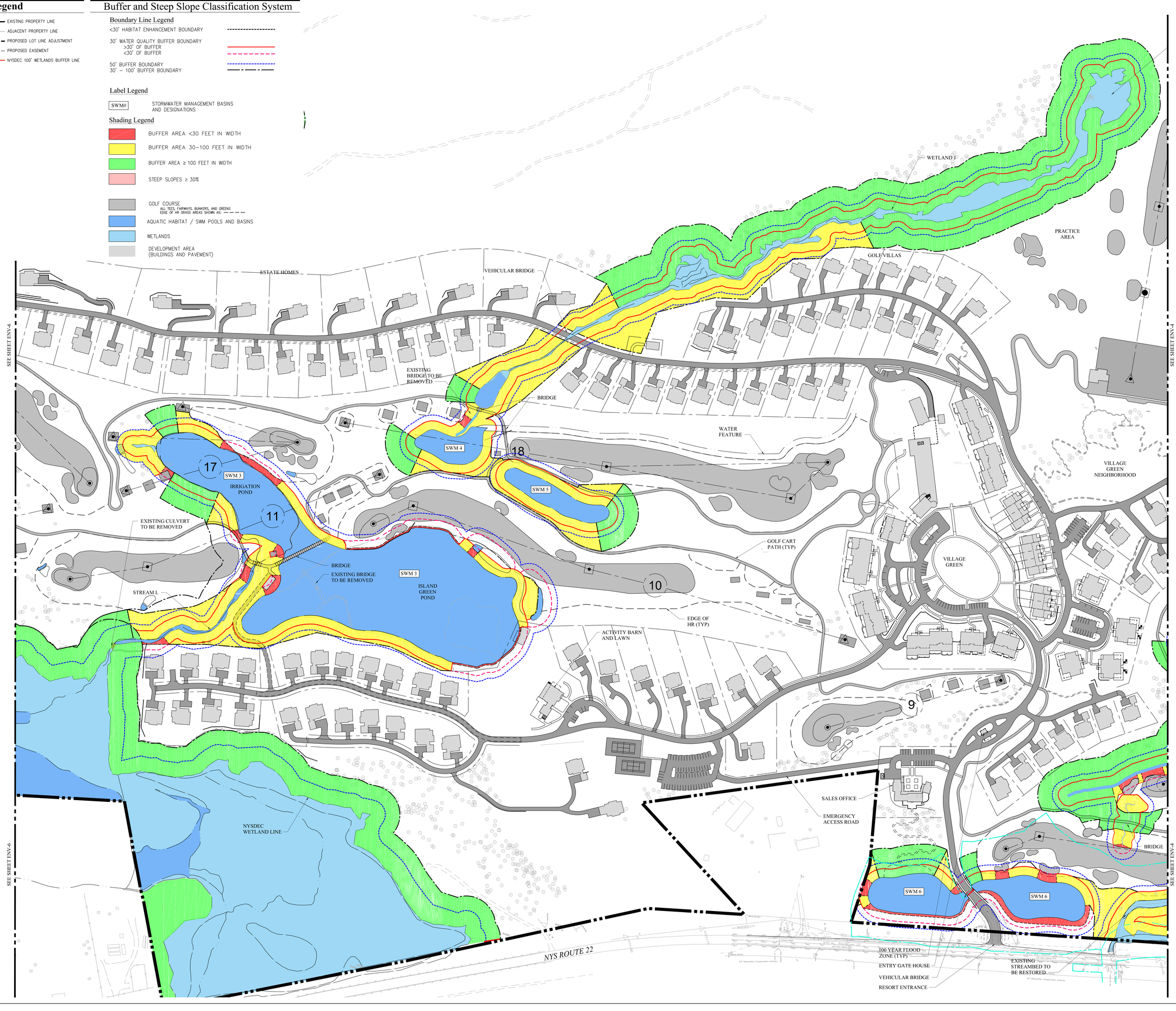

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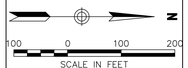
KEY MAP:



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Designed by JC | Drawn by CMC | Checked by MWJ
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4651 Route 22
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Not Issued for Construction

Drawing Title
Habitat Management Plan
Bufering Plan - Center

Drawing Number
ENV-5

Sheet 40 of 41

Project Number
29011.00

Buffer and Steep Slope Classification System

Boundary Line Legend

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Designed by JC | Drawn by CMG | Checked by MWJ
CAD checked by MC | Approved by ACD
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4651 Route 22
Amenia, New York

Issued for:
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Approval
Not Issued for Construction

Drawing Title
Habitat Management Plan
Buffering Plan - South

Drawing Number
ENV-6

Sheet 41 of 41

Project Number
29011.00

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Appendix D:
Site-Specific Buffer Specifications

Project: Silo Ridge
Date: 1-Jul-14

Table D-1 Part 1 - Silo Ridge Buffer Management Plan
Water Quality Buffer (30 feet in width) Coverage
Existing Natural Sensitive Habitats

Location (Map #)	Habitat Unit	Aquatic Edge (Linear ft.)[1]	Aquatic Edge (Linear ft.)[1]	Aquatic Edge with ≥ 30 ft. Buffer (Linear Feet)							
				Existing [2]		Proposed [3]		Proposed Plan			
								Linear Feet		% Buffered	
		Existing	Proposed	Feet	% Buffered	Feet	% Buffered	Decrease	Increase	Decrease	Increase
ENV-4	Isolated Wetland S	1368	1368	1368	100%	1368	100%	0	0	0%	0%
ENV-4	Stream V	2903	2903	2903	100%	2903	100%	0	0	0%	0%
ENV-4	Amenia Brook[4]	7078	7078	3226	46%	6947	98%	0	3721	0%	53%
ENV-5	Wetland J	6727	6727	6081	90%	6599	98%	0	518	0%	8%
ENV-5	Stream L	1233	1233	509	41%	1114	90%	0	605	0%	49%
ENV-5	Stream QQ	670	0	0	0%	0	0%	0	0	0%	0%
ENV-6	Wetland P	403	403	403	100%	403	100%	0	0	0%	0%
ENV-6	Wetland AM-15	7850	7850	7222	92%	7850	100%	0	628	0%	8%
N/A	Wetland U	2257	2257	2257	100%	2257	100%	0	0	0%	0%
N/A	Wetland X	428	428	428	100%	428	100%	0	0	0%	0%
N/A	Wetland W	3317	3317	3317	100%	3317	100%	0	0	0%	0%
Totals		**34,234**	**33,564**	**27,714**	**81%**	**33,186**	**99%**	**0**	**5,472**	**0%**	**18%**

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

Project: Silo Ridge
Date: 7/1/2014

Table D-1 Part 2 - Silo Ridge Buffer Management Plan
Water Quality Buffer (30 feet in width) Coverage
Existing Constructed Habitats

Location (Map #)	Habitat Unit	Aquatic Edge (Linear ft.)[1]	Aquatic Edge (Linear ft.)[1]	Aquatic Edge with ≥ 30 ft. Buffer (Linear Feet)							
				Existing [2]		Proposed [3]		Proposed Plan			
								Linear Feet		% Buffered	
		Existing	Proposed	Feet	% Buffered	Feet	% Buffered	Decrease	Increase	Decrease	Increase
ENV-4	Isolated Stream R	712	712	712	100%	572	80%	140		20%	
ENV-4	Pond D	696	740	696	0%	290	39%	406			39%
ENV-4	Pond H	817	807	0	0%	175	22%		175		22%
ENV-4	Stream E-1	472	0	253	54%	0	0%	253		54%	
ENV-4	Stream E-2	1206	808	0	0%	808	100%		808		100%
ENV-4	Isolated Wetland I	242	0	242	100%	0	0%	242		100%	
ENV-5	Wetland G-1	1604	1604	1299	81%	1352	84%		53		3%
ENV-5	Wetland G-2	396	396	0	0%	389	98%		389		98%
ENV-5	Pond B (SWM 6)	796	927	0	0%	342	37%		342		37%
ENV-5	Pond A (SWM 6)	631	830	0	0%	324	39%		324		39%
ENV-5	Pond J-1 (SWM 4)	589	644	0	0%	621	96%		621		96%
ENV-5	Pond Z[4] (SWM 3)	3210	2278	0	0%	1547	68%		1547		68%
ENV-5	Pond K[4] (SWM 3)	1716	1412	990	58%	1109	79%		119		21%
ENV-5	Wetland O	1136	0	0	0%	0	0%	0	0		
ENV-5	Wetland OO	156	0	0	0%	0	0%	0	0		
ENV-6	Stream N/P	341	525	0	0%	525	100%		525		100%
ENV-6	Wetland N (SWM 2)	390	613	0	0%	326	53%		326		53%
ENV-4	SWM 7	0	362	0	0%	362	100%		362		100%
ENV-4	SWM 8	0	489	0	0%	0	0%	0	0		
ENV-5	SWM 5	0	844	0	0%	844	100%		844		100%
ENV-6	SWM 1	0	404	0	0%	379	94%		379		94%
ENV-6	Water Feature	0	709	0	0%	340	48%		340		48%
Totals		**15,110**	**15,104**	**4,192**	**28%**	**10,305**	**68%**	**1,041**	**7,154**		**40%**

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.

VHB Engineering, Surveying and Landscape Architecture, P.C. | Affiliated with Vanasse Hangen Brustlin, Inc.

Planning
Transportation
Land Development
Environmental

October 2, 2014

Ref: 29011.00

Rosie Miranda
Regulatory Project Manager
Western Section
U.S. Army Corps of Engineers
New York District
Jacob K. Javits Federal Building
26 Federal Plaza
New York, NY 10278-0090

Re: Request for Additional Information
Permit Application No. NAN-2014-0975-WMI
Silo Ridge Resort Community
4651 Route 22
Town of Amenia
Dutchess County, New York

Dear Ms. Miranda:

Pursuant to your September 8, 2014 correspondence regarding the above-referenced permit application (copy included as Attachment A), VHB Engineering, Surveying and Landscape Architecture, P.C. (VHB) has prepared assessments and supplied supporting materials and documentation regarding wetland and species impacts associated with the proposed Silo Ridge Resort Community redevelopment project (the "proposed action"). VHB's responses to your requests are provided in the text below and/or included as attachments to this correspondence.

In response to your request regarding wetland impacts at the Silo Ridge property (the "subject property" or "the site"), VHB has prepared additional 8.5x11 plan sheets illustrating impacted Wetlands/Streams E-1, E-2, G-2, O, OO and QQ. The additional plan sheets are included as Attachment B. It is important to note that, as detailed in VHB's September 2014 *Silo Ridge Resort Community Revised Habitat Management Plan* (HMP) (copy included as Attachment C) extensive mitigation for these impacts would occur through the implementation of stream restoration efforts, as well as extensive aquatic and shoreline planting projects at the subject property.

With respect to potential species impacts, VHB has prepared impact assessments of the proposed action on the Federally-Endangered Indiana bat (*Myotis sodalis*), the Federally-proposed for listing northern long-eared bat (*Myotis septenrionalis*), the Federally-Threatened bog turtle (*Clemmys muhlenbergii*) and the New England Cottontail (*Sylvilagus transitionalis*), which is currently a candidate for Federal listing.

Indiana Bat

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According to the New York State Department of Environmental Conservation (NYSDEC), there are no known Indiana bat hibernacula located within Dutchess County, however maternity and bachelor roosting colonies have been identified through radio-telemetry studies and mist net captures in Dutchess County.[1] No NYSDEC records currently exist for Indiana bat roosting colonies at or adjacent to the subject property.[2] However, summer roosting colonies of Indiana bat are known to occur within living, dying and dead trees within rural and suburban landscapes, including the Appalachian Oak-Hickory Forest and Beech-Maple Mesic Forest communities,[3] both of which occur on the Silo Ridge property. Based upon these considerations, an Indiana bat mist net survey was conducted at the subject property in August 2007 by Stearns and Wheeler (a copy of the Indiana bat survey summary report is included as Attachment D). The mist net survey, which was conducted pursuant to the existing federal protocols for surveying the Indiana bat[4], included survey efforts within potential roosting, foraging, and travel habitats of this species, most notably stream corridors and open understories of forested communities. According to the aforementioned survey report, although 30 individuals representing five bat species were captured during the mist net survey, no Indiana bats were netted. The survey report further indicates that no mines, caves or other suitable winter hibernation sites for Indiana bat were observed at the subject property.

Although Indiana bat was not identified at the subject property during the mist net survey, given the known existence of Indiana bat roosting colonies in Dutchess County, as well as the existence of potentially suitable roosting and foraging habitat at the subject property, the proposed action has been designed so as to avoid adverse impacts to potential Indiana bat habitat at the site. Specifically, as the presence of Indiana bat in a given area is thought to be influenced by the availability of suitable roost sites,[5] the proposed action would preserve large, undisturbed blocks of forested communities representing potential Indiana bat roosting habitat. Following implementation of the proposed action, approximately 290± acres of upland forested habitat would be present at the subject property, including a continuous 228-acre unit extending along the ridge complex located at the western portion of the site (existing and proposed ecological conditions maps are included in the HMP [Attachment C]). This forested unit is comprised of extensive the Beech-Maple Mesic Forest and Appalachian Oak-Hickory Forest communities located along the lower and mid-to-upper slopes of the ridge complex, respectively. As noted previously, both communities are known as preferred summer roosting habitat for Indiana bat. In particular, the Appalachian Oak-Hickory Forest community supports suitable tree cover, including oaks (*Quercus* spp.), hickories (*Carya* spp.) and other living and dead trees with physical features (e.g. exfoliating bark and/or broken limbs) that could provide Indiana bat with summer roosting habitat.

The remaining areas of post-development forested habitat include a 41-acre block located to the north of Route 44 and an 11-acre unit running along the northwestern border of NYSDEC Wetland AM-15 (Wetland L). As detailed in the text and graphics of the HMP (Attachment C), the latter unit includes a stand of shagbark hickories (ranging in size from 12-24 inches diameter-at-breast-height [dbh]) located proximate to the southwestern corner of the wetland. Additionally,

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[1] New York Natural Heritage Program. Indiana Bat Conservation Guide. 2014. Available online at: http://www.acris.nynhp.org/guide.php?id=7405 Accessed September 15, 2014.

[2] New York State Department of Environmental Conservation. 2014. New York Nature Explorer database. Available online at: http://www.dec.ny.gov/natureexplorer/app/ Accessed September 15, 2014.

[3] Edinger, G.J., et al. (editors). 2002. *Ecological Communities of New York State*. Second Edition (Draft). New York Natural Heritage Program, NYSDEC.

[4] United States Department of the Interior, Fish and Wildlife Service. 2007. *Indiana Bat (Myotis sodalis) Draft Recovery Plan: First Revision* (Appendix 5).

[5] United States Department of the Interior, Fish and Wildlife Service. 2007. *Indiana Bat (Myotis sodalis) Draft Recovery Plan: First Revision*

post-development forested habitat also would include several wooded knolls interspersed throughout the site, the largest of which covers just over six acres.

The proposed action includes the preservation and enhancement of extensive riparian and floodplain corridors and forests, as these communities are recognized as both foraging and roosting habitat for Indiana bat.[4] As detailed in the text and graphics of the HMP (Attachment C), all flowing waters on-site have been targeted for the establishment of either stream-side buffers or terrestrial habitat enhancement areas. Wherever possible, aquatic shoreline plantings have also been incorporated into habitat enhancement plans for these lotic habitats. In particular, extensive streambed restoration efforts are proposed for Stream P, Stream V and Amenia Brook, where several species of foraging bats were captured during the aforementioned mist net survey. Similarly, all pond habitats on-site have been targeted for aquatic habitat enhancement plantings, including littoral shelf aquatic plant communities and shoreline plantings. Additionally, the proposed action would include the creation of over 43,491 feet of conservation buffers (which preserve a minimum of 30 feet of undisturbed, functional native terrestrial vegetation) and water quality buffers (which preserve a minimum of 30 feet of undisturbed, functional native terrestrial vegetation) around wetlands streams, ponds, and other aquatic features.

In summary, although the subject property supports suitable roosting habitat for Indiana bat, no records currently exist for this species as occurring at the subject property, and no Indiana bats were captured during the on-site mist net survey, which was performed according to USFWS protocols. Nevertheless, the proposed action includes extensive preservation, enhancement, and restoration of forested, wetland and aquatic habitats identified as potential roosting and/or foraging habitat for Indiana bat. Accordingly, no significant adverse impacts to Indiana bat are anticipated as a result of the proposed action.

Northern Long-Eared Bat

On June 30, 2014, the USFWS issued a six-month extension of the final determination of whether to list the northern long-eared bat as a Federally-Endangered species, with a final determination expected on or before April2, 2015.[6] According to the USFWS, the extension was issued because *"substantial disagreement over the sufficiency or accuracy of existing information on white-nose syndrome, which has been identified as the primary threat to the species, have led to disagreement regarding the current status of the species.*"

As detailed in the Stearns and Wheeler mist net survey report (Attachment D), 10 northern long-eared bats were captured during survey efforts conducted at the subject property in August 2007. Accordingly, although the Federal listing status of the northern long-eared bat currently remains undecided, the proposed action has been designed so as to avoid potential adverse impacts to any existing northern long-eared bats at the site through extensive proactive measures that would preserve and enhance existing habitat for this species.

Similar to Indiana bat, winter roosting habitat for northern long-eared bat occurs within caves or mines, while summer roosting habitat occurs either singly or in colonies underneath the bark or in cavities or crevices of living or dead trees.[7] Foraging habitat includes forested understories of hillsides and ridges, as well as the surfaces of aquatic habitats. Based upon these considerations, winter roosting habitat does not exist, potential summer roosting habitat is supported and

[6] Federal Register Vol. 79, No. 125. Monday, June 30, 2014 / Proposed Rules
[7] United States Fish and Wildlife Service. 2014. Northern Long-Eared Bat (*Myotis septenrionalis*) Fact Sheet. Available online at: http://www.fws.gov/midwest/endangered/mammals/nlba/nlbaFactSheet.html. Accessed September 18, 2014.

foraging habitat was confirmed at the site during the 2007 mist netting survey. Given that roosting and foraging habitat for northern long-eared bat is nearly identical to that of Indiana bat, the habitat preservation efforts for the latter species detailed previously would preserve roosting habitat for both bat species. In particular, the 228-acre acres of forested habitat located along the ridge complex at the western portion of the site represents roosting and foraging habitat for northern long-eared bat, as does the wooded/wetland complex associated with NYSDEC Wetland AM-15. Further, the extensive stream and pond preservation/enhancement efforts proposed for the site would maintain and improve existing foraging habitat, including that of Amenia Brook, where northern long-eared bat was netted in 2007.

In summary, although a decision on the listing status of northern long-eared bat is not expected until early 2015, the proposed action incorporates extensive habitat preservation and enhancement measures for this species. As such, no significant adverse impact to northern long-eared bat habitat is anticipated as a result of the proposed action.

Bog Turtle

Bog turtle has been documented in the general vicinity of the site by the NYSDEC, however no NYSDEC records currently exist for bog turtles at or adjacent to the site.[8] A Phase I bog turtle habitat assessment was conducted at the site on April 3, 2007 by Bagdon Environmental, pursuant to the methods described in the USFWS "*Bog Turtle (Clemmys muhlenbergii), Northern Population, Recovery Plan*", dated May 15, 2001[9] and revised in April 2006. The purpose of the Phase I habitat assessment was to determine the suitability of on-site wetlands and water features to support bog turtles. The results of the Phase I habitat assessment were discussed with the NYSDEC Endangered Species Unit and Dr. Michael W. Klemens, Ph.D., author of the aforementioned USFWS bog turtle guidance and environmental consultant for the Town of Amenia. Based upon these consultations and evaluations of vegetative cover types, soils and hydrology, the Phase I habitat assessment concluded that suitable, though not optimal bog turtle habitat occurs at the subject property within an approximately 3-acre crescent-shaped area at the north-northwestern portion of NYSDEC Wetland AM-15. Accordingly, following consultations with the NYSDEC and Dr. Klemens, Bagdon Environmental conducted a Phase II bog turtle survey, pursuant to the methods described in the aforementioned USFWS guidance document. The Phase II bog turtle survey took place on four separate days during late April through early June and was conducted by Bagdon Environmental and Chazen Companies personnel. Additionally, Dr. Klemens participated in the survey effort on one of the four survey days. As described in the survey report, no bog turtles were identified during the survey and "*It is very unlikely that bog turtles inhabit the site, based on the habitat assessment and extensive searches conducted this spring.*" The report further concludes that "*The dominance of invasive species and highly degraded conditions in the surrounding area makes it highly unlikely that bog turtles are present at the Site*." A copy of the Phase I and Phase II bog turtle survey report is included as Attachment E.

It is important to note that, as summarized previously, the proposed action includes the preservation of NYSDEC Wetland AM-15, and an 11-acre unit of forested habitat adjoining this wetland. As detailed in the HMP (Attachment C), proposed work activities within the 100-foot adjacent area of NYSDEC Wetland AM-15 would be limited to removal of cut turf areas and

[8] New York State Department of Environmental Conservation. 2014. New York Nature Explorer database. Available online at: http://www.dec.ny.gov/natureexplorer/app/ Accessed September 15, 2014.

[9] U.S. Fish and Wildlife Service. 2001. Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan. Available online at http://www.fws.gov/northeast/nyfo/es/bogturtle.pdf. Accessed September 15, 2014.

invasive plant species, and the planting of native vegetation. This restoration program would also include an invasive species monitoring and control component, in order to assure the success of new plantings within the adjacent area of NYSDEC Wetland AM-15.

In summary, based upon the results of the Phase I bog turtle survey, on-site habitat for this species is limited to a portion of NYSDEC Wetland AM-15. Furthermore, no bog turtles were identified within this wetland during the Phase II bog turtle survey. Nevertheless, NYSDEC AM-15 and the surrounding upland habitat would be preserved and enhanced as a result of the proposed action. As such, no significant adverse impacts to bog turtle or bog turtle habitat are anticipated as a result of the proposed action.

New England Cottontail

According to the NYSDEC, New England cottontail has not been reported from the subject property,[10] although recent survey efforts indicate that extant populations of this species occur within four southeastern New York State counties, including Dutchess County.[11] In New York and within southeastern New York State in particular, New England cottontail is known to occur within isolated early successional habitats, including shrubby areas, thickets, wetlands and disturbed areas, including edge habitats of agricultural fields and road corridors.[5] As such, the subject property currently supports potential habitat for this species, including transitional habitat areas located between the golf fairways and forested areas, as well as wetland habitats.

New England cottontail is currently a candidate for Federal listing. Although Candidate species receive no statutory protection under the Endangered Species Act (ESA), "*the USFWS encourages cooperative conservation efforts for these species because they are, by definition, species that may warrant future protection under the ESA*."[12] In keeping with this voluntary policy, the proposed action incorporates substantial habitat enhancement and maintenance efforts for early successional habitats. As detailed in the text and graphics of the HMP (Attachment C), grassland and shrubland plantings would be used extensively within the golf course to enhance existing transitional areas and to create new transitional vegetative habitats where none currently exist, in some instances providing connectivity between existing woodlots. Additionally, the maintenance of adjacent tall grass areas between golf course fairways and the aforementioned transitional habitats will result in the establishment of multi-strata vegetative transitions between maintained fairways and neighboring forests throughout much of the golf course. These early successional habitats will be maintained by removing various amounts of maturing woody vegetation on an intermittent basis. As such, important habitat for wildlife of early successional species, including New England cottontail, would not disappear from the site through transition to later successional stages. In total, after the site is fully developed, there would be approximately 96.8 acres of grassland habitats available for use by resident and transient wildlife of early successional habitats, including New England cottontail. Additionally, the preservation and enhancement of wetlands and surrounding upland habitats detailed previously, including NYSDEC Wetland AM-15, would conserve and improve additional existing habitat for New England cottontail.

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[10] New York State Department of Environmental Conservation. 2014. New York Nature Explorer database. Available online at: http://www.dec.ny.gov/natureexplorer/app/ Accessed September 15, 2014.

[11] New York Natural Heritage Program. New England Cottontail Conservation Guide. 2014. Available online at: http://www.acris.nynhp.org/guide.php?id=7415 Accessed September 15, 2014.

[12] United States Fish and Wildlife Service. 2014. Candidate Species, *Section 4 of the Endangered Species Act* Fact Sheet. Available online at: http://www.fws.gov/endangered/esa-library/pdf/candidate_species.pdf . Accessed September 18, 2014.

Based upon the foregoing voluntary habitat management measures, no significant adverse impacts to potential New England cottontail habitat are anticipated as a result of the proposed action.

Thank you for your cooperation in this matter. If additional information is required, or should you have any questions, please do not hesitate to contact me directly at 914.467.6614.

Sincerely,

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

Amanda DeCesare, P.E.
Senior Project Manager
AD/

\\vhb\proj\WhitePlains\29011.00 APWAN\docs\Permits\Wetlands\USACE Silo Ridge Wetlands Permit App\USACE September 2014 Response\Miranda USACE ltr 10-2-14.docx

Attachment A

DEPARTMENT OF THE ARMY
NEW YORK DISTRICT, CORPS OF ENGINEERS
JACOB K. JAVITS FEDERAL BUILDING
26 FEDERAL PLAZA
NEW YORK, NEW YORK 10278-0090

Regulatory Branch

SEP 0 8 2014

SUBJECT: Permit Application Number NAN-2014-0975-WMI
by Silo Ridge Ventures, LLC (Silo Ridge Resort Community)

Mr. Pedro Torres
Silo Ridge Ventures, LLC
5021 Route 44
Amenia, New York 12501

Dear Mr. Torres:

On August 8, 2014, the New York District of the U.S. Army Corps of Engineers received a request for authorization for the discharge of fill material into waters of the United States in association with the construction of the Silo Ridge Resort Community located on New York State Route 22, approximately 0.2 miles south of Lake Amenia Road, in the Town of Amenia, Dutchess County, New York. We have reviewed your recently submitted information and have determined that, before the 45-day review period under the "Notification" general condition of the Nationwide General Permits can commence, more information is required.

Please submit plans illustrating the impacted portion of the wetlands and to include shading and a clear labeling of the acres of wetlands to be filled, and the acres of stream to be filled and the linear feet of stream to be filled. The site plans must be in 8 ½-inch by 11-inch format.

Also, consultation with the U.S. Fish and Wildlife Service (USFWS) in accordance with the Endangered Species Act (ESA), including an assessment of the potential impacts to the Federally-listed endangered Indiana bat (*Myotis sodalis*), to the Federally-proposed for listing northern long-eared bat (*Myotis septentrionalis*), to the Federally-listed threatened bog turtle (*Clemmys muhlenbergii*), and to the Federal candidate for listing New England cottontail (*Sylvilagus transitionalis)* will be necessary. Please discuss potential environmental impacts for the aforementioned species and include any biological assessments and/or surveys that were completed.

Please submit two copies of all application materials in order to facilitate the necessary coordination with the U.S. Fish and Wildlife Service.

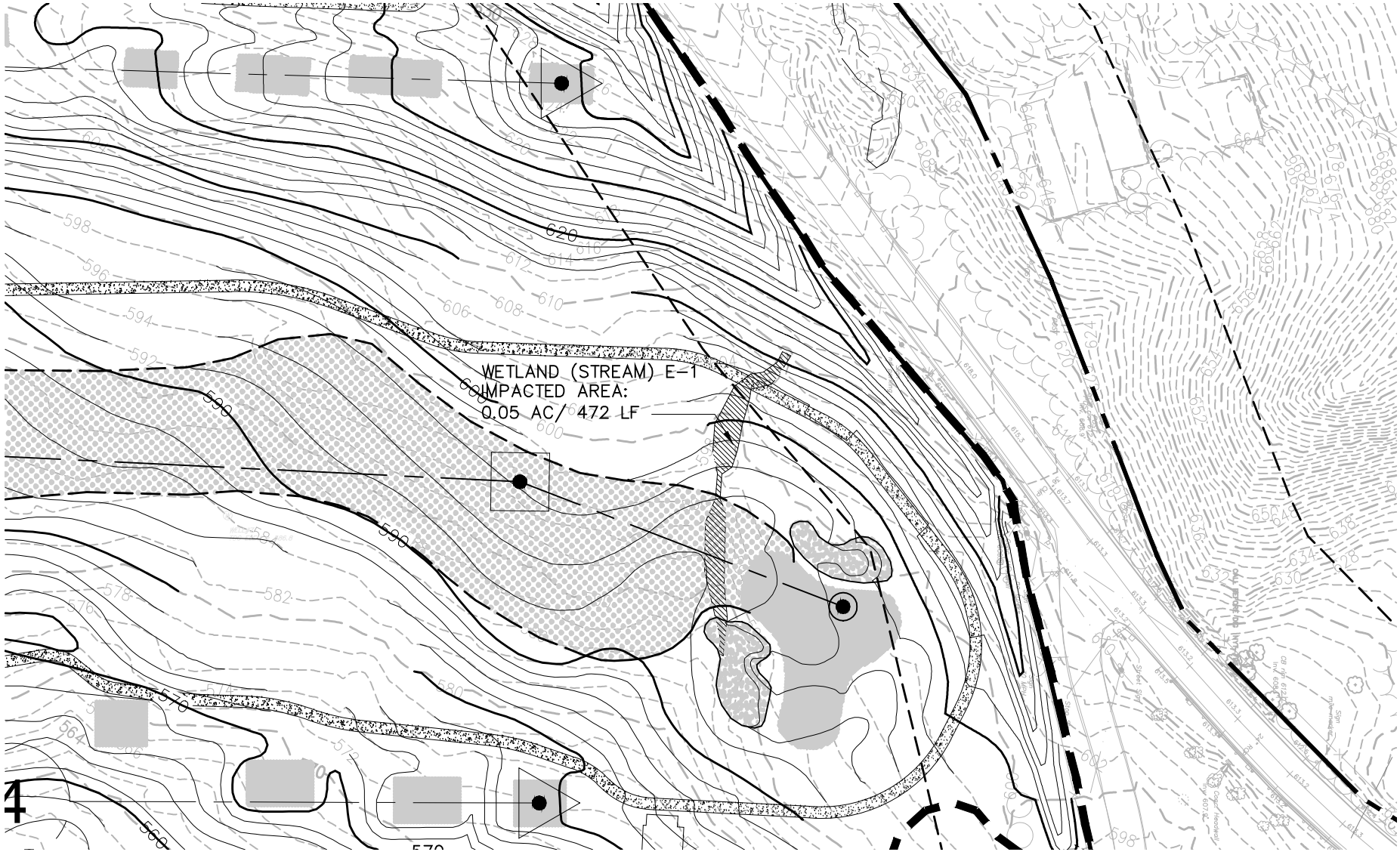
As soon as you provide the above requested information, we will resume processing of your application. If you have any questions, please contact the undersigned at (917) 790-8420.

Sincerely,

Rosie Miranda
Regulatory Project Manager
Western Section

cc: Amanda DeCesare, P.E., VHB

Attachment B



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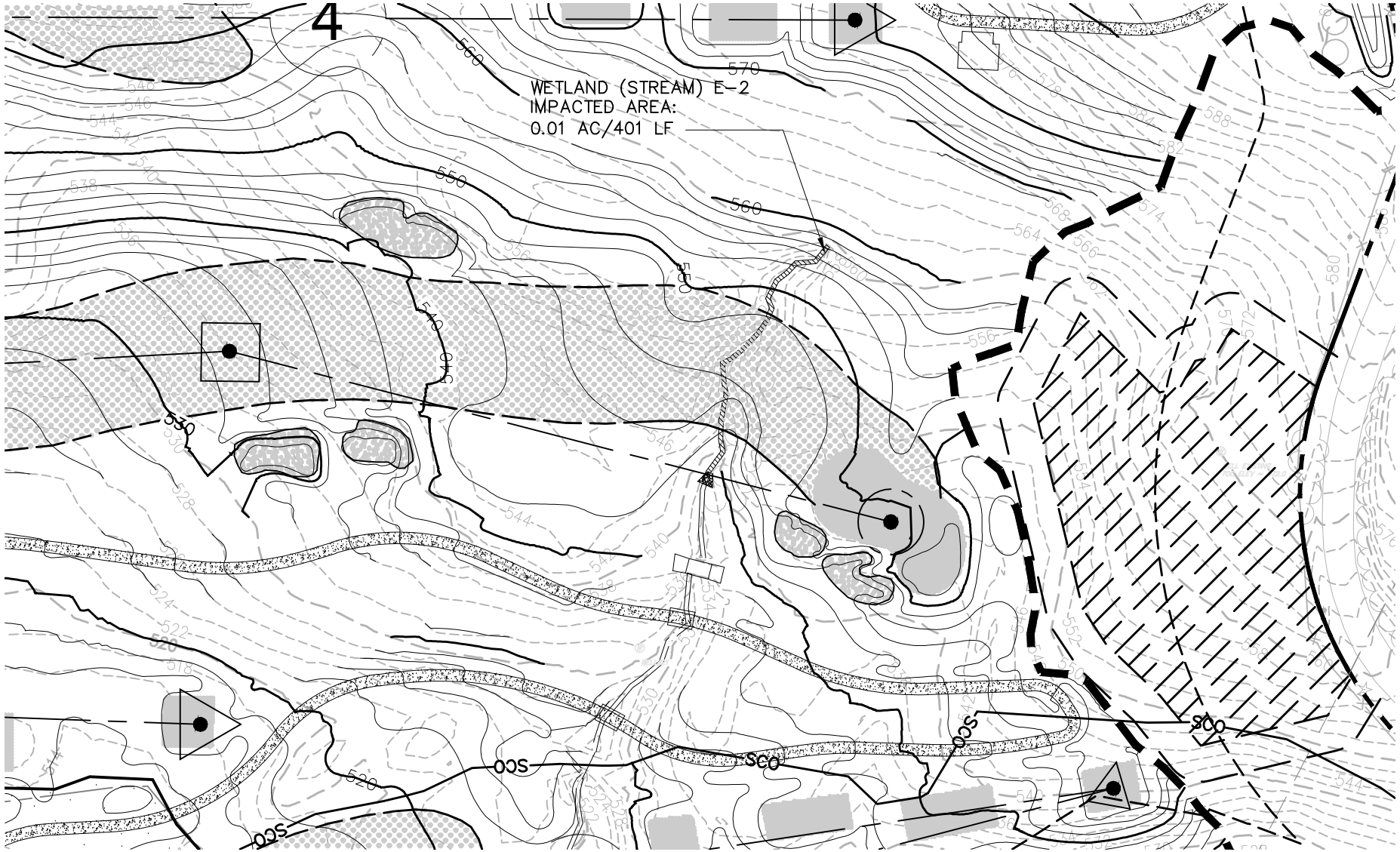
100 0 100 200

SCALE IN FEET

Vanasse Hangen Brustlin, Inc.

September 2014

Silo Ridge Resort Community
Wetland (Stream) E-1
Excerpted From Sheet C7.00
(See Overall Grading and Drainage Plan)



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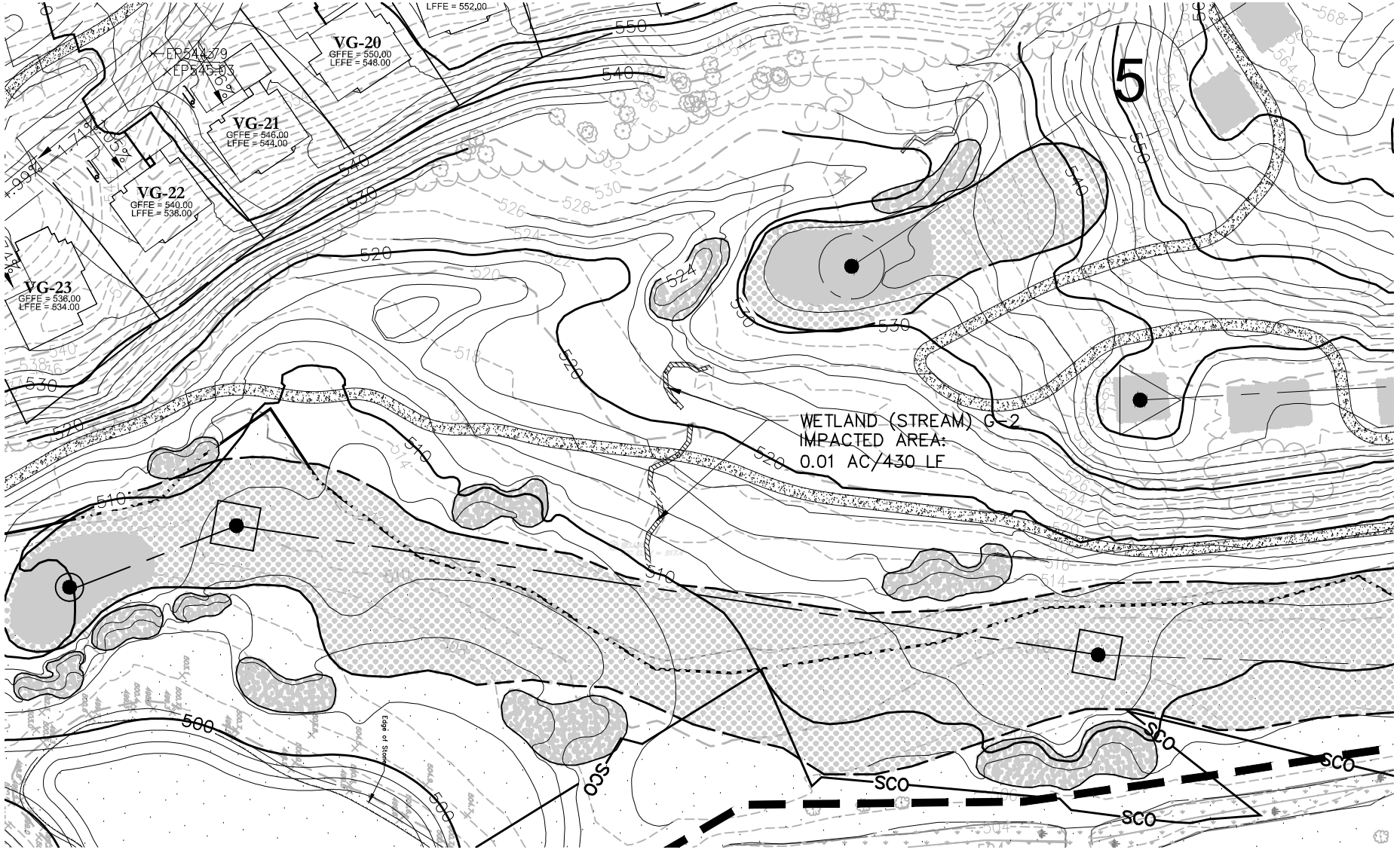
SCALE IN FEET

Vanasse Hangen Brustlin, Inc.

September 2014

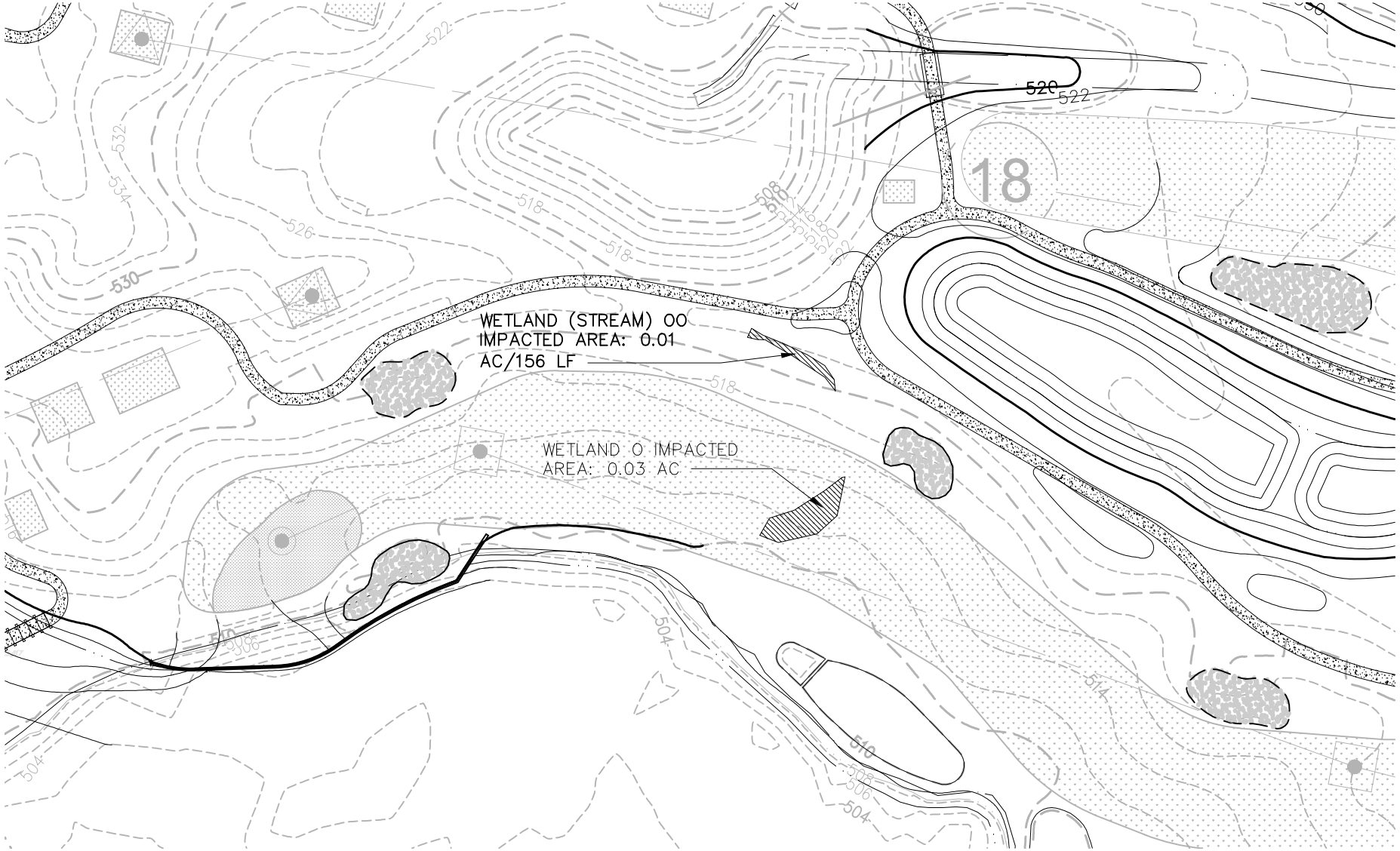
Silo Ridge Resort Community
Wetland (Stream) E-2
Excerpted From Sheet C7.00
(See Overall Grading and Drainage Plan)



Vanasse Hangen Brustlin, Inc.

September 2014

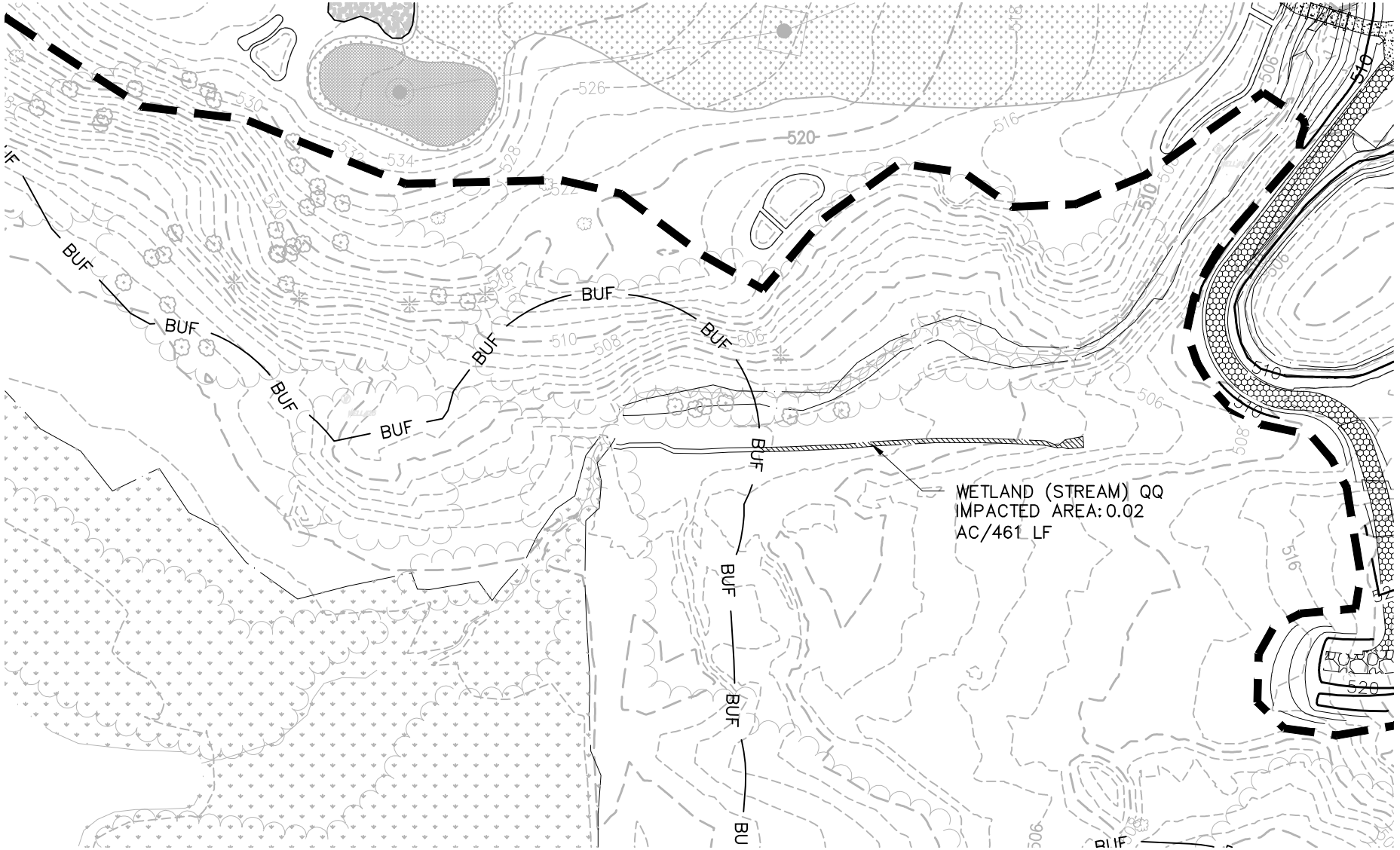
Silo Ridge Resort Community
Wetland (Stream) G-2
Excerpted From Sheet C7.00
(See Overall Grading and Drainage Plan)

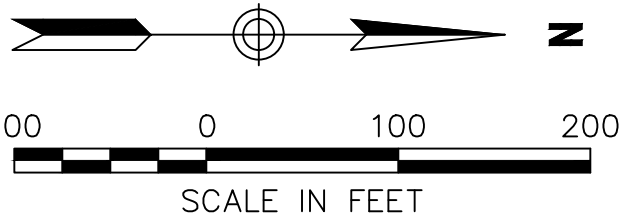


Vanasse Hangen Brustlin, Inc.

September 2014

Silo Ridge Resort Community
Wetland O and Wetland (Stream) OO





Vanasse Hangen Brustlin, Inc.

September 2014

Silo Ridge Resort Community
Wetland (Stream) QQ
Excerpted From Sheet C7.00
(See Overall Grading and Drainage Plan)

Attachment C

Revised Habitat Management Plan

Silo Ridge Resort Community

Town of Amenia
Dutchess County, New York

September 2014

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.

Prepared for:

Silo Ridge Ventures, LLC
5021 Route 44
Amenia, New York 12501

Prepared by:

VHB Engineering, Surveying and Landscape Architecture, P.C.
50 Main Street
White Plains, New York 10606

This HMP is an update to the original HMP prepared by Karl Strause PhD & Jason Tourscher of The Chazen Companies for HGCC June 6, 2008
Revised by Lisa Standley, PhD of VHB

TABLE OF CONTENTS

LIST OF APPENDICES A- E

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 September 2014) 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 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. Table 1 in 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 nine (9) 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 292.8 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 (Figure ENV-3, Appendix C). 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 41 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 6 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 72.6 acres of grassland habitats present for use by resident and transient wildlife (Figure ENV-3, Appendix C). 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 L3.01.

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 L3.01.

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-5, 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

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 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 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 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 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 bislineata*	X	X	X
Redback salamander	Caudata	Plethodontidae	*Plethodon cinereus*	X	X	X
Red-spotted newt	Caudata	Salamandridae	*Notophthalmus viridescens viridescens*	X	X	X
Eastern painted turtle	Testudinata	Emydidae	*Chrysemys picta picta*	X	X	X
Eastern garter snake	Squamata	Colubridae	*Thamnophis sirtalis sirtalis*	X	X	X

Common Name	Order	Family	Scientific Name	Breeding Habitat	Wintering Habitat	Foraging Habitat
Snapping turtle	Testudines	Chelydridae	*Chelydra serpentina*	X	X	X
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

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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 mammalsThe 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

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

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 BUILDINGS)
- AREAS OF SLOPES < 15%
- AREAS OF SLOPES = 15%-30%
- AREAS OF SLOPES => 30%
- 100' NYSDEC WETLAND BUFFER
- 100 YEAR FLOOD PLAIN

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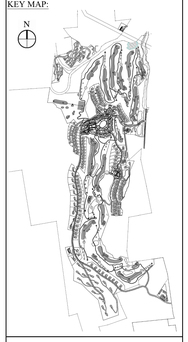
KEY MAP:



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SCALE IN FEET

No.	Revision	Date	Appvd
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

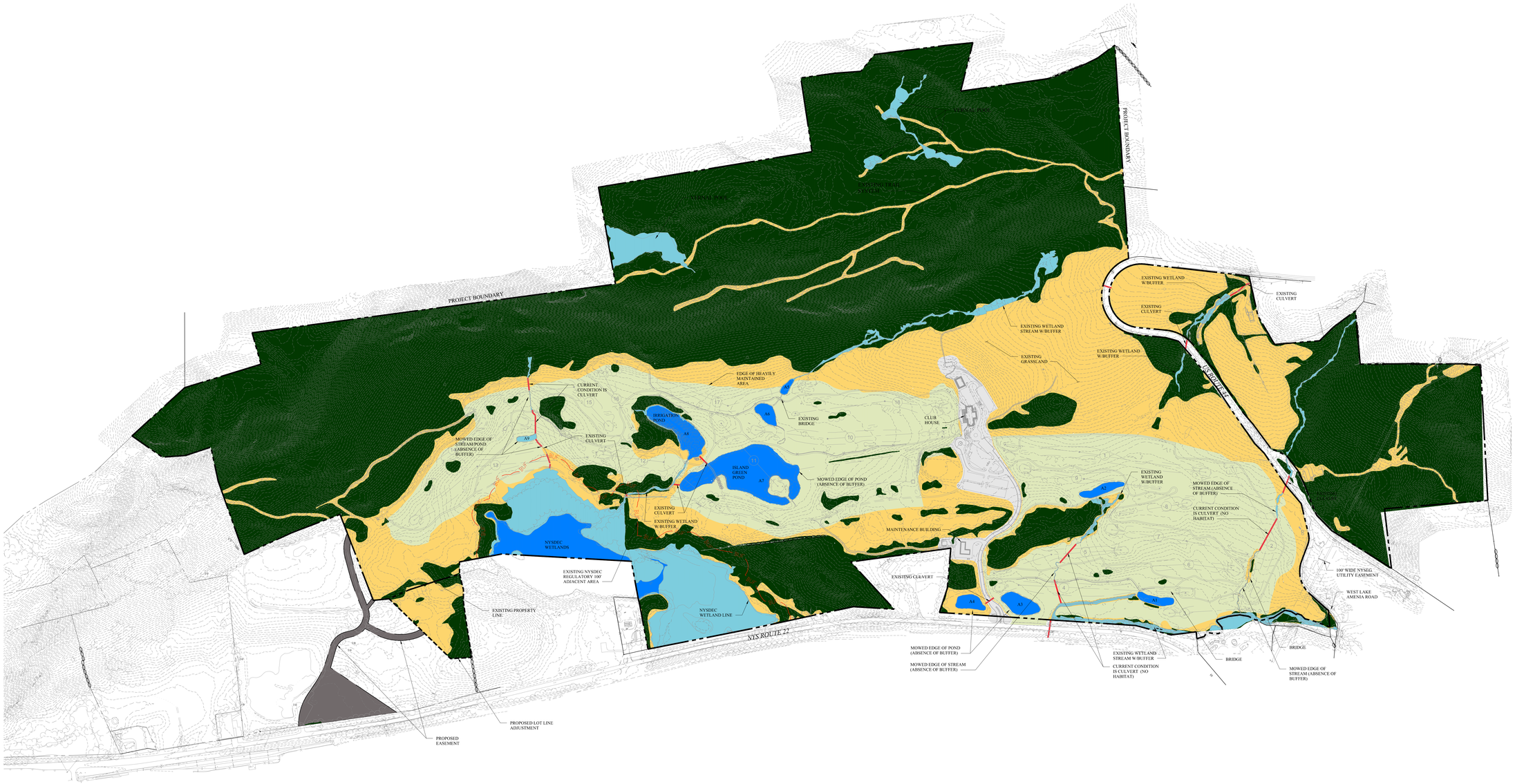
Sheet 36 of 41

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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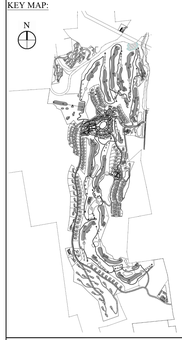

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Silo Ridge
Resort Community
Master Development Plan
4651 Route 22
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Not Issued for Construction

Drawing Title
Habitat Management Plan
Existing Conditions

Drawing Number
ENV-2

Sheet 37 of 41

Project Number
29011.00

Legend

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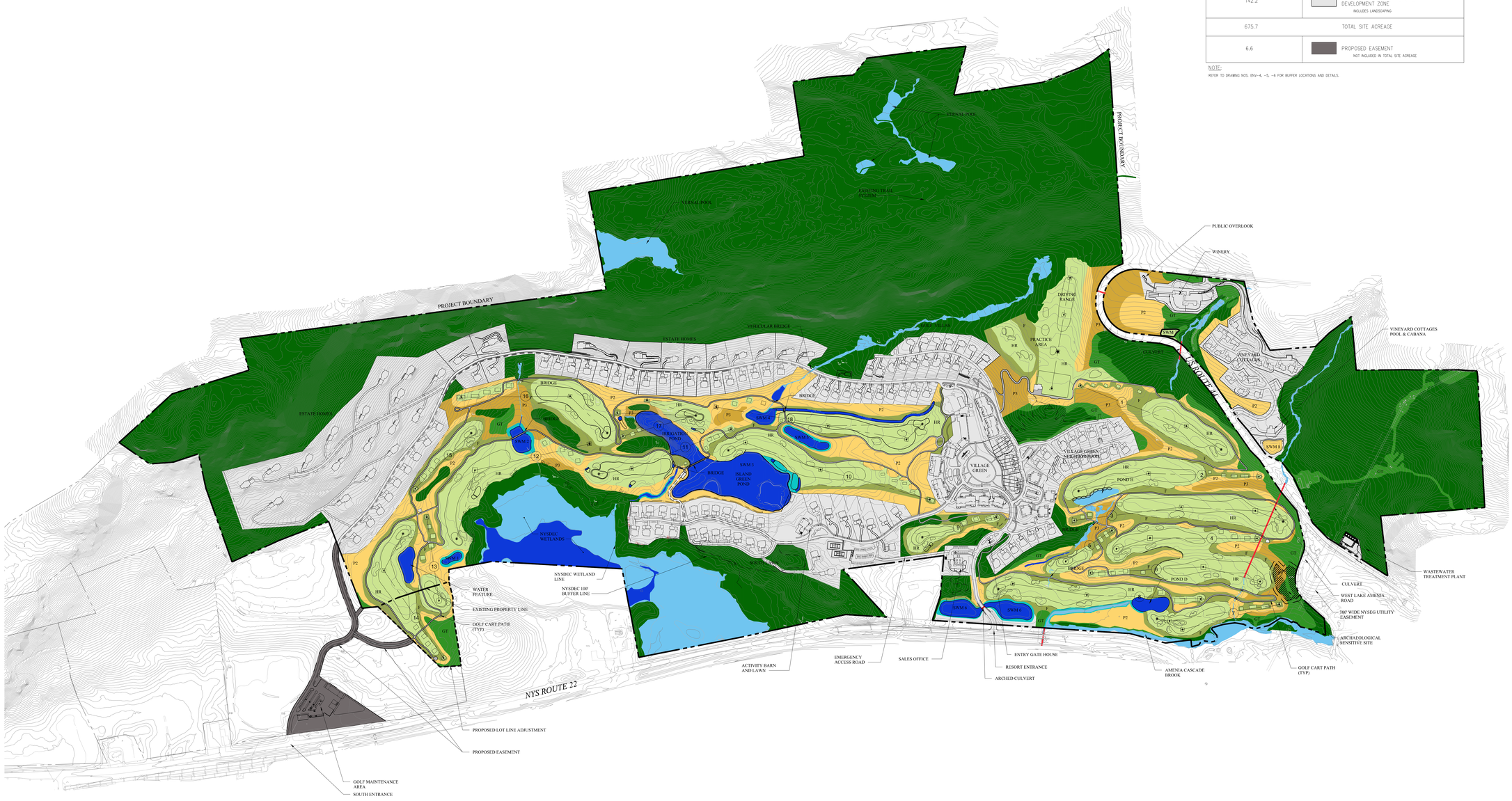
- PROPOSED LOT LINE ADJUSTMENT
- PROPOSED EASEMENT
- BUF — BUF — NYSDEC 100' WETLANDS BUFFER LINE

Proposed Acreage	Habitat Classification Legend
91.1	GOLF COURSE – IN PLAY ALL IN PLAY TEES, FAIRWAYS, ROUGHS, BUNKERS, AND GREENS
23.9	NATIVE FESCUE 6" – 1'
2.3	P1, SHORELINE GROUP
43.9	P2, NATIVE SHORT GRASS ±1'
14.4	P3, NATIVE TALL GRASS >1'
14.3	GT, TRANSITIONAL GRASSES
292.8	FOREST HABITAT
19.4	AQUATIC HABITAT (INCLUDES PO) SWM – CONSTRUCTED STORMWATER MANAGEMENT PRACTICES Ag – CURRENT ON-SITE IMPOUNDMENTS AND STREAMS
31.4	WETLANDS
142.2	RESIDENTIAL AND COMMERCIAL DEVELOPMENT ZONE INCLUDES LANDSCAPING
675.7	TOTAL SITE ACREAGE
6.6	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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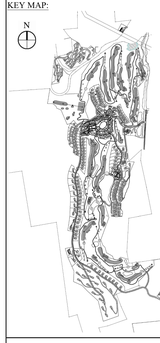

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Drawing Title
Habitat Management Plan
Proposed Conditions

Drawing Number
ENV-3

Sheet 38 of 41

Project Number
29011.00

SEE SHEET ENV-5

SEE SHEET ENV-5

WETLAND J

DRIVING RANGE

PUBLIC OVERLOOK

WINERY

ISOLATED WETLAND S

PRACTICE AREA

SWM 7

CULVERT

ISOLATED WETLAND R

VINEYARD COTTAGES

US ROUTE 44

STREAM V

SWM 8

VINEYARD COTTAGES POOL & CABANA

VILLAGE GREEN NEIGHBORHOOD

POND H

CULVERT

EXISTING CULVERT TO BE REMOVED

BRIDGE WETLAND G-1

WASTEWATER TREATMENT PLANT

EDGE OF HR (TYP)

GOLF CART PATH (TYP)

EXISTING BRIDGE TO BE REMOVED

WEST LAKE AMENIA ROAD

100' WIDE NYSEG UTILITY EASEMENT

ARCHAEOLOGICAL SENSITIVE SITE

BRIDGE

BRIDGE

POND D

EXISTING CULVERT TO BE REMOVED

SWM 6

EXISTING STREAMBED TO BE RESTORED

NYS ROUTE 22

AMENIA/CASCADE BROOK

WETLAND G-2

EXISTING STREAMBED TO BE RESTORED

FLOODWAY (TYP)

100 YEAR FLOODPLAIN (TYP)

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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KEY MAP:

N

100 0 100 200
SCALE IN FEET

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Drawing Title
Habitat Management Plan
Buffering Plan - North

Drawing Number
ENV-4

Sheet 39 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

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

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- 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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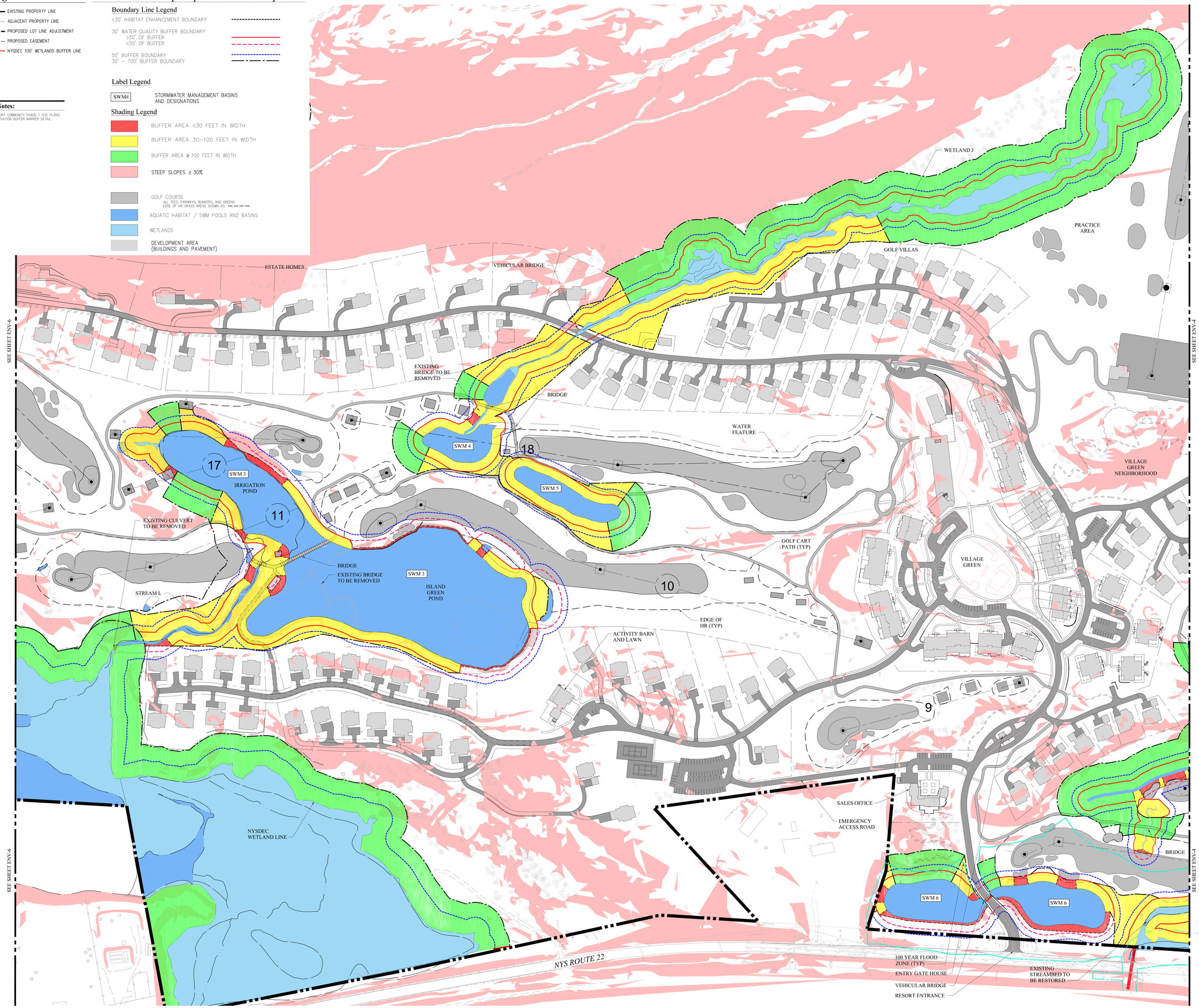
- WETLANDS
- DEVELOPMENT AREA (BUILDINGS AND PAVEMENT)



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KEY MAP:

N

100 0 100 200
SCALE IN FEET

No.	Revision	Date	Appvd
2	PER TOWN COMMENTS	8/11/14	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
Habitat Management Plan
Bufering Plan - Center

Drawing Number
ENV-5

Sheet 40 of 41

Project Number
29011.00

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

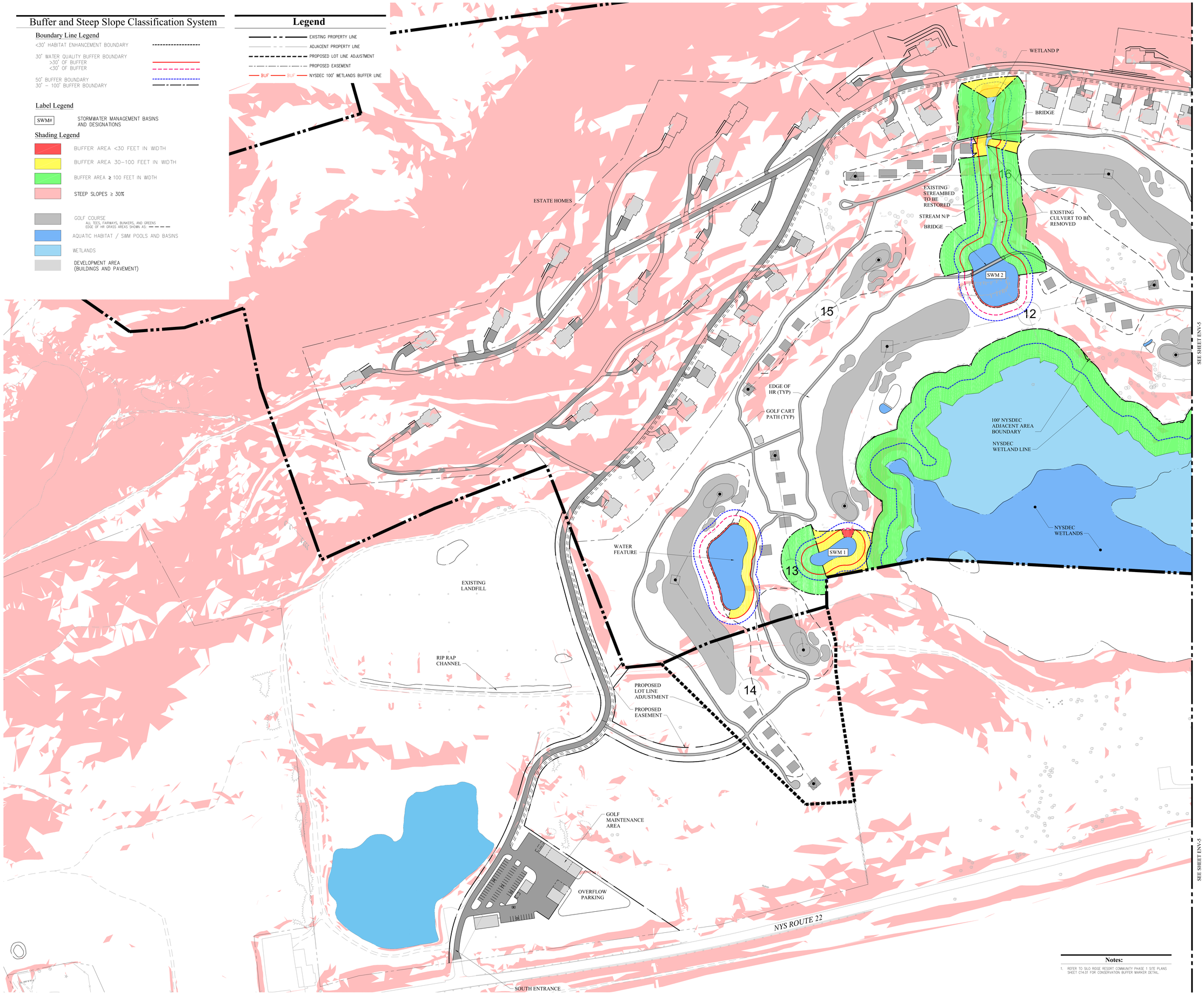
- SWM# — STORMWATER MANAGEMENT BASINS AND DESIGNATIONS

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)

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.

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KEY MAP:

100 0 100 200
SCALE IN FEET

No.	Revision	Date	Appvd
2	PER TOWN COMMENTS	8/11/14	ACD
1	PER TOWN COMMENTS	6/19/14	ACD

Designed by JC | Drawn by: CMG | Checked by: MWJ
CAD checked by: MC | 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

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Amended Special Use Permit/
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Drawing Title
Habitat Management Plan
Buffering Plan - South

Drawing Number
ENV-6

Sheet of
41 41

Project Number
29011.00

Appendix D:
Site-Specific Buffer Specifications

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

Location (Map #)	Habitat Unit	Aquatic Edge (Linear ft.)[1]	Aquatic Edge (Linear ft.)[1]	Aquatic Edge (Linear ft.)[1]	Aquatic Edge with ≥ 30 ft. Buffer (Linear Feet)					
					Existing [2]		Approved 2009 [3]		Proposed 2014 [3]	
		Existing	Approved 2009	Proposed 2014	Feet	% Buffered	Feet	% Buffered	Feet	% Buffered
ENV-4	Isolated Stream R	712	712	712	712	100%	712	100%	572	80%
ENV-4	Pond D	696	1031	740	696	0%	616	60%	290	39%
ENV-4	Pond H	817	817	807	0	0%	545	67%	175	22%
ENV-4	Stream E-1	472	472	0	253	54%	394	83%	0	0%
ENV-4	Stream E-2	1206	1806	808	0	0%	873	48%	808	100%
ENV-4	Isolated Wetland I	242	242	0	242	100%	0	0%	0	0%
ENV-4	SWM 1 - Approved 2009	0	463	0	0	0%	463	100%	0	0%
ENV-4	SWM 2 - Approved 2009	0	881	0	0	0%	440	50%	0	0%
ENV-4	SWM 3 - Approved 2009	0	277	0	0	0%	153	55%	0	0%
ENV-4	SWM 4 - Approved 2009	0	1781	0	0	0%	1067	60%	0	0%
ENV-4	SWM 7 - Proposed 2014	0	0	362	0	0%	0	0%	362	100%
ENV-4	SWM 8 - Proposed 2014	0	0	489	0	0%	0	0%	0	0%
ENV-5	Wetland G-1	1604	1604	1604	1299	81%	1192	74%	1352	84%
ENV-5	Wetland G-2	396	396	396	0	0%	221	56%	389	98%
ENV-5	Pond B (SWM 6 - Proposed 2014)	796	796	927	0	0%	269	34%	342	37%
ENV-5	Pond A (SWM 6 - Proposed 2014)	631	631	830	0	0%	592	94%	324	39%
ENV-5	Pond J-1 (SWM 4 - Proposed 2014)	589	589	644	0	0%	156	26%	621	96%
ENV-5	Pond Z[4] (SWM 3 - Proposed 2014)	3210	3210	2278	0	0%	2002	62%	1547	68%
ENV-5	Pond K[4] (SWM 3 - Proposed 2014)	1716	1716	1412	990	58%	1577	92%	1109	79%
ENV-5	Wetland O	1136	1136	0	0	0%	0	0%	0	0%
ENV-5	Wetland OO	156	156	0	0	0%	0	0%	0	0%
ENV-5	Stream QQ	670	670	0	0	0%	393	59%	0	0%
ENV-5	SWM 5 - Approved 2009	0	375	0	0	0%	291	78%	0	0%
ENV-5	SWM 6 - Approved 2009	0	602	0	0	0%	602	100%	0	0%
ENV-5	SWM 7 - Approved 2009	0	840	0	0	0%	789	94%	0	0%
ENV-5	SWM 8 - Approved 2009	0	690	0	0	0%	690	100%	0	0%
ENV-5	SWM 9 - Approved 2009	0	660	0	0	0%	660	100%	0	0%
ENV-5	SWM 10 - Approved 2009	0	801	0	0	0%	801	100%	0	0%
ENV-5	SWM 5 - Proposed 2014	0	0	844	0	0%	0	0%	844	100%
ENV-6	Stream N/P	341	341	525	0	0%	164	48%	525	100%
ENV-6	Wetland N (SWM 2 - Proposed 2014)	390	390	613	0	0%	205	53%	326	53%
ENV-6	SWM 11 - Approved 2009	0	1405		0	0%	1405	0%	0	0%
ENV-6	SWM 1 - Proposed 2014	0	0	404	0	0%	0	0%	379	94%
ENV-6	Water Feature - Proposed 2014	0	0	709	0	0%	0	0%	340	48%
Totals		**15,780**	**25,490**	**15,104**	**4,192**	**27%**	**17,272**	**68%**	**10,305**	**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.

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

Location (Map #)	Habitat Unit	Aquatic Edge (Linear ft.)[1]	Aquatic Edge (Linear ft.)[1]	Aquatic Edge (Linear ft.)[1]	Aquatic Edge with ≥ 30 ft. Buffer (Linear Feet)					
					Existing [2]		Approved 2009 [3]		Proposed 2014 [3]	
		Existing	Approved 2009	Proposed 2014	Feet	% Buffered	Feet	% Buffered	Feet	% Buffered
ENV-4	Isolated Wetland S	1368	1368	1368	1368	100%	1368	100%	1368	100%
ENV-4	Stream V	2903	2903	2903	2903	100%	2903	100%	2903	100%
ENV-4	Amenia Brook[4]	7078	7078	7078	3226	46%	5238	74%	6947	98%
ENV-5	Wetland J	6727	6727	6727	6081	90%	6433	96%	6599	98%
ENV-5	Stream L	1233	1233	1233	509	41%	1088	88%	1114	90%
ENV-6	Wetland P	403	403	403	403	100%	403	100%	403	100%
ENV-6	Wetland AM-15	7850	7850	7850	7222	92%	7850	100%	7850	100%
N/A	Wetland U	2257	2257	2257	2257	100%	2257	100%	2257	100%
N/A	Wetland X	428	428	428	428	100%	428	100%	428	100%
N/A	Wetland W	3317	3317	3317	3317	100%	3317	100%	3317	100%
Totals		**33,564**	**33,564**	**33,564**	**27,714**	**83%**	**31,285**	**93%**	**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

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.

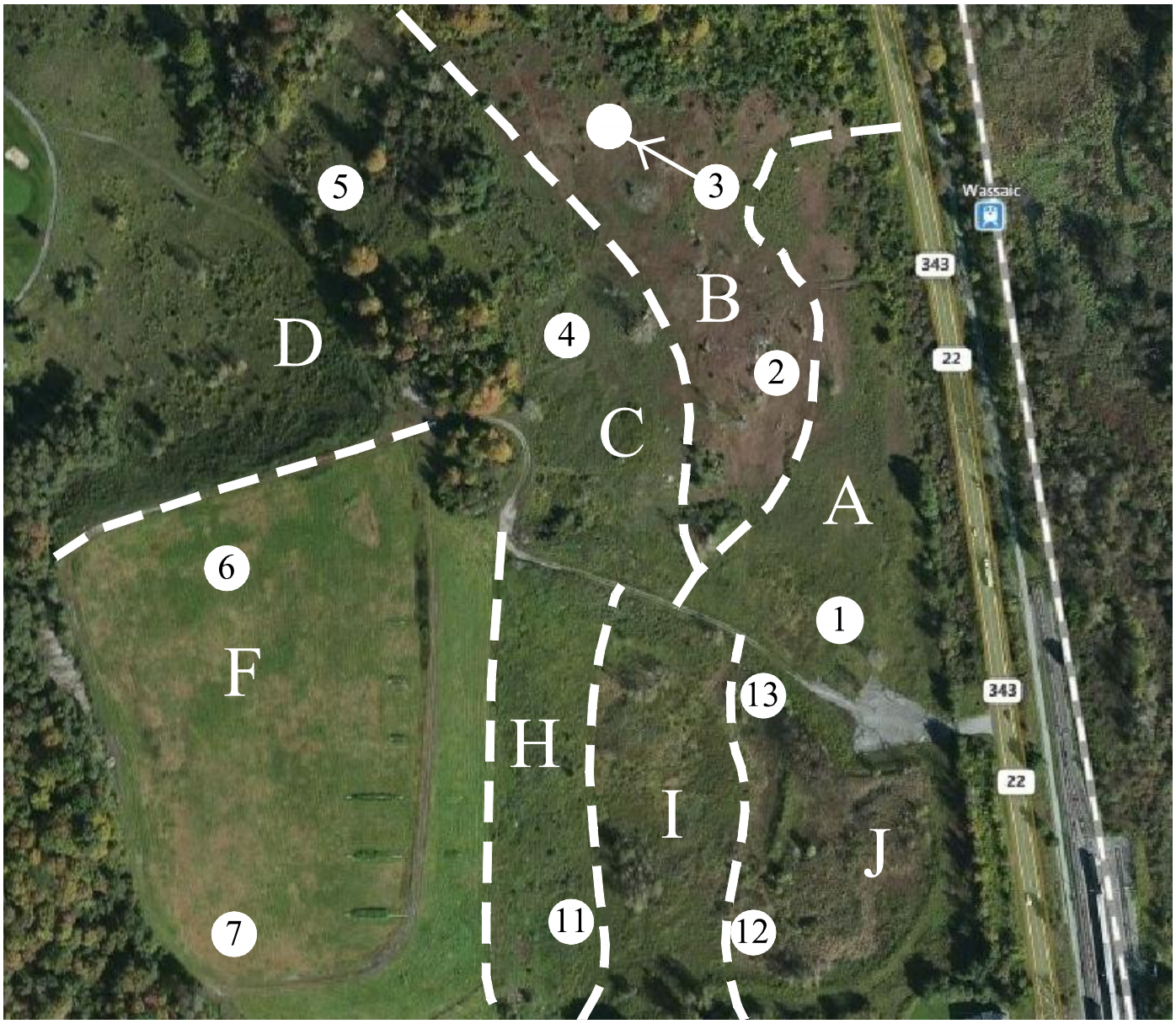
The Town's consultant asked if the old-field and grassland areas (A, B, C) would have the potential to be an "attraction zone" for grassland species if these areas were not mowed. These areas together total 14.6 acres (5.9 hectares) of grassland habitat. In the absence of mowing, it is most likely that 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

▼

[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
4561 Route 22
Amenia, New York 12501

Attachment D

FEDERAL PROTOCOL MIST NET SURVEY FOR INDIANA BATS (*Myotis sodalis*) AT THE SILO RIDGE GOLF COURSE AND PROPOSED RESIDENTIAL DEVELOPMENT TOWN OF AMENIA, DUTCHESS COUNTY, NEW YORK

SECTION 1 – INTRODUCTION

Stearns & Wheler was retained by The Chazen Companies to conduct a federal protocol summer survey[1] for the federally-listed endangered species, Indiana bat (*Myotis sodalis*), as part of its federal wetlands general permit process for the Silo Ridge Golf Course and proposed residential subdivision site. The site is located to the west of State Route 22, south of U.S. Route 44, between Amenia and Wassaic in the Town of Amenia, Dutchess County, NY. Indiana bats are considered a potential concern because the site is located within about 27 miles of a known Indiana bat hibernaculum, and is therefore within the seasonal migration range of that hibernaculum, The site also contains mature forest habitat and several stream corridors that might support summer roost habitat or foraging habitat for Indiana bats.

This report summarizes the federal protocol mist net survey conducted on August 7 and 8, 2007 by Stearns & Wheler. It includes a description of the study area, methods used in the survey and their compliance with federal protocol, the natural history of the Indiana bat, and the findings from the survey. The report is based on a review of recent literature and on data collected in the field. The study resulted in the capture of 30 bats, representing 5 species, but no Indiana bats were captured on the site.

SECTION 2 – STUDY AREA

2.1 SITE LOCATION

The ±670-acre Silo Ridge site is located on the west side of State Route 22, south of U.S. Route 44, between the communities of Amenia and Wassaic in the Town of Amenia, Dutchess County, NY. The approximate extent of the subject property is depicted in Figure 1.

[1] As defined in Appendix 5 of the *Indiana Bat (Myotis sodalis) Draft Recovery Plan: First Revision* (USFWS, 2007).

2.2 COVER TYPES

The subject property is an existing 18-hole golf course with interspersed woodlots, watercourses, and ponds, bordered to the west by mixed age and mature second-growth hardwood forest located at the toe of a north-south running ridge. Vegetation cover types identified on the property during this survey included the following (as defined by Edinger, et al. 2002):

1. Artificial pond.
2. Eutrophic pond.
3. Confined river.
4. Intermittent stream.
5. Shallow emergent marsh.
6. Shrub swamp.
7. Red Maple-hardwood swamp.
8. Successional old field.
9. Successional shrubland.
10. Successional southern hardwood forest.
11. Hemlock-Hardwood forest.
12. Mowed lawn.
13. Unpaved road/path.
14. Paved road/path.
15. Rural structure exterior.

Habitat at the top of the ridge was surveyed by others, but was not surveyed as part of this study, since no disturbance to that area of the property was proposed. However, all habitat types to the east of the ridge were visually inspected during daylight hours for potential roosting, foraging, and travel habitat.

SECTION 3 – NATURAL HISTORY OF INDIANA BATS

3.1 SPECIES DESCRIPTION

The Indiana bat (*Myotis sodalis*), one of nine bat species found in New York State (NYSDEC, 2004), is a medium-sized bat weighing 6 to 9 grams, with a wingspan of 24 to 28 centimeters (Harvey, et al., 1999). Its pelage is a dull grayish brown dorsally, with a slightly lighter pinkish

cinnamon color ventrally. Its nose is often, though not always, pinkish. Distinguishing features of the Indiana bat that separate it from other bats of the *Myotis* genus include a distinctly keeled calcar, short and sparse hairs on its feet, and a rounded facial profile.

It is most easily distinguished from the Little Brown Myotis (*Myotis lucifugus*) and the Northern Long Eared Myotis (*Myotis septentrionalis*) by the presence of the keeled calcar (not always prominent); the fact that its pelage is duller and grayer than either; substantially smaller feet (±9 mm) and shorter toe hairs than *M. lucifugus*; substantially smaller ears and tragus than those of *M. septentrionalis*; and generally pinker face or nose than either. In general, though dorso-ventrally bicolored, the contrast between the dorsal and ventral surfaces in *M. sodalis* is generally not as distinct as it is in either *M. lucifugus* or *M. septentrionalis*.

The Indiana bat's scientific name translates from Latin as "mouse eared (*Myotis*) companion (*sodalis*)." This descriptive name stems from the fact that *M. sodalis* has small, mouse-like ears, similar to the rest of the genus *Myotis*; and that it is considered a social species due to its behavior of hibernating in large, tightly packed clusters.

3.2 RANGE

Indiana bats may be found over much of the eastern half of the United States. The largest wintering (hibernating) population, consisting of almost half of all Indiana bats, is found in southern Indiana (USFWS, 2004). Other large hibernating concentrations of this species are found in Illinois, Kentucky, Missouri, New York, Ohio, Tennessee, and West Virginia. Smaller hibernation or summer roost sites have been identified in Alabama, Arkansas, Connecticut, Florida, Georgia, Iowa, Maryland, Massachusetts, Michigan, Mississippi, New Jersey, North Carolina, Oklahoma, Pennsylvania, Vermont, and Virginia. Little is currently known about the species' dispersal patterns from their known hibernacula, although this is the subject of current study (Hicks, pers. comm., 2004).

3.3 HABITAT REQUIREMENTS

Wintering habitat for the Indiana bat includes limestone (karst) caves and abandoned mines. Wintering habitats must provide very specific temperature and humidity characteristics to be suitable for and selected by this species (USFWS, 2004). In the Northeast, Indiana bats generally select caves or mines with temperatures of 10°C (50°F) or below when the bats arrive in October

and November, and that maintain temperatures of about 48°C (39°-46°F) in mid-winter (USFWS, 2007). Relative humidity in known hibernacula is thought to be preferred at about 74 percent, but below saturation, but has been measured as low as 54 percent (USFWS, 2007). Indiana bats' habit of clustering in a relatively small number of known caves suggests that few caves provide their specific hibernation requirements (USFWS, 2007).

During the late spring and summer months, Indiana bats roost within tree cavities or underneath the exfoliating bark of trees (USFWS, 2007) such as Shagbark Hickory (*Carya ovata*), Sugar Maple (*Acer saccharum*), Black Locust (*Robinia pseudoacacia*) (Hicks, pers. comm., 2004), or Large White Oak (*Quercus alba*) (USFWS, 2007). The suitability of a roost tree is determined by its condition (dead or alive), the quantity of loose bark on it, the tree's solar exposure and proximity to other trees, and the tree's spatial relationship to water sources and foraging areas (USFWS, 2007). The presence of Indiana bat in a given area is thought to be influenced by the availability of suitable roost sites (USFWS, 2007).

Riparian and floodplain forests, as well as upland forests, are recognized as both roost and foraging habitats. This species is also known to forage in old fields and pastures with scattered trees (USFWS, 2007), but generally do not cross large open areas.

3.4 LIFE HISTORY

Indiana bats generally emerge from hibernacula in New York in late April through May, returning to these sites in September. Females generally emerge ahead of males. Both sexes may use temporary roosts until a roost with a larger number of bats can be established (USFWS, 2007). Roosts are generally in habitat as described above, often near edges and in fragmented forests (USFWS, 2007). Maternity roosts (roosts for pregnant females) are generally colonial. A given group of bats may use multiple maternity roosts, depending on weather conditions, with one roost being primary and others being considered secondary, or alternate (USFWS, 2007).

Females become pregnant by delayed fertilization soon after emerging from hibernation and give birth to a single young in late June or early July (USFWS, 2007). Young are able to fly within one month of birth. Indiana bats spend the balance of the summer prior to migration building up fat reserves for hibernation. They feed strictly on flying insects, selection of which is dependent upon their local environment, as well as age, sex, and reproductive status.

In late August and early September, the bats leave their summer roosts to migrate to their winter hibernacula. At the hibernaculum site, they exhibit a behavior called swarming. Swarming consists of large numbers of bats flying in and out of hibernaculum entrances between dusk and dawn, though few actually roost within the caves during the day. This behavior continues for several weeks. Mating occurs toward the latter portion of this period. Females store sperm for delayed fertilization, which occurs shortly after emerging from hibernation in the spring.

By the end of November, the majority of bats are in hibernation, tightly packed in clusters of up to 300 individuals per square foot (USFWS, 2007). During hibernation, individual bats may arouse and fly around before returning to a state of torpor (Hicks, pers. comm., 2001).

3.5 POPULATION STATUS

The Indiana bat is a New York State and federally-listed endangered species, with a Recovery Priority of 8, which means that the species has a moderate degree of threat and high recovery potential (USFWS, 2007). The 2005 winter census estimate of the population was 457,000 (USFWS, 2007). The hibernating population of the Indiana bat in the State of New York has risen from 20,200 in 1965 to 41,701 in 2005, yielding a 100 percent increase (USFWS, 2007).

SECTION 4 – FIELD METHODS

4.1 FEDERAL PROTOCOL FOR INDIANA BAT SUMMER SURVEYS

Surveys for Indiana bats at the Silo Ridge site were done in general compliance with the federal protocol outlined in Appendix 5 of the *Indiana Bat (Myotis sodalis) Draft Recovery Plan: First Revision* (2007). One modification to the federal protocol was implemented, in that net sets were doubled in sampling areas (four nets per site), rather than repeating sampling for two nights per net site. The following excerpts from the federal protocol outline mist netting guidelines for Indiana bat sampling:

A. **Netting Season**. May 15 through August 15.

B. **Equipment.** Mist nets; use the finest, lowest visibility mesh commercially available:

1. In the past, this was 1 ply, 40 denier monofilament, denoted 40/1.

2. Currently, monofilament is not available and the finest on the market is 2 ply, 50 denier nylon, denoted 50/2.

3. Mesh of approximately 38 mm.

C. **Hardware.** Hardware is not specified in the federal protocol.

D. **Net Placement.** Potential travel corridors such as streams or logging trails typically are the most effective places to net. Place nets approximately perpendicular across the corridor. Nets should fill the corridor from side to side and from stream (or ground) level up to the overhanging canopy. A typical set is 7 meters high, consisting of three or more nets "stacked" on top of one another and up to 20 meters wide. (Different width nets may be purchased and used as the situation dictates.) Occasionally, it may be desirable to net where there is no good corridor. Take caution to get the nets up into the canopy. The typical equipment described in the section above may be inadequate for these situations, requiring innovation on the part of the observers.

E. **Recommended Net Site Spacing.**

1. **Stream Corridors**. One net site per km of stream

2. **Non-Corridor Land Tracts**. Two net sites per square km of forested habitat.

F. **Minimum Level of Effort.** Netting at each site should consist of:

1. At least four net nights (unless bats are caught sooner) (one net set up for one night = one net night).

2. A minimum of two net locations at each net site (at least 30 m apart, especially in linear habitat such as a stream corridor).

3. A minimum of two nights of netting.

G. **Sample Period**. Begin at sunset; net for at least five hours.

1. Each net should be checked approximately every 10 minutes.

2. No disturbance near the nets, other than to check nets and remove bats.

H. **Weather Conditions.** Severe weather adversely affects the capture of bats. If Indiana bats are caught during weather extremes, it is probably because they are at the site and active despite inclement weather. On the other hand, if bats are not caught, it may be that there are bats at the site, but they may be inactive due to the weather. Negative results combined with any of the following weather conditions throughout all or most of the sampling period are likely to require additional netting: (1) precipitation; (2) temperatures below 10°C; or (3) strong winds (use good judgment: moving nets is more likely to be detected by bats).

I. **Moonlight**. There is some evidence that small myotine bats (bats of the genus *Myotis*) avoid brightly lit areas, perhaps as predator avoidance. It is typically best to set nets under the canopy where they are out of the moonlight, particularly when the moon is 1/2 full or greater.

4.2 EQUIPMENT USED

The equipment used in this study included mist nets specially prepared for capturing microchiropteran (small, insectivorous) bats. These nets were 50 denier, 2 ply nylon nets with 38 mm mesh. The nets were rigged either as horizontal nets (having their greatest dimension in the horizontal plane) strung between vertical upright poles, or as vertical canopy nets (with their greatest dimension being in the vertical plane) suspended from overhanging tree limbs and spread between two horizontally suspended poles. Sizes and configurations of individual net sets are outlined in Table 1. Nets were deployed so as to completely cover openings between vegetation on either side, and from the ground to overhanging vegetation, where possible. Positions of mist net sites were measured with a Garmin e-trex Vista® hand-held geographic positioning system (GPS) unit (Garmin International, Inc., Chicago, IL). Latitude and longitude positions were measured to the thousandth of a minute and are outlined in Table 1. Photographs of each of the net locations are contained in Appendix A.

In addition to the mist nets, an Anabat® II bat detector (Titley Electronics, Ballina, NSW, Australia) was used to monitor bat echolocation activity near some net locations. Since Indiana bats cannot currently be absolutely identified by acoustic signature alone, the acoustic monitoring was done to ascertain overall bat activity near capture sites, rather than for species identification.

Captured bats were weighed to the nearest 0.1 gm using an Ohaus CS200 digital scale and their forearm lengths were measured to the nearest 0.1 mm with a SPi 2000 dialMax caliper. Representatives of each species captured were photographed with a Nikon D70 digital single-lens reflex camera with a zoom lens and on-camera flash unit at a resolution of 6 megapixels. Photos of representatives of each species captured are provided in Appendix B.

4.3 NETTING LOCATIONS AND DESCRIPTIONS

Mist nets for capturing bats were set up at 16 locations on the subject property over the course of 2 nights. Locations and descriptions of each net set are outlined in Table 1. Photographs of each net set are contained in Appendix A. Locations of nets on the site are also depicted in Figure 2.

TABLE 1

MIST NETTING LOCATIONS, TYPES AND HABITATS

NET SETS	DATE	LOCATION		NET TYPE*	HABITAT
		LATITUDE	LONGITUDE		
1a	07 Aug 07	41°50.234’	73°33.994’	6m C	Across perennial stream at outlet from canopy cover
1b	07 Aug 07	41°50.198’	73°33.999’	(1) 9m H	Across perennial stream under overhanging tree
2a	07 Aug 07	41°50.177’	73°34.004’	6m C	Across perennial stream under overhanging tree
2b	07 Aug 07	41°50.128’	73°33.990’	(1) 3m H	Across perennial stream at outlet from box culvert
3a	07 Aug 07	41°50.174’	73°34.169’	(2) 6m H	Set in open understory of mature successional forest
3b	07 Aug 07	41°50.162’	73°34.154’	(1) 6m H	Set in open understory of mature successional forest
4a	07 Aug 07	41°50.125’	73°34.155’	(2) 6m H	Set in open understory of mature successional forest
4b	07 Aug 07	41°50.083’	73°34.112’	6m C	Set in open understory of mature successional forest
5a	08 Aug 07	41°49.986’	73°34.129’	6m C	Across dirt road through mature successional forest
5b	08 Aug 07	41°49.957’	73°34.132’	(3) 6m H	Across dirt road through mature successional forest
6a	08 Aug 07	41°49.925’	73°34.121’	(1) 9m H	Across dirt road through mature successional forest

NET SETS	DATE	LOCATION		NET TYPE*	HABITAT
		LATITUDE	LONGITUDE		
6b	08 Aug 07	41°49.902'	73°34.124'	6m C	Across dirt road through mature successional forest
7a	08 Aug 07	41°49.307'	73°34.340'	(1) 3m H	Across logging road in mature successional forest
7b	08 Aug 07	41°49.284'	73°34.307'	6m C	Across logging road in mature successional forest
8a	08 Aug 07	41°49.268'	73°34.303'	(3) 6m H	Across logging road in mature successional forest
8b	08 Aug 07	41°49.281'	73°34.364'	(1) 12m H	Set in open understory of mature successional forest

H = Horizontal net
C = Canopy net
(#) = Number of horizontal nets stacked in a set.

4.4 METHODS

During daylight hours, the site was surveyed visually for appropriate habitat and potential net site locations. In particular, potential flight corridors between potential roosting and feeding sites or along which bats might travel to find food or water were identified. When net sites were selected, their location was recorded with a hand-held GPS unit and their habitat type was described. We focused our sampling effort on areas of forest that were both appropriate habitat and proposed for development-related disturbance. Areas that were not proposed for disturbance along the top of the ridge on the west side of the property were not surveyed for habitat.

Weather predictions for each night were checked via National Weather Service broadcasts late each afternoon to determine if weather conditions would be suitable for sampling. Conditions sought for sampling included temperatures over 10°C (50°F) with no precipitation and calm to very light winds. The moon phase was full to waning gibbous during the sampling period.

Nets were set up in early evening, but were left in collapsed position to prevent bycatch of birds. Nets were positioned at least 30 meters apart. Nets were opened within 20 minutes of sundown, and were checked every 10 minutes for a minimum period of 5 hours. Nets were not disturbed between checking visits. At each checking visit, the number of captures was recorded, as well as the current temperature. Changes in weather, cloud cover, or wind were noted as they occurred. After the five-hour survey period was complete, the nets were collapsed and removed.

Upon capture of a bat, it was placed in a cloth holding bag and removed to a processing station away from the nets. At the processing station, the bat was identified to species, weighed, its forearm was measured, its sex and reproductive status were determined, and representative individuals of each species captured were photographed, then released.

Stearns & Wheler's procedures are compared with the federal protocol requirements in Table 2. The comparison indicates that this approach met or exceeded all of the federal protocol requirements for mist netting for Indiana bats.

TABLE 2

SITE SURVEY PROCEDURES COMPARED TO FEDERAL PROTOCOL

PROCEDURAL ELEMENT	FEDERAL PROTOCOL	ON-SITE PROCEDURES
Netting season	May 15 through August 15	July 30-August 4, 2007
Equipment	Mist nets, 2 ply, 50 denier nylon, 38 mm mesh	Mist nets, 2 ply, 50 denier nylon, 38 mm mesh
Net placement	On corridors or not; perpendicular to corridors; filling openings	On corridors and not; perpendicular to corridors; filling openings
Net spacing	One per km of stream or two sites per sq. km. of forest.	>2 net sites per sq. km. of forested habitat
Net-nights (1 net for 1 night = 1 net-night	Minimum four net-nights unless an Indiana bat is caught sooner	16 net nights
Number of net locations	Minimum of two per site; 30 m apart	Four net locations per net site; at least 30 m apart
Number of sampling nights	Minimum of two, unless Indiana bat is caught sooner.	Two sampling nights
Sampling period	From sundown for 5 hours	From sundown for 5 hours
Net check frequency	Every 10 minutes	Every 10 minutes
Net disturbance	None between checks	None between checks
Precipitation	No precipitation	Some precipitation, but bats remained active
Temperature	Above 10°C	Above 10°C
Winds	Calm to light (nets should not move)	Calm to light (no net movement detected)
Moonlight	Half moon or less, or under canopy	Full to waning gibbous; under canopy

SECTION 5 – FINDINGS

5.1 HABITAT ASSESSMENT

Based on the cover types identified, there is potentially suitable habitat for Indiana bats on this site. Potential roosting habitat includes mature successional southern hardwood forested areas that include mature Shagbark Hickory (*Carya ovata*) in uplands and Red-Maple hardwood swamp forests in wetlands. These areas contained standing dead trees with exfoliating bark that are either in canopy gaps or are supra-canopy in height, allowing direct sunlight exposure to the bole of the tree. Potential foraging habitat includes similar cover types to potential roosting habitat, as well as perennial and intermittent watercourses. Some areas of successional southern hardwood forests, particularly along the toe of the ridge, were too cluttered in the understory to provide suitable flight paths for bats, and were therefore not considered suitable habitat. No subterranean habitats (caves or mines) were found on the site.

5.2 NETTING RESULTS

The site was sampled on August 7 and 8, 2007, with eight net sets (two net sites) being monitored each night. Habitats sampled included successional southern hardwoods and perennial stream. Sites were selected from areas proposed to be disturbed, as well as from areas believed likely to provide habitat for bats. The data sheets from each night of sampling with photos of the sampling sites are contained in Appendix A. Captures are summarized in Table 3.

On night 1 (August 7, 2007), we netted two sites (four net sets) along Amenia Creek, a perennial watercourse with a discontinuous overhanging tree canopy; and two sites (four net sets) in the open understory of a mature hardwood lot located between the 4th and 5th fairway. Seven Northern Long-Eared Bats (*Myotis septentrionalis*), two Eastern Pipistrelles (*Perimyotis subflavus*), and one Eastern Red Bat (*Lasiurus borealis*) along Amenia Creek were captured. Four Little Brown Bats (*Myotis lucifugus*), two Eastern Pipistrelles, and one Big Brown Bat (*Eptesicus fuscus*) were captured in the mature hardwood lot.

On night 2 (August 8, 2007), we netted along an unpaved maintenance access road through the edge of mature successional southern hardwood forest to the south of the maintenance building, and along an old logging road through mature successional southern hardwood forest to the west of the 14th fairway. The maintenance road sets yielded captures of three Little Brown Bats, two

Big Brown Bats, and one Northern Long-Eared Bat, as well as one Southern Flying Squirrel (*Glaucomys volans*). The logging road sets yielded four Big Brown Bats, two Northern Long-Eared Bats, and one Eastern Pipistrelle.

Other species of wildlife observed during the habitat and netting surveys included White-footed Mouse (*Peromyscus leucopus*), Eastern Chipmunk (*Tamias striatus*), Southern Flying Squirrel, White-tailed Deer (*Odocoilius virginianus*), Turkey Vulture (*Cathartes aura*), Bumble Bee (*Megabombus pensyvanicus*), Katydid (Family *Tettigoniidae*, subfamily *Pseudophyllinae*), Green Lacewing (Family *Chrysopidae*), Great Spangled Frittilary (*Speyeria cybele*), and Monarch (*Danaus plexippus*).

No Indiana bats were captured on this site during this study. While capture of an Indiana bat demonstrates their presence, failure to capture one does not necessarily prove their absence, since non-occurrence cannot be proven. No previous records of Indiana bats on the site or within 2.5 miles of the site exist. However, appropriate habitat is found on the site, and the site is within the seasonal migratory range of several hibernacula, so we conclude that occurrence of Indiana bats on this site remains a possibility.

TABLE 3

BATS CAPTURED AT THE SILO RIDGE SITE

DATE	SPECIES	NET	AGE	SEX	REPRODUCTIVE STATUS	WEIGHT (GM)	LENGTH OF FOREARM (MM)
07 Aug	Northern Bat	1b	A	F	PL	7.0	37
07 Aug	Northern Bat	2b	A	F	N	7.5	38
07 Aug	Northern Bat	2b	A	F	PL	8.0	38
07 Aug	Northern Bat	1b	A	M	--	6.5	37
07 Aug	Northern Bat	1b	A	F	N	7.3	37
07 Aug	Eastern Red Bat	1b	A	M	--	12.0	43
07 Aug	Eastern Pipistrelle	2b	A	F	N	6.8	35
07 Aug	Northern Bat	2b	A	F	N	7.5	36
07 Aug	Eastern Pipistrelle	2b	J	F	N	6.5	35
07 Aug	Northern Bat	2b	A	F	N	7.8	38
07 Aug	Little Brown Bat	3a	A	F	N	9.4	39.4
07 Aug	Little Brown Bat	3a	A	M	--	8.8	38.8
07 Aug	Eastern Pipistrelle	3a	J	F	N	6.1	36.1
07 Aug	Eastern Pipistrelle	3a	J	M	--	6.8	36.1
07 Aug	Big Brown Bat	3a	J	M	--	16.9	46.8
07 Aug	Little Brown Bat	4a	A	F	N	--	38.5
07 Aug	Little Brown Bat	3a	--	F	--	--	--

DATE	SPECIES	NET	AGE	SEX	REPRODUCTIVE STATUS	WEIGHT (GM)	LENGTH OF FOREARM (MM)
08 Aug	Little Brown Bat	6a	A	F	PL	7.4	39.6
08 Aug	Northern Bat	5b	J	M	--	6.3	46.7
08 Aug	Little Brown Bat	5b	A	M	--	8.1	37.7
08 Aug	Big Brown Bat	6a	A	F	PL	23.9	45.2
08 Aug	Little Brown Bat	5b	A	F	N	7.1	38.7
08 Aug	Big Brown Bat	6a	A	F	PL	19.9	50.4
08 Aug	Big Brown Bat	8a	A	F	PL	22.0	47
08 Aug	Big Brown Bat	8a	A	M	--	23.8	45
08 Aug	Big Brown Bat	8a	A	F	PL	22.0	44
08 Aug	Big Brown Bat	7b	A	F	PL	22.0	44
08 Aug	Northern Bat	8a	J	M	--	7.0	37
08 Aug	Eastern Pipistrelle	8a	J	F	N	6.3	37
08 Aug	Northern Bat	8b	J	M	--	6.5	37

Age: A = Adult; J = Juvenile
Sex: M = Male; F = Female
Reproductive State: N = Nilliparous; PL = Post-Lactating; -- = No data

SECTION 6 – MANAGEMENT RECOMMENDATIONS

Due to the fact that Indiana bats may still use potential habitat on this site, we recommend a conservative approach to the development of this site. The following precautions are recommended for proposed development on this site to avoid incidental, indirect, or direct take of Indiana bats as defined in the Endangered Species Act.

6.1 MINIMIZE IMPACTS TO MATURE FORESTED HABITATS

We recommend minimizing clearing of mature forest areas with open understory to avoid impacting the remaining potential roosting, foraging, and travel habitat of Indiana bats on the Silo Ridge property. This will leave potential habitat intact for Indiana bats. The site contains extensive mixed age forest that is very cluttered in the understory, and is probably not suitable habitat for Indiana bats. Clearing of these areas will not likely affect Indiana bats.

6.2 SEASONAL RESTRICTION ON FOREST CLEARING

Proposed forest clearing should be conducted between the end of October and the end of March to avoid cutting trees in which Indiana bats might possibly be roosting. This will avoid direct take of bats.

6.3 MINIMIZE AERIAL AND AQUATIC CHEMICAL APPLICATIONS

Future golf course maintenance should consider avoiding or minimizing aerial spraying of insecticides and application of herbicides, dyes, or other pesticides to water bodies on the site. Such chemical application can impact insect populations, which are the food source of bats. Further, such chemicals may indirectly affect bats through ingestion of water or insects, and may biomagnify in bats, causing adverse impacts to bats.

SECTION 7 – CONCLUSION

Using procedures outlined in the *Indiana Bat Draft Recover Plan* (USFWS, 2007), this survey resulted in the capture of 30 bats, representing 5 species on the Silo Ridge property. No Indiana bats were captured, however. While no records exist for Indiana bat roosts on the site in the past, appropriate habitat for Indiana bat roosting, foraging, and travel occurs on the site, and the site falls within the seasonal migratory range of several known Indiana bat hibernacula. As a result, we conclude that the site does contain potential habitat for the Indiana bat, and precautions should be taken in developing the property to avoid direct or incidental take of Indiana bats. Recommended precautions to avoid the take of Indiana bats include protection and avoidance of appropriate habitat, seasonal restrictions on clearing, and minimization of pesticide applications. These precautions should avoid direct, or incidental take of Indiana bats at the Silo Ridge site.

SECTION 8 - REFERENCES

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Attachment E

Phase 1 & 2 Bog Turtle Surveys
Silo Ridge Country Club – Portions of Wetland "L"
Town of Amenia, Dutchess County, New York

Prepared for:

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July 2007

Phase 1 & 2 Bog Turtle Surveys
Silo Ridge Country Club – Portions of Wetland "L"
Town of Amenia, Dutchess County, New York

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Appendices

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1.0 Introduction

Bagdon Environmental was retained by The Chazen Companies to conduct Phase 1 and Phase 2 Surveys for the State listed *Endangered* and Federally listed *Threatened* bog turtle (*Clemmys muhlenbergii*) on Wetland "L" of the Silo Ridge Country Club site. The site is located in the Town of Amenia, Dutchess County, New York, as shown on the attached location map (Figure 1).

A Phase I habitat assessment of the site was conducted on April 3, 2007 pursuant to the "Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan" (dated May 15, 2001) and revisions dated April 2006 (attached as Appendix B). The purpose of the habitat assessment was to determine the suitability of the habitat onsite to support bog turtles.

The conditions of the site and vicinity are described in this report, relative to the quality of existing habitat and known occurrences of bog turtles in the area. The Phase I survey results were discussed with the New York State Department of Environmental Conservation (NYSDEC) Endangered Species Unit and Dr. Michael Klemens, consultant for the Town of Amenia and author of the "Recovery Plan" referenced above prepared for the U. S. Fish and Wildlife Service (USFWS). The results of the Phase 1 survey indicated that a relatively small area of the wetland (approximately 3 acres) was potentially suitable for bog turtles necessitating a Phase 2 survey.

2.0 Evaluation and Search Methods

2.1 Phase 1 Habitat Evaluation Methodology

The identification and evaluation of potential bog turtle habitat on the site was based on specific physical, biological and chemical characteristics described in the USFWS Recovery Plan and Section 3 of this report. In general, wetlands that are contiguous to or near known occupied sites should be evaluated thoroughly to determine bog turtle presence and potential use. A field survey conducted by a qualified biologist is required for a thorough site evaluation. The key components of bog turtle habitat are suitable hydrology, soils and vegetation. Habitat assessments should focus on emergent and mixed emergent/scrub-shrub wetlands due to the propensity of bog turtles to utilize open canopy wetlands in the spring. Adjacent forested wetlands are also evaluated if they contain suitable soils and hydrology.

In conducting this assessment, a Bagdon Environmental biologist traversed the site wetlands to determine if suitable bog turtle habitat conditions were present. Vegetation cover types and plant species composition were documented along with observed soil and hydrological conditions.

2.2 Resource Review

Resources reviewed prior to conducting the fieldwork (in addition to resources listed in the Reference Section) include the following:

- New York Natural Heritage Program (NYNHP) records of rare wildlife, plants, and significant habitats in the vicinity of the site.
- Site map and topographic survey (1"=100').
- Aerial photo (2004 True Color – Digital ortho-corrected)
- National Wetland Inventory maps
- Dutchess County Soil Survey
- NYSDEC Freshwater Wetland maps
- U.S.G.S. topographic map
- Endangered, Threatened, and Special Concern Species of NYS (ECL Section 11-0535)
- Federal Endangered and Threatened Wildlife and Plants (50 CFR 17.11 and 17.12).

2.3 Agency Contacts

The following people were contacted to discuss the potential for bog turtles to occur onsite:

- Alvin A. Breisch, NYSDEC - Senior Wildlife Biologist (Endangered Species Unit Reptile and Amphibian Specialist)
- Dr. Michael Klemens - consultant for the Town of Amenia and author of the USFWS Recovery Plan.

Bagdon Environmental met with Alvin Breisch of the NYSDEC Endangered Species Unit on April 13, 2007 to discuss the known records of bog turtles in the area and to review Phase I site assessment of the site. Site conditions were discussed in detail including approximately 40 site photos, aerial photographs and topographic maps. The approximate limits of the Phase 2 survey were discussed during this meeting and also by telephone with Dr. Klemens.

2.4 Phase 2 Search Protocol and Methodology

The following search protocol was utilized for completing the bog turtle surveys in the designated survey area identified in the Phase I bog turtle assessment:

- Conduct searches on at least four (4) separate site visits within the period of April 15 to June 15. Surveys conducted in May will be done at least three days apart.
- Each site visit will entail four (4) biologists searching (random and transect search) over a 1-day period with an average search effort of 18 person hours/day (4 days) for a total search effort of approximately 72 person hours. (Note: Required search time is 48 to 72 person hours, based upon a minimum of 4-6 person hours/acre of designated habitat/visit with 4 visits minimum.)

- Searches will be conducted under favorable weather conditions (air temperature >55° F to maintain the validity of the survey effort. Surveys may be done when it is sunny or cloudy. Surveys can be conducted during and after light rain, provided air temperatures are>65° F.
- Surveys will be conducted within the period of one hour after sunrise and one hour prior to sunset.
- Searches will be supervised by Senior Ecologist Norbert Quenzer, possessor of a NYSDEC Scientific Collector License for bog turtles.
- The site contains approximately 3.0± acres of emergent and mixed emergent scrub-shrub wetland along with suitable forested wetland that constitutes potential bog turtle habitat for nesting and thermoregulation. Based on the Phase I bog turtle assessment, most of the project wetlands do not constitute suitable habitat. Therefore, most of the search effort will focus on the areas of the site identified as potential bog turtle habitat. Forested wetlands adjacent to the proposed search area on the site will be searched to a lesser degree due to the propensity of bog turtles to utilize open canopy areas in the spring.
- Transect and random search methods will be utilized with GPS tracking during all searches (to facilitate a documented record of search).
- Any bog turtle found during the surveys will be appropriately documented including photographed, marked (shell-notch) and pertinent information recorded (sex, age, carapace length and width, weight and abnormalities). All locations of observed turtle(s) will be mapped using a sub-meter hand-held GPS.

The site was surveyed using standard techniques in the Recovery Plan and 2006 Revisions. These include traversing the site using visual and tactile search methods. The tactile search effort was enhanced by use of small hand-held rakes that helped facilitate searching under tussocks and other vegetation. These rakes also proved useful in exploring exposed muck areas, sediments and algae pools.

2.5 Phase 2 Search Personnel

Norbert Quenzer Jr.- Bagdon Environmental
Vice President/Senior Ecologist – Supervising Phase 2 Surveys

David B. Tompkins – The Chazen Companies
Senior Director, Environmental & Ecological Services

Steven A. Finch – The Chazen Companies
Wetland Scientist/Biologist

Jason F. Tourscher – The Chazen Companies
Biologist/Wetland Scientist

David J. Griggs - The Chazen Companies

Randy Stechert – The Chazen Companies

3.0 Bog Turtle Status and Habitat Requirements

Bog turtle fact sheets, prepared by the NYSDEC and USFWS, are attached as Appendix A. These fact sheets present some of the basic information on the bog turtle including its description, distribution, seasonal activities and habitat requirements. More specific information is contained in the references listed at the end of this report.

In summary, the bog turtle is considered by many to be the rarest turtle species in North America. It is currently listed as endangered in New York State and threatened throughout its range by the U.S. Fish and Wildlife Service. Extant populations in New York State occur principally in Dutchess, Columbia, Putnam and Orange Counties.

Habitat destruction and illegal collecting have decimated many historical bog turtle sites. These factors, combined with a disjunct distribution in many areas and a low reproductive capacity, threaten the bog turtle with extinction throughout its range. The USFWS has prepared a *Bog Turtle Recovery Plan* that aids agency personnel in protecting known sites throughout the New York State and other portions of its range. Cooperative agreements with landowners through conservation easements or land purchase are paramount to protecting the bog turtle.

The New York Natural Heritage Program (NYNHP) assigns the rarity rank of G3S2 with the following explanation of ranks:

> G3 = Either rare and local throughout its range (21 to 100 occurrences), or found locally (even abundantly at some of its locations) in a restricted range (e.g. a physiographic region), or vulnerable to extinction throughout its range because
> of other factors.
>
> S2 = Typically 6 to 20 occurrences, few remaining individuals, acres, or miles of stream, or factors demonstrably making it very vulnerable in New York State.

Bog turtles are usually found in association with fens. Fens are wetlands dominated by herbaceous vegetation that receive calcareous groundwater discharge through seepage and small streams (rivulets). These wetlands typically contain deep muck soils needed for predator escape, aestivation during hot weather and winter hibernation. Equally important is the presence of elevated hummocks of sphagnum moss or emergent vegetation, such as tussock sedge (*Carex stricta*), for thermoregulation, egg laying and incubation in the spring. Other habitats where bog turtles are found include wet meadows, cow pastures, shrub swamps and forested wetlands with emergent wetland

openings. As with fens, these wetlands usually have small rivulets fed by groundwater, deep muck soils and emergent vegetation with exposure to the sun.

4.0 Site Description

Bog turtles have been documented in the general area of the site by the NYSDEC, however no bog turtles are known to occur on or adjacent to the site. Due to the potential for illegal collection and destruction of bog turtle habitat, the exact location of known sites reviewed with the NYSDEC Endangered Species Unit is not presented in this report.

Much of the site is developed as an existing golf course with undeveloped areas of mature forest, successional forest, old-field, mowed areas and wetland. Wetlands onsite include Palustrine (USFWS Classification, Cowardin, et. al.) forested wetland, emergent wetland (*Phragmites australis*/*Lythrum salicaria* dominated), shrub/scrub wetland and open water. A composite list of plant and wildlife species observed in the wetland during Bagdon Environmental's field surveys is attached as Appendix C. Photographs of the site are included as Appendix D.

It appears that the study area (wetland "L") has been disturbed extensively by water level alterations, nutrient loading and possible contamination. Sources of these disturbances include construction and maintenance Route 22; storm water runoff from Route 22; former quarry operations; periodic beaver impoundment; historical ditching of the wetland; golf course runoff and an adjacent Superfund site which is known to have discharged PCBs into Wetland L.

The results of the Phase 1 survey indicated that a crescent shaped area along the northern and western edges of the wetland contained some of the components of bog turtle habitat including mucky soils, spring-fed rivulets and open emergent and scrub-shrub cover types. Several small open water areas are present along the edge of the wetland with *Chara* sp. indicating calcareous seepage. A few clumps of shrubby cinquefoil (*Potentilla fruiticosa*) were observed, however, there were no other strong calciphites present that are typical of fens. A fen in the Amenia area, known to contain bog turtles, was visited on April 3, 2007 to observe the condition of calciphites such as grass-of-parnassus (*Parnassia glauca*) and shrubby cinquefoil. These species were easily recognized at the time. Even though some of the calcareous plants were present, the overall character of the wetland complex onsite is not representative of a calcareous fen, the optimal habitat of bog turtles.

The forested wetland in the western portion of the wetland complex has some openings in the canopy and deep mucky soils with hummocks and extensive groundwater discharge (seepage). Sphagnum covered hummocks were also common throughout the forested wetland. These areas were included in the search area shown in Figure 2.

Beyond the edge of the crescent shaped study area, the water levels increase significantly and most of the interior wetland is dominated by *Phragmites australis* and *Lythrum salicaria*. Several large areas of open water are present with dense growths of filamentous algae. These areas were not deemed suitable habitat and were excluded from the Phase 2 search.

Common woody species in the forested wetland include red maple, American elm (*Ulmus americana*), red ash (*Fraxinus pennsylvanicus*), highbush blueberry (*Vaccinium corymbosum*), spicebush (*Lindera benzoin),* winterberry holly (*Ilex verticillata)*, and northern arrowwood (*Viburnum recognitum*). Examples of herbaceous species in the forested wetlands include cinnamon fern (*Osmunda cinnamomea*), sensitive fern (*Onoclea sensibilis*), tussock sedge (*Carex stricta*), calico aster (*Aster lateriflorus*), rough-stemmed goldenrod (*Solidago patula*), turtlehead (*Chelone glabra*) and skunk cabbage.

The scrub-shrub wetland is characterized by silky dogwood, gray dogwood, northern arrowwood, speckled alder (*Alnus rugosa*), elderberry (*Sambucus canadensis*), and willow (*Salix* sp.).

The emergent wetlands contain purple loosestrife, cattail (*Typha* sp.), reed canary grass (*Phalaris arundinacea*), Phragmites, sedges (*Carex stipata, C. crinita*, *C. stricta*, and *C. vulpinoidea*), soft rush (*Juncus effusus*), green bulrush (*Scirpus atrovirens*), giant goldenrod (*Solidago gigantea*), sensitive fern, arrowwood, and iris (*Iris versicolor*). Phragmites and purple loosestrife are present in most of the emergent areas in the form of dense, monotypic stands.

5.0 Summary of Findings and Conclusions

Only a small portion of the wetland complex has potentially suitable habitat for bog turtles. Most of the wetland complex appears to be disturbed as a result of a variety of surrounding land uses both onsite and off-site, as evidenced by the dominance of invasive plant species. The dominance of invasive species severely reduces the overall habitat suitability for bog turtles due to the height and density of the plants. The canopy created by these species shades out sunlight and the plant density restricts movement. Given the highly degraded conditions and low habitat suitability of most of the wetland complex, bog turtles are very unlikely to be present.

Based on Phase 1 and Phase 2 surveys and discussions with NYSDEC personnel, Bagdon Environmental presents the following conclusions and observations:

- Most of the wetland complex contiguous with the site consists of emergent wetlands dominated by dense stands of invasive species (*Phragmites australis* and *Lythrum salicaria*) that developed following hydrological alteration and nutrient enrichment

from storm water and other sources noted in this report. These areas do not constitute suitable bog turtle habitat.

- A crescent shaped area in the north and western edge of the wetland contains some of the habitat components for bog turtles, however it does not represent fen conditions known to be the optimal bog turtle habitat. This area constituted the primary search area of the Phase 2 survey.

- No bog turtles were found during the Phase 2 surveys, nor is there any record of bog turtles on or adjacent to the site. It is very unlikely that bog turtles inhabit the site based on the habitat assessment and extensive searches conducted this spring. However, on the remote chance that bog turtles do inhabit the wetlands it is important to avoid further degrading the wetland hydrology and water quality, especially in the areas comprising the Phase 2 search area.

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Table 1
Phase 2 Search Effort Summary

Search Dates	Surveyors [1]	Search Times	Search Hours (Person Hours)
4-24-07	NQ, DT, SF, RS	10:45 – 4:45	6.0 X 4 = 24 hrs
5-4-07	NQ, DT, SF, RS	10:15 – 3:45	5.5 X 4 = 22 hrs
5-10-07	NQ, SF, JT, DG	10:45 – 3:45	5.0 X 4 = 20 hrs
6-1-07	NQ, DT, SF, JT, MK	10:00 – 1:30	3.5 X 5 = 17.5 hrs
			Total Search Hours = 83.5

[1] NQ = Norbert Quenzer
DT = David Tompkins
SF = Steven Finch
DG = David Griggs
RS = Randy Stechert
JT = Jason Tourcher
MK = Michael Klemens

Table 2
Weather Conditions - Phase 2

Date	Air Temp	Water Temp	Substrate Temp	Cloud Cover	Wind Speed
4-24-07	65 - 70°F	51 - 53°F	47°F	< 25%	5-10 mph w/20 mph gusts
5-4-07	60 – 70°F	54°F	48°F	< 25%	5-15 mph
5-10-07	77 – 80°F	66°F	54°F	< 25%	0-10 mph
6-1-07	77 – 89°F	75°F	65°F	< 25%	0-5 mph

NEW YORK STATE
DEPARTMENT OF
ENVIRONMENTAL CONSERVATION

Bog Turtle Fact Sheet

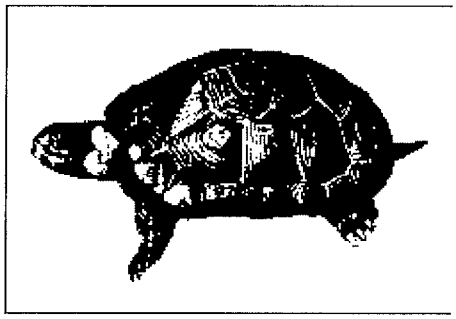
Bog Turtle

Clemmys muhlenbergii

New York Status: Endangered

Federal Status: Threatened

Description



The bog turtle is New York's smallest turtle, reaching a maximum length of 4.5 inches. It is one of seventeen species of turtles found in New York State, including marine turtles. A bright yellow or orange blotch on each side of its head and neck are a distinctive feature of this species. The body color is dark with an orange-red wash on the inside of the legs of some individuals. The carapace (upper shell) is domed and somewhat rectangular, often with prominent rings on the shell plates (scutes). In some older individuals, or those that burrow frequently in coarse substrates, the shell may become quite smooth and polished. Although generally black, the carapace is sometimes highlighted by a chestnut sunburst pattern in each scute. The plastron (lower shell) is hingeless, with a pattern of cream and black blotches. As with most turtles, the plastron of the male is slightly concave while the female's is flat.

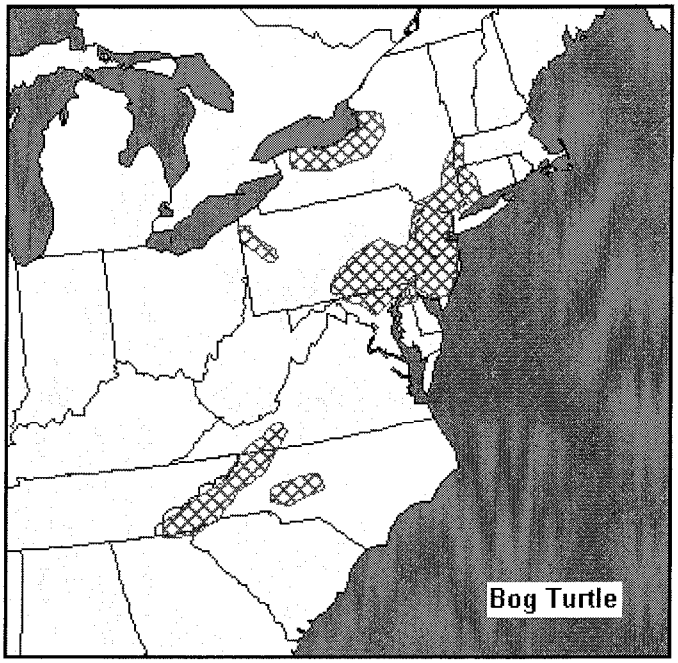
Life History

In New York, the bog turtle emerges from hibernation, often spent in an abandoned muskrat lodge or other burrow, by mid-April. In New York bog turtles often hibernate communally with other bog turtles and with spotted turtles (*Clemmys guttata*). Generally both the air and water temperature must exceed 50 degrees F for the turtle to become active. Mating occurs primarily in the spring but may also occur in the fall and may be focused in or near the hibernaculum (winter shelter). In early to mid-June, a clutch of two to four eggs is laid in a nest which is generally located inside the upper part of an unshaded tussock. The eggs hatch around mid-September. Some young turtles spend the winter in the nest, emerging the following spring. The adults enter hibernation in late October. Sexual maturity may be reached at eight years or as late as eleven. A bog turtle may live for more than 30 years.

Although generally very secretive, the bog turtle can be seen basking in the open, especially in

the early spring just after emerging from hibernation. It is an opportunistic feeder, eating what it can get, although it prefers invertebrates such as slugs, worms, and insects. Seeds, plant leaves, and carrion are also included in its diet.

Distribution and Habitat



The bog turtle is found in the eastern United States scattered in disjunct colonies from New York and Massachusetts south to southern Tennessee and Georgia. This is a semi-aquatic species, preferring habitat with cool, shallow, slow-moving water, deep soft muck soils, and tussock-forming herbaceous vegetation. In New York, the bog turtle is generally found in open, early successional types of habitats such as wet meadows or open calcareous boggy areas generally dominated by sedges (*Carex spp.*) or sphagnum moss. Like other cold-blooded or ectothermic species, it requires habitats with a good deal of solar penetration for basking and nesting. Plants such as purple loosestrife (*Lythrum salicaria*) and reed (*Phragmites australis*) can quickly invade such areas resulting in the loss of basking and nesting habitat.

Status

More than half of the 74 historic bog turtle locations in New York still contain apparently suitable habitat. Only one quarter of these sites, however, are known to support extant populations, primarily in southeastern New York.

The primary threats to this species are loss or degradation of habitat and illegal collecting. In New York, development and natural succession are the major threat to bog turtle habitat. As sites deteriorate, bog turtles normally move out of their old sites to new areas where fire, beavers agriculture or other causes have created an open wet meadow type habitat. Development, especially roads, residential, commercial and reservoir construction inhibits the species' ability to move to new, potential habitat. Consequently new populations are not being established as old sites deteriorate.

Collection of the bog turtle without a permit is prohibited in all states where it occurs. It was listed as threatened in 1997 by the U. S. Fish and Wildlife Service, and has been listed in

CITES Appendix I, (Convention of International Trade in Endangered Species) since 1975. Unfortunately, illegal collection still goes on threatening this long-lived, slow reproducing turtle.

Contamination by pesticides, agricultural run-off and industrial discharge may negatively affect the bog turtle and its habitat directly. Contaminates may also accumulate in or adversely affect the turtle's invertebrate food supply.

Management and Research Needs

Since 1976, the New York State Department of Environmental Conservation has been conducting field surveys of historic and potential bog turtle sites to document current populations and habitat suitability. Some currently inhabited bog turtle sites and some historic sites are under the ownership of the State or conservation organizations. Many of the best remaining sites are still in private ownership and efforts continue to acquire or otherwise protect theses areas.

Information is being gathered on reproductive potential, daily and seasonal movements, nesting and hibernation areas, and habitat use through the tracking of animals tagged with radio transmitters. Since the bog turtle is sensitive to habitat changes that are the result of natural succession, studies are underway that will monitor the responses of a bog turtle population to habitat manipulations.

Techniques for breeding and raising bog turtles in captivity have been developed and a study has begun to investigate the effectiveness of releasing young or adult turtles into the wild.

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Map adapted from Conant and Collins (1998),Ernst, Lovich and Barbour (1994) and Harding (1997)

Bog Turtle Project Review Fact Sheet
Hudson/Housatonic Recovery Unit
New York Field Office
February 2006

The following fact sheet is intended to provide information to assist with the review of projects which occur within the likely range of the bog turtle (*Clemmys muhlenbergii*) (within the Hudson/Housatonic Recovery Unit) within State of New York. The bog turtle is Federally-listed as threatened and State-listed as an endangered species.

Bog turtles prefer open canopy wetlands with soft, saturated soils such as fens or sedge meadows fed by seeps and springs of cold groundwater that has been in contact with calcium-rich bedrock or soils. In New York, bog turtles are very often found in or near rivulets having deep mucky substrate, but where above-surface water depths are very shallow – usually only a few inches deep at most. Plant species commonly associated with bog turtle habitats include tamarack (*Larix laricina*), cinquefoil (*Potentilla* spp.), alders (*Alnus* spp.), willows (*Salix* spp.), sedges (*Carex* spp.), sphagnum moss (*Sphagnum* sp.), jewelweed (*Impatiens capensis*), rice cut-grass (*Leersia oryzoides*), tearthumb (*Polygonum sagittatum*), arrow arum (*Peltandra virginica*), red maple (*Acer rubrum*), skunk cabbage (*Symplocarpus foetidus*), rushes (*Juncus* spp.), and bulrushes (*Scirpus* spp.).

The U.S. Fish and Wildlife Service (Service) recommends that an evaluation be completed of any existing wetland habitat that would be disturbed, directly or indirectly, by the project, and its potential to support the bog turtle (Phase 1 survey). Information on surveys can be found at http://www.fws.gov/northeast/nyfo/es/btsurvey.pdf.

The Service and New York State Department of Environmental Conservation (NYSDEC) should be sent a copy of the Phase 1 survey results for review and comment including a USGS topographic map indicating location of site; project design map, including location of wetlands and streams; color photographs of the site; surveyors name; date of visit; opinion on potential/not potential habitat; description of the hydrology, soils, and vegetation.

If the Phase 1 survey identifies any wetlands with potentially suitable habitat, an evaluation is needed to determine whether the proposed project will completely avoid all direct and indirect effects to the wetlands, in consultation with the Service and the NYSDEC. Information to assist with the evaluation of potential impacts on bog turtles can be found in Appendix A - Bog Turtle Conservation Zones of the Bog Turtle (*Clemmys muhlenbergii*) Northern Population Recovery Plan (U.S. Fish and Wildlife Service 2001) which can be found at http://www.fws.gov/northeast/nyfo/es/btconszone.pdf. If impacts cannot be avoided, a Phase 2 survey should be completed. The purpose of the Phase 2 survey is to determine the likely presence of bog turtles at the site in potentially suitable habitat. Please see detailed instructions regarding survey protocols at http://www.fws.gov/northeast/nyfo/es/btsurvey.pdf. Also, please contact this office before conducting any Phase 2 surveys.

Please note that the New York Field Office is currently developing a list of surveyors whom we have determined are capable of conducting both Phase 1 and Phase 2 surveys in New York. You can contact our office for a copy of the list in spring 2006.

The project's environmental documents should identify project activities that might result in adverse impacts to the bog turtle or their habitat. Information on any potential impacts and the results of any recommended habitat analyses or surveys for the bog turtle should be provided to this office and they will be used to evaluate potential impacts to the bog turtle or their habitat, and to determine the need for further coordination or consultation pursuant to the Endangered Species Act (ESA) (87 Stat. 884, as amended; 16 U.S.C. 1531 *et seq*.).

References:

U.S. Fish and Wildlife Service. 2001. Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan. Hadley, Massachusetts. 103 pp.

GUIDELINES FOR BOG TURTLE SURVEYS[1]

(revised April 2006)

RATIONALE

A bog turtle survey (when conducted according to these guidelines) is an attempt to determine presence or probable absence of the species; it does not provide sufficient data to determine population size or structure. Following these guidelines will standardize survey procedures. It will help maximize the potential for detection of bog turtles at previously undocumented sites at a minimum acceptable level of effort. Although the detection of bog turtles confirms their presence, failure to detect them does not absolutely confirm their absence (likewise, bog turtles do not occur in all appropriate habitats and many seemingly suitable sites are devoid of the species). Surveys as extensive as outlined below are usually sufficient to detect bog turtles; however, there have been instances in which additional effort was necessary to detect bog turtles, especially when habitat was less than optimum, survey conditions were less than ideal, or turtle densities were low.

PRIOR TO CONDUCTING ANY SURVEYS

If a project is proposed to occur in a county of known bog turtle occurrence (see attachment 1), contact the U.S. Fish and Wildlife Service (Service) and/or the appropriate State wildlife agency (see attachment 2). They will determine whether or not any known bog turtle sites occur in or near the project area, and will determine the need for surveys.

< If a wetland in or near the project area is *known* to support bog turtles, measures must be taken to avoid impacts to the species. The Service and State wildlife agency will work with federal, state and local regulatory agencies, permit applicants, and project proponents to ensure that adverse effects to bog turtles are avoided or minimized.

< If wetlands in or adjacent to the project area are *not* known bog turtle habitat, conduct a bog turtle habitat survey (Phase 1 survey) if:

1. The wetland(s) have an emergent and/or scrub-shrub wetland component, or are forested with suitable soils and hydrology (see below), *and*

2. Direct and indirect adverse effects to the wetland(s) cannot be avoided.

   See *Bog Turtle Conservation Zones*[2] for guidance regarding activities that may affect bog turtles and their habitat. In addition, consult with the Fish and Wildlife Service and/or appropriate State wildlife agency to definitively determine whether or not a Phase 1 survey will be necessary.

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[1] These guidelines are a modification of those found in the final "Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan" (dated May 15, 2001). Several minor revisions were made to facilitate survey efforts and increase searcher effectiveness. As additional information becomes available regarding survey techniques and effectiveness, these survey guidelines may be updated and revised. Contact the Fish and Wildlife Service or one of the state agencies listed in Attachment 1 for the most recent version of these guidelines.

[2] See Appendix A of the "Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan" (dated May 15, 2001).

BOG TURTLE HABITAT SURVEY (= Phase 1 survey)

The purpose of this survey is to determine whether or not the wetland(s) are *potential* bog turtle habitat. These surveys are performed by a recognized, qualified bog turtle surveyor (contact the Service or the appropriate State wildlife agency to receive a list of recognized, qualified bog turtle surveyors). The following conditions and information apply to habitat surveys.

< Surveys can be performed any month of the year (except when significant snow and/or ice cover is present). This flexibility in conducting Phase 1 surveys allows efforts during the Phase 2 survey window to be spent on wetlands most likely to support bog turtles (*i.e.*, those that meet the criteria below).

< Potential bog turtle habitat is recognized by three criteria *(not all of which may occur in the same portion of a particular wetland*):

1. **Suitable hydrology**. Bog turtle wetlands are typically spring-fed with shallow surface water or saturated soils present year-round, although in summer the wet area(s) may be restricted to near spring head(s). Typically these wetlands are interspersed with dry and wet pockets. There is often subsurface flow. In addition, shallow rivulets (less than 4 inches deep) or pseudo-rivulets are often present.

2. **Suitable soils**. Usually a bottom substrate of permanently saturated organic or mineral soils. These are often soft, mucky-like soils (this does not refer to a technical soil type); you will usually sink to your ankles (3-5 inches) or deeper in muck, although in degraded wetlands or summers of dry years this may be limited to areas near spring heads or drainage ditches. In some portions of the species' range, the soft substrate consists of scattered pockets of peat instead of muck.

3. **Suitable vegetation**. Dominant vegetation of low grasses and sedges (in emergent wetlands), often with a scrub-shrub wetland component. Common emergent vegetation includes, but is not limited to: tussock sedge (*Carex stricta*), soft rush (*Juncus effusus*), rice cut grass (*Leersia oryzoides*), sensitive fern (*Onoclea sensibilis*), tearthumbs (*Polygonum* spp.), jewelweeds (*Impatiens* spp.), arrowheads (*Saggitaria* spp.), skunk cabbage (*Symplocarpus foetidus*), panic grasses (*Panicum* spp.), other sedges (*Carex* spp.), spike rushes (*Eleocharis* spp.), grass-of-Parnassus (*Parnassia glauca*), shrubby cinquefoil (*Dasiphora fruticosa*), sweet-flag (*Acorus calamus*), and in disturbed sites, reed canary grass (*Phalaris arundinacea*) or purple loosestrife (*Lythrum salicaria*). Common scrub-shrub species include alder (*Alnus spp*.), red maple (*Acer rubrum*), willow (*Salix spp*.), tamarack (*Larix laricina*), and in disturbed sites, multiflora rose (*Rosa multiflora*). Some forested wetland habitats are suitable given hydrology, soils and/or historic land use. These forested wetlands include red maple, tamarack, and cedar swamps.

Suitable hydrology and soils are the critical criteria (*i.e.*, the primary determinants of potentially suitable habitat).

< Suitable hydrology, soils and vegetation are necessary to provide the critical wintering sites (soft muck, peat, burrows, root systems of woody vegetation) and nesting habitats (open areas with tussocky or hummocky vegetation) for this species. It is very important to note,

however, that one or more of these criteria may be absent from portions of a wetland or wetland complex supporting bog turtles. Absence of one or more criteria does not preclude bog turtle use of these areas to meet important life functions, including foraging, shelter and dispersal.

< If these criteria (suitable soils, vegetation and hydrology) are present in the *wetland*, then the *wetland* is considered to be potential bog turtle habitat, regardless of whether or not that portion of the wetland occurring within the project boundaries contains all three criteria. If the *wetland* is determined to be potential habitat and the project will directly or indirectly impact *any portion* of the wetland (see *Bog Turtle Conservation Zones*), then either:

  < Completely avoid all direct and indirect effects to the wetland, in consultation with the Service and appropriate State wildlife agency, OR

  < Conduct a Phase 2 survey to determine the presence of bog turtles.

< The Service and appropriate State wildlife agency (see list) should be sent a copy of survey results for review and comment including: a USGS topographic map indicating location of site; project design map, including location of wetlands and stream and delineation of wetland type (PEM, PSS, PFO, POW) and "designated survey areas"[3]; color photographs of the site; surveyor's name; date of visit; opinion on potential/not potential habitat; a description of the hydrology, soils, and vegetation. A phase 1 report template and field form are available from the States and Service.

BOG TURTLE SURVEY (= Phase 2 survey)

If the wetland(s) are identified as potential bog turtle habitat (see Phase 1 survey), and direct and indirect adverse effects cannot be avoided, conduct a bog turtle survey in accordance with the specifications below. Note that this is *not* a survey to estimate population size or structure; a long-term mark/recapture study would be required for that.

Prior to conducting the survey, contact the appropriate State agency (see attached list) to determine whether or not a scientific collector's permit valid for the location and period of the survey will be required.

The Phase 2 survey will focus on the areas of the wetland that meet the soils, hydrology and vegetation criteria, as defined under the Phase 1 survey guidelines. Those areas that meet the criteria are referred to as "designated survey areas" for Phase 2 and Phase 3 survey purposes.

1. Surveys should only be performed during the period from April 15-June 15. For the Lake Plain Recovery Unit (see Recovery Plan), surveys should only be performed during the period from May 1 to June 30. This coincides with the period of greatest annual turtle activity (spring emergence and breeding) and before vegetation gets too dense to accurately survey. While turtles may be found outside of these dates, a result of no turtles would be considered inconclusive. Surveys beyond June also have a higher likelihood of disruption or destruction of nests or newly hatched young.

[3] "Designated survey areas" are those areas of the wetland that meet the soils, hydrology and vegetation criteria for potential bog turtle habitat. These areas may occur within the emergent, scrub-shrub or forested parts of the wetland.

2. Ambient air temperature at the surface in the shade should be ≥ 55° F.

3. Surveys should be done during the day, at least one hour after sunrise and no later than one hour before sunset.

4. Surveys may be done when it is sunny or cloudy. In addition, surveys may be conducted during and after light rain, provided air temperatures are ≥ 65° F.

5. At least one surveyor must be a recognized qualified bog turtle surveyor[4], and the others should have some previous experience successfully conducting bog turtle surveys or herpetological surveys in wetlands. To maintain survey effort consistency and increase the probability of encountering turtles, the same surveyors should be used for each wetland.

6. A minimum of four (4) surveys per wetland site are needed to adequately assess the site for presence of bog turtles. At least two of these surveys must be performed in May. From April 15 to April 30, surveys should be separated by six or more days. From May 1 to June 15, surveys should be separated by three or more days. The shorter period between surveys during May and June is needed to ensure that surveys are carried out during the optimum window of time (*i.e.*, before wetland vegetation becomes too thick).

   Note that bog turtles are more likely to be encountered by spreading the surveys out over a longer period. For example, erroneous survey results could be obtained if surveys were conducted on four successive days in late April due to possible late spring emergence, or during periods of extreme weather because turtles may be buried in mud and difficult to find.

   Because this is solely a presence/absence survey, survey efforts at a particular wetland may cease once a bog turtle has been found.

7. Survey time should be at least four (4) to six (6) person-hours per acre of designated survey area per visit. Additional survey time may be warranted in wetlands that are difficult to survey or that have high quality potential habitat. The designated survey area includes all areas of the wetland where soft, mucky-like soils are present, regardless of vegetative cover type. This includes emergent, scrub-shrub, and forested areas of the wetland.

   If the cover is too thick to effectively survey using Phase 2 survey techniques alone (*e.g.*, dominated by multiflora rose, reed canary grass, *Phragmites*), contact the Service and State wildlife agency for guidance on Phase 3 survey techniques (trapping) to supplement the Phase 2 effort. In addition, Phase 3 (trapping) surveys may also be warranted if the site is in the Lake Plain-Prairie Peninsula Recovery Unit. Check with the Service or State wildlife agency for further guidance.

[4] Searching for bog turtles and recognizing their habitat is a skill that can take many months or years of field work to develop. This level of expertise is necessary when conducting searches in order to ensure that surveys are effective and turtles are not harmed during the survey (*e.g.*, by stepping on nests). Many individuals that have been recognized as qualified to conduct bog turtle surveys obtained their experience through graduate degree research or employment by a state wildlife agency. Others have spent many years actively surveying for bog turtles as amateur herpetologists or consultants.

8. Walk quietly through the wetland. Bog turtles will bask on herbaceous vegetation and bare ground, or be half-buried in shallow water or rivulets. Walking noisily through the wetland will often cause the turtles to submerge before they can be observed. Be sure to search areas where turtles may not be visible, including under mats of dead vegetation, shallow pools, underground springs, open mud areas, vole runways and under tussocks. Do not step on the tops of tussocks or hummocks because turtle nests, eggs and nesting microhabitat may be destroyed. Both random opportunistic searching and transect surveys should be used at each wetland.

   The following survey sequence is recommended to optimize detection of bog turtles:

   - Semi-rapid walk through the designated survey area using visual encounter techniques.

   - If no bog turtles are found during visual survey, while walking through site identify highest quality habitat patches. Within these highest quality patches, begin looking under live and dead vegetation using muddling and probing techniques.

   - If still no bog turtles are found, the rest of the designated survey area should be surveyed using visual encounter surveys, muddling and probing techniques.

9. Photo-documentation of each bog turtle located will be required; a macro lens is highly recommended. The photos should be in color and of sufficient detail and clarity to identify the bog turtle to species and individual. Therefore, photographs of the carapace, plastron, and face/neck markings should be taken of each individual turtle. Do not harass the turtle in an attempt to get photos of the face/neck markings; if gently placed on the ground, most turtles will slowly extend their necks if not harassed. If shell notching is conducted, do the photo-documentation after the notching is done.

10. The following information should be collected for each bog turtle: sex, carapace length-straight line and maximum length, carapace width, weight, and details about scars/injuries. Maximum plastron length information should also be collected to differentiate juveniles from adults as well as to obtain additional information on recruitment, growth, and demography.

11. Each bog turtle should be marked (*e.g.*, notched, PIT tagged) in a manner consistent with the requirements of the appropriate State agency and/or Service. Contact the appropriate State wildlife agency prior to conducting the survey to determine what type of marking system, if any, should be used.

12. All bog turtles must be returned to the point of capture as soon as possible on the same day as capture. They should only be held long enough to identify, measure, weigh, and photograph them, during which time their exposure to high temperatures must be avoided. No bog turtles may be removed from the wetland without permission from the Service and appropriate State agency.

13. The Fish and Wildlife Service and appropriate State agency should be sent a copy of survey results for review and concurrence, including the following: dates of site visits; time spent

per designated survey area per wetland per visit; names of surveyors; a site map including wetlands and delineations of designated survey areas; a table indicating the size of each wetland, the designated survey area within each wetland, and the survey effort per visit; a description of the wetlands within the project area (*e.g.*, acreage, vegetation, soils, hydrology); an explanation of which wetlands or portions of wetlands were or were not surveyed, and why; survey methodology; weather per visit at beginning and end of survey (air temperature, wind, and precipitation); presence or absence of bog turtles, including number of turtles found and date, and information and measurements specified in item 10 above; and other reptile and amphibian species found and date.

ADDITIONAL SURVEYS / STUDIES

Proper implementation of the Phase 2 survey protocol is usually adequate to determine species presence or probable absence, especially in small wetlands lacking invasive plant species. Additional surveys, however, may be necessary to determine whether or not bog turtles are using a particular wetland, especially if the Phase 2 survey results are negative but the quality and quantity of habitat are good and in a watershed of known occurrence. In this case, additional surveys (Phase 2 and/or Phase 3 (trapping) surveys), possibly extending into the following field season, may be recommended by the Service or appropriate State agency.

If bog turtles are documented to occur at a site, additional surveys/studies may be necessary to characterize the population (*e.g.*, number, density, population structure, recruitment), identify nesting and hibernating areas, and/or identify and assess adverse impacts to the species and its habitat, particularly if project activities are proposed to occur in, or within 300 feet of, wetlands occupied by the species.

Attachment 1

CONTACT AGENCIES - BY STATE

(April 2006)

STATE	FISH AND WILDLIFE SERVICE	STATE AGENCY
Connecticut	U.S. Fish and Wildlife Service New England Field Office 22 Bridge Street, Unit #1 Concord, NH 03301	Department of Environmental Protection Env. & Geographic Information Center 79 Elm Street, Store Floor, Hartford, CT 06106 *(info about presence of bog turtles in or near a project area)* Department of Environmental Protection Wildlife Division, Sixth Floor 79 Elm Street, Store Floor, Hartford, CT 06106 *(to get a Scientific Collectors Permit or determine what type of marking system to use)*
Delaware	U.S. Fish and Wildlife Service Chesapeake Bay Field Office 177 Admiral Cochrane Drive Annapolis, MD 21401	Nongame & Endangered Species Program Delaware Division of Fish and Wildlife 4876 Hay Point Landing Road Smyrna, DE 19977
Maryland	U.S. Fish and Wildlife Service Chesapeake Bay Field Office 177 Admiral Cochrane Drive Annapolis, MD 21401	Maryland Department of Natural Resources Wildlife & Heritage Division PO Box 68, Main Street Wye Mills, MD 21679
Massachusetts	U.S. Fish and Wildlife Service New England Field Office 22 Bridge Street, Unit #1 Concord, NH 03301	Division of Fisheries and Wildlife Dept. Fisheries, Wildlife and Env Law Enforcement Rt. 135 Westboro, MA 01581
New Jersey	U.S. Fish and Wildlife Service New Jersey Field Office 927 North Main Street, Bldg. D-1 Pleasantville, NJ 08232	New Jersey Division of Fish and Wildlife Endangered and Nongame Species Program 143 Van Syckels Road Hampton, NJ 08827
New York	U.S. Fish and Wildlife Service 3817 Luker Road Cortland, NY 13045	New York Natural Heritage Program Department of Environmental Conservation 700 Troy-Schenectady Road Latham, NY 12110-2400 *(info about presence of bog turtles in or near a project area)* NY Department of Environmental Conservation Special Licenses Unit 50 Wolf Road, Albany, NY 12233 *(for endangered species permit applications)*
Pennsylvania	U.S. Fish and Wildlife Service Pennsylvania Field Office 315 South Allen Street, Suite 322 State College, PA 16801	Natural Diversity Section Pennsylvania Fish and Boat Commission 450 Robinson Lane Bellefonte, PA 16823

Attachment 2

BOG TURTLE COUNTIES OF OCCURRENCE OR LIKELY OCCURRENCE[1]
(April 2006)

STATE	COUNTY	
Connecticut	Fairfield	Litchfield
Delaware	New Castle	
Maryland	Baltimore Carroll	Cecil Harford
Massachusetts	Berkshire	
New Jersey	Burlington Gloucester Hunterdon Middlesex Monmouth Morris	Ocean Salem Somerset Sussex Union Warren
New York	Albany Columbia Dutchess Genesee Orange Oswego Putnam	Seneca Sullivan Ulster Wayne Westchester
Pennsylvania	Adams Berks Bucks Chester Cumberland Delaware Franklin	Lancaster Lebanon Lehigh Monroe Montgomery Northampton Schuylkill York

[1] *This list is valid for one year from the date indicated. It may, however, be revised more frequently if new counties of occurrence are documented. Updates to this list are available from the Service upon request.*

Information was not supplied

Information was not supplied

BAGDON
environmental

NORBERT QUENZER JR.

EDUCATION

B.S., Forest Biology-Wildlife, 1979, State University of New York, College of Environmental Science and Forestry, Syracuse, NY.

A.S., Forest Management, 1977, Columbia-Greene Community College, Hudson, NY.

EMPLOYMENT HISTORY

Vice President/Senior Ecologist - Bagdon Environmental, Delmar, New York. January 1986 to present.

Mr. Quenzer is responsible for managing and conducting wetland studies at Bagdon Environmental. Duties include state and federal wetland delineation; mitigation and restoration plan development; permit application preparation; client/regulatory liaison; and expert testimony. As Senior Ecologist, Mr. Quenzer conducts and supervises ecological evaluations; wildlife/vegetation inventory and analysis; endangered species surveys; and habitat evaluations. Mr. Quenzer has been principal investigator and supervisor of hundreds of wetland and ecological projects during his tenure at Bagdon Environmental.

Interpretive Naturalist - New York State Department of Environmental Conservation, Albany, New York. 1985.

Developed and presented educational programs on the ecological, cultural and historic attributes of the New York State Forest Preserve.

Environmental Biologist - Jason M. Cortell and Associates, Inc., Gladstone, New Jersey. 1982 to 1985.

Primary responsibilities were wetland assessment and wildlife/vegetation inventory and analysis. Additional duties included: aquatic vegetation surveys, macroinvertebrate analysis, electrofishing, field monitoring and analysis of water quality, air quality, noise and meteorological data.

Wildlife Research Assistant - Cornell University, Department of Natural Resources, Highland, New York. 1980 to 1981.

Organized and directed field studies for pine vole (*Microtus pinetorum*) control project in Hudson Valley apple orchards.

PROFESSIONAL MEMBERSHIPS

Association of State Wetland Managers
Ecological Society of America
New York State Wetlands Forum - Chair (1994-1996) and Founding Member
Society of Wetland Scientists – Professional Certification Standards Committee
The Wildlife Society

PROFESSIONAL CERTIFICATION AND TRAINING

Certified Professional Wetland Scientist, Society of Wetland Scientists
Certified Ecologist, Ecological Society of America
Certified Wildlife Biologist, The Wildlife Society
Certified Habitat Evaluation Procedures, U.S. Fish and Wildlife Service
Federal Wetland Identification and Delineation Techniques

PROFESSIONAL LICENSES

New York State Department of Environmental Conservation

- Scientific Collectors License - #LCP01-183
- Endangered Species amendment for Bog Turtles (*Clemmys muhlenbergii)* in Dutchess, Orange, Putnam and Westchester Counties

New York State Department of Environmental Conservation
Division of Fish, Wildlife and Marine Resources - Special Licenses Unit
625 Broadway
Albany, NY 12233-4752
Phone Number (518) 402-8985
Fax Number: (518) 402-8925

NEW YORK STATE FISH AND WILDLIFE LICENSE

License Type: Endangered/Threatened Species: General

License Number: 117

Licensee:

NORBERT QUENZER, JR.
BAGDON ENVIRONMENTAL
25 DELAWARE AVENUE
DELMAR, NY 12054

Fee Amount: $.00
Effective Date: 03/28/2007
Expiration Date: 03/31/2008
Region: 4 County: ALBANY
Home Phone Number: (518) 475-0252
Business Phone Number: (518) 439-8588

DOB: 4/23/1957

Statutory Authority:

ECL 11-0535 6NYCRR Part 182 6NYCRR Part 175

Conditions:

1. A. Please read all license conditions BEFORE conducting any activity pursuant to this license.

B. The licensee assumes all liability and responsibility for any activities conducted under the authority of this license or any actions resulting from activities authorized by the license.

C. This license may be revoked for any of the following reasons:
i. licensee provided materially false or inaccurate statements in his or her application, supporting documentation or on required reports;
ii. failure by the licensee to comply with any terms or conditions of this license;
iii. licensee exceeds the scope of the purpose or activities described in his or her application for this license;
iv. licensee fails to comply with any provisions of the NYS Environmental Conservation Law, any other State or Federal laws or regulations of the Department directly related to the licensed activity;
v. licensee submits a check, money order or voucher for this license or application for this license that is subsequently returned to the Department for insufficient funds or nonpayment after the license has been issued.

D. The renewal of this license is the responsibility of the licensee. This license is deemed expired on the date of expiration listed on the license unless otherwise notified by the Department.

E. Direct all questions concerning this license to the Special Licenses Unit (518) 402-8985.

New York State Department of Environmental Conservation
Division of Fish, Wildlife and Marine Resources - Special Licenses Unit
625 Broadway
Albany, NY 12233-4752
Phone Number (518) 402-8985
Fax Number: (518) 402-8925

NEW YORK STATE FISH AND WILDLIFE LICENSE

Conditions:

2. A. The licensee and/or designated agents are authorized to collect and possess bog turtles (Clemmys muhlenbergii), for scientific purposes. Collected turtles are to be released at the point of capture as soon as possible following collection of biological information. Turtles may not be removed from the field without prior permission from the Endangered Species Unit (ESU) at (518)-402-8855.

B. Turtles may be captured by hand capture or by use of turtle traps in the New York counties of Dutchess, Orange, Putnam, and Westchester. If fixed traps are employed in the capture of turtles, they must be checked no less frequently than once each 24 hours while in operation. Fixed traps must be tagged with the name and address of the licensee.

C. Turtles may be marked in the field by file notching of marginal scutes. If notch codes are to be applied to collected turtles, the licensee will first discuss with the ESU the system of codes to be used. All notch codes actually applied to turtles by the licensee are to be reported to the ESU. The licensee will take care to avoid obscuring any prior/existing markings on previously marked turtles.

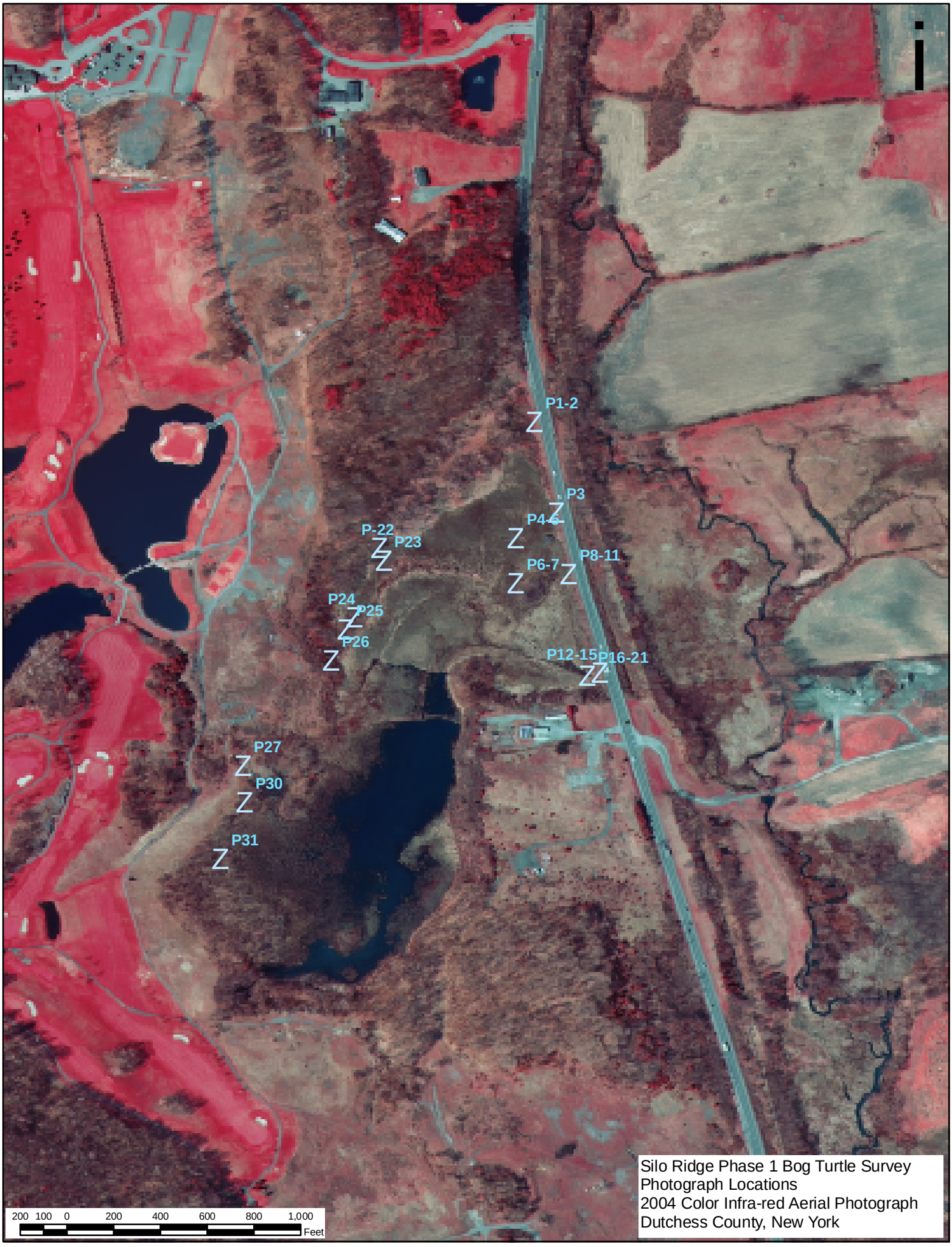
D. The licensee may designate agents to conduct activities authorized by this license. Such designations must be in writing and the licensee must maintain an accurate list of agents designated pursuant to this license and such list must be on file with the NYS DEC Special Licenses Unit. The licensee is responsible for all actions taken by designated agents under this license.

E. This license is not a license to trespass and the licensee and/or designated agents must obtain permission from the appropriate landowner prior to conducting activities authorized pursuant to this license.

F. The licensee and/or designated agents shall notify the appropriate Regional Environmental Conservation Officer at least 48 hours prior to any collecting activity.

G. The licensee shall file with the department on or before the expiration date of this license a report of all activities conducted pursuant to this license during the preceding calendar year.

Phase 2 Bog Turtle Search Area
2004 True Color Aerial Photograph
Dutchess County, New York


P1-2
P3
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Feet
Silo Ridge Phase 1 Bog Turtle Survey
Photograph Locations
2004 Color Infra-red Aerial Photograph
Dutchess County, New York

Silo Ridge Phase 1 Bog Turtle Survey
Photograph Locations
2004 Color Infra-red Aerial Photograph
Dutchess County, New York

Planning
Transportation
Land Development
Environmental

October 29, 2014

Ref: 29011.00

Rosie Miranda
Regulatory Project Manager
Western Section
U.S. Army Corps of Engineers
New York District
Jacob K. Javits Federal Building
26 Federal Plaza
New York, NY 10278-0090

Re: Request for Additional Information
Permit Application No. NAN-2014-0975-WMI
Silo Ridge Resort Community
4651 Route 22
Town of Amenia
Dutchess County, New York

Dear Ms. Miranda:

Thank you for contacting me yesterday regarding the above-referenced permit application. As discussed during our telephone conversation, enclosed please find two sets of the five 8.5x11 plans detailing the seven wetlands where project mitigation is proposed (Wetlands A, B, D, J-1, K, N and Z). As detailed on the table below, in order to mitigate for the loss of 0.13 acres of wetlands at the site, the project proposes a total of 1.78 acres of expansion to the seven aforementioned wetland areas, resulting in an overall 13.7:1 replacement ratio of waters of the United States.

Summary of Impacts to On-Site Waters of the United States

Wetland Feature	Existing Area (acres)	Loss (acres)	Gain (acres)	Post-Construction Area (acres)
A & B	1.39	-	0.37	1.76
C-1	1.12	-	-	1.12
C-2	0.38	-	-	0.38
C-3	0.12	-	-	0.12
D	0.43	-	0.24	0.67
E-1	0.05	0.05	-	0.00
E-2	0.04	0.01	-	0.03
G-1	0.33	-	-	0.33

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914.467.6600 ▪ FAX 914.761.3759
www.vhb.com

Wetland Feature	Existing Area (acres)	Loss (acres)	Gain (acres)	Post-Construction Area (acres)
G-2	0.01	0.01	-	0.00
H	0.51	-	-	0.51
J	2.06	-	-	2.06
J-1	0.40	-	0.08	0.48
K & Z	7.59	-	0.65	8.24
L	26.19	-	-	26.19
N	0.15	-	0.44	0.59
O	0.03	0.03	-	0.00
OO	0.01	0.01	-	0.00
P	0.06	-	-	0.06
QQ	0.02	0.02	-	0.00
U	2.78	-	-	2.78
V	0.35	-	-	0.35
W	1.30	-	-	1.30
X	0.25	-	-	0.25
Total	**45.57**	**0.13**	**1.78**	**47.22**

Thank you for your cooperation in this matter. If additional information is required, or should you have any questions, please do not hesitate to contact me directly at 516.787.3454

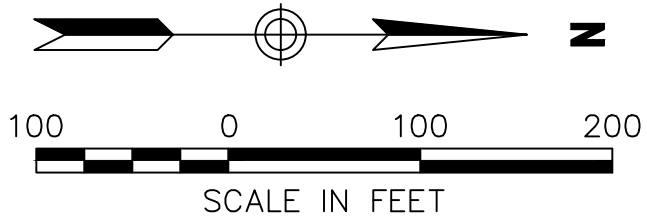
Sincerely,

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

David Kennedy
Project Scientist

DK/ba

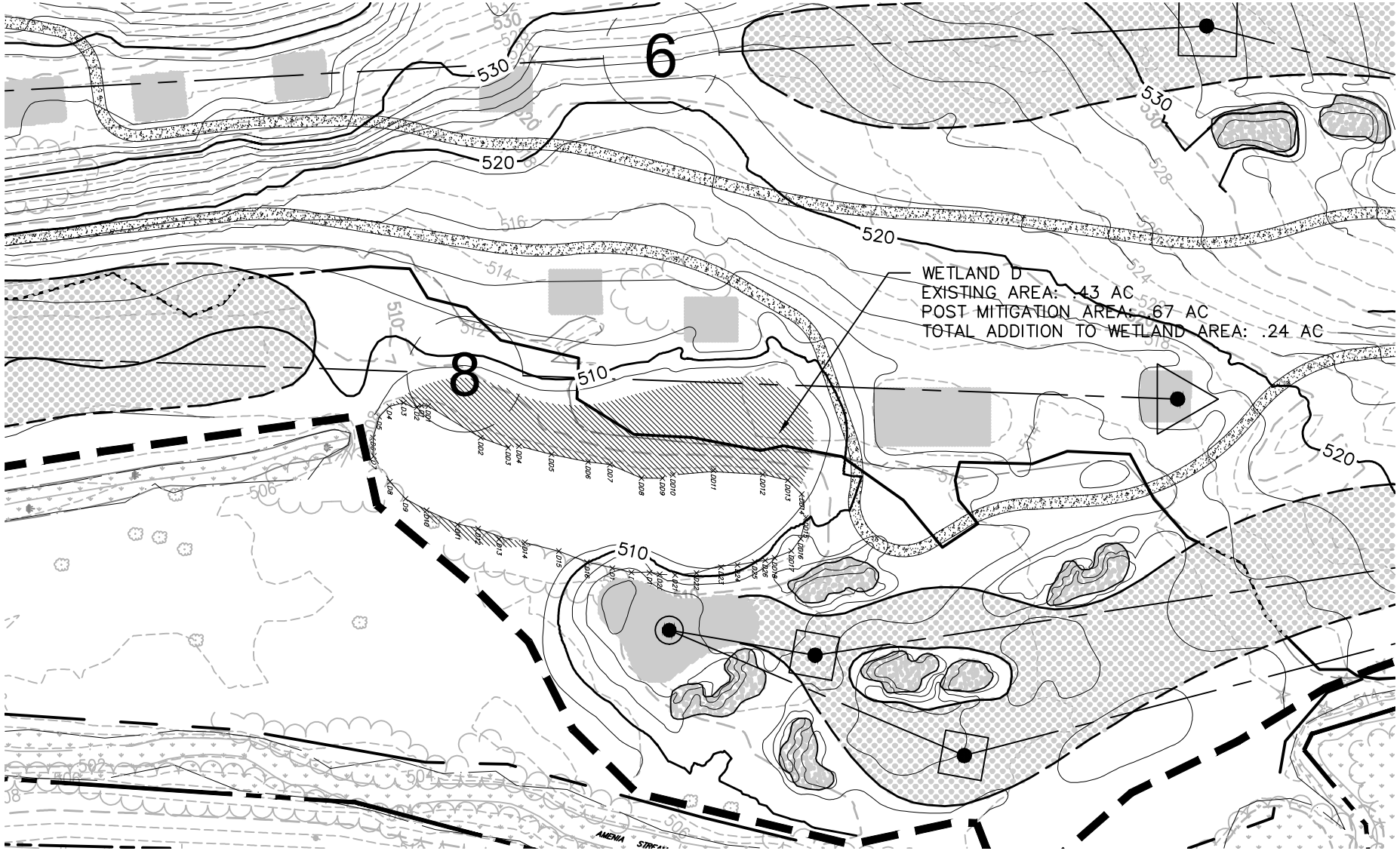
\\NYWPDATA\projects\29011.00 APWAN\ProjRecords\FinalDocs\Miranda USACE Ltr_10-29-14_.docx



Vanasse Hangen Brustlin, Inc.

September 2014

Silo Ridge Resort Community
Wetland A and Wetland B
Excerpted From Sheet C7.00
(See Overall Grading and Drainage Plan)



N

100 0 100 200

SCALE IN FEET

Vanasse Hangen Brustlin, Inc.

September 2014

Silo Ridge Resort Community
Wetland D
Excerpted From Sheet C7.00
(See Overall Grading and Drainage Plan)

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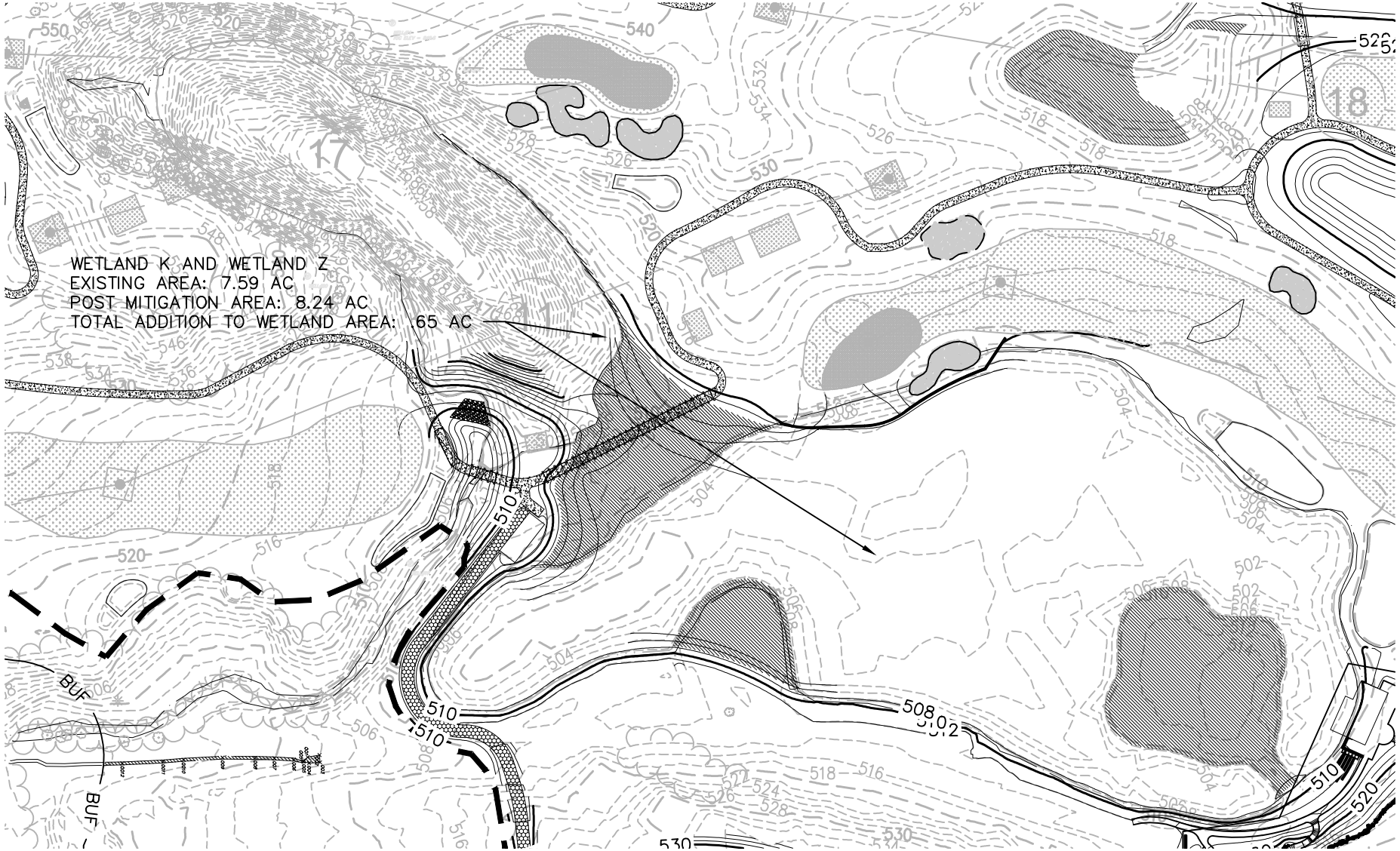
September 2014

Silo Ridge Resort Community
Wetland J-1
Excerpted From Sheet C7.00
(See Overall Grading and Drainage Plan)



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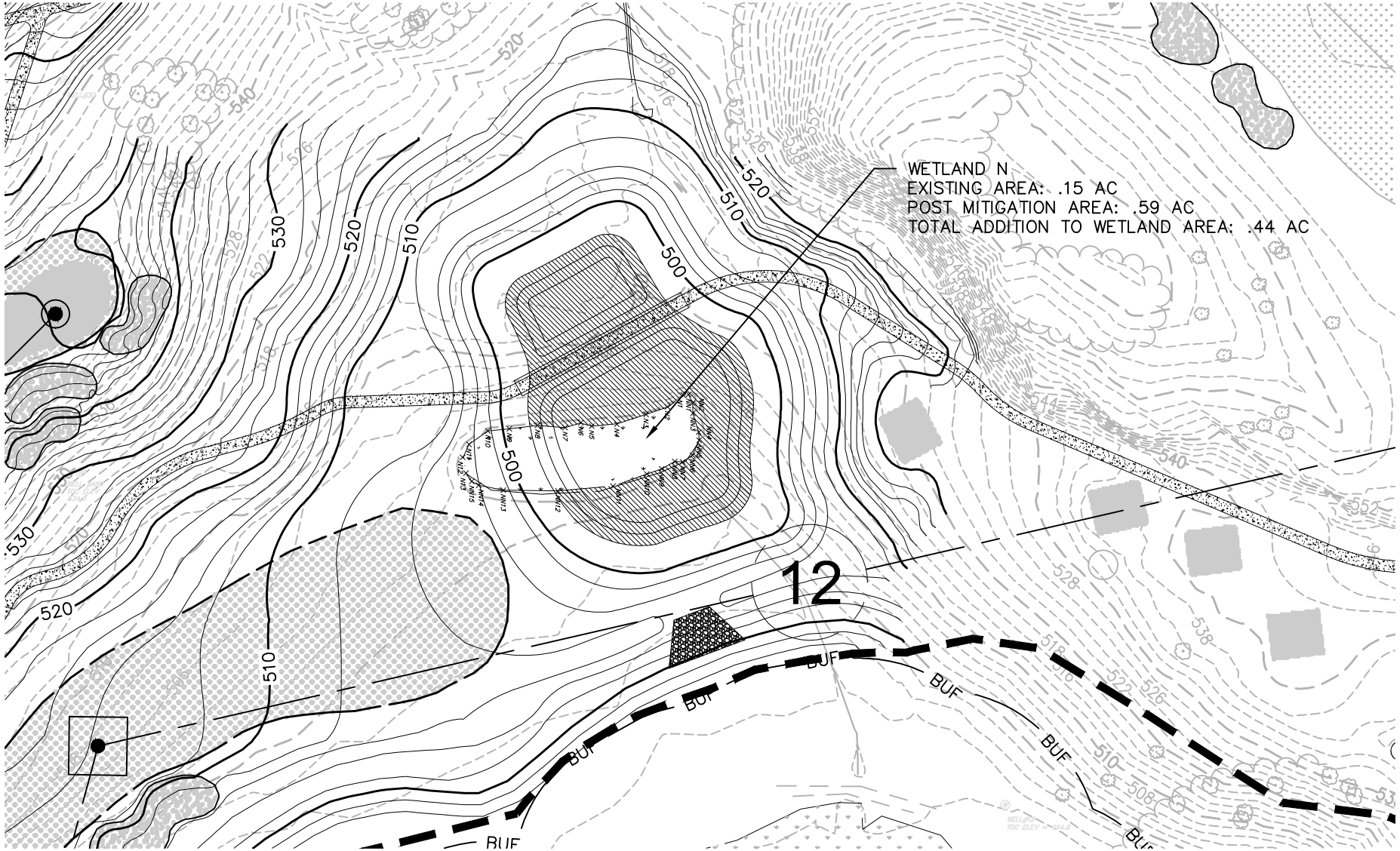
Silo Ridge Resort Community
Wetland K and Wetland Z
Excerpted From Sheet C7.00
(See Overall Grading and Drainage Plan)



Vanasse Hangen Brustlin, Inc.

September 2014

Silo Ridge Resort Community
Wetland N
Excerpted From Sheet C7.00
(See Overall Grading and Drainage Plan)