

Endangered and Threatened Species Report

Summit Woods

NY State Route 52
Town of East Fishkill
Dutchess County, New York

April 10, 2006
Chazen Project No. 70516.00



Prepared for:

Teahan and Constantino
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EXECUTIVE SUMMARY

This Endangered and Threatened Species Report was completed by The Chazen Companies (TCC) for Teahan and Constantino as part of the environmental review process pertaining to the proposed development of the +/- 325 acre project area located adjacent to New York State Route 52, in the Town of East Fishkill, Dutchess County, New York known as Summit Woods. TCC was retained to evaluate the potential for Endangered, Threatened, and Rare (ETR) species to occur on-site, to assess the potential for impacts to ETR species or their habitats, and, if applicable, to design mitigation to offset and/or compensate for impacts.

The Site is composed of a relatively equal mix of agricultural fields (approximately 125 acres or 38%), successional hardwood forest (approximately 100 acres or 31%), and wetlands (approximately 100 acres or 31%). The wetland habitat on-site is comprised of an approximately 100-acre section of New York State Department of Environmental Conservation (NYSDEC) Wetland HJ-49, an approximately 790-acre wetland complex consisting of emergent, scrub/shrub, and forested wetland community types.

Correspondence with the NYSDEC and the United States Fish and Wildlife Service (USFWS) indicated that the only ETR species which may potentially occur on the Site were the federally- and state-endangered Indiana bat (*Myotis soldalis*), the federally-threatened and state-endangered bog turtle (*Clemmys muhlenbergii*), and the state-threatened Blanding's turtle (*Emydoidea blandingii*). To assess the potential for these species to occur on the Property, TCC reviewed a Natural Resources Survey of the Site conducted by Ecological Solutions, LLC, conducted multiple site visits to document on-site habitat features, and consulted with USFWS and NYSDEC on the known occurrences of these species in the project area.

Potential summer roosting habitat for Indiana bats occurs on the Property in wooded areas within NYSDEC Wetland HJ-49 and on Stormville Mountain. However, as no wetland impacts are proposed, and as the forested hillside will be designated as open space, we do not anticipate any impacts to Indiana bat habitat. Preliminary consultation with USFWS indicates that this agency agrees with TCC's assessment that the proposed development plan does not incorporate significant impacts to bat habitat and that further evaluation of this issue is not necessary.

TCC also concludes that no further evaluation of the Blanding's turtle issue is necessary. This assessment is based on: the absence of primary Blanding's turtle habitat on-site, the failure of a trapping program to identify these turtles in appropriate habitat on an adjacent parcel, and the location of the nearest known

population being outside of this species' known dispersal range in Dutchess County. Furthermore, the heavily trafficked roads surrounding the Site represent a substantial dispersal barrier, significantly reducing the likelihood that turtles will move onto the Site from any nearby populations.

Potential bog turtle habitat was identified on the Summit Woods site in NYSDEC Wetland HJ-49. The highest-quality potential bog turtle habitat on-site is located at the base of Stormville Mountain along the southern edge of HJ-49. This habitat occurs in an area to be designated as open space according to the proposed development plan. Moreover, the existence of woody and invasive species, unrelated to the proposed development, in the on-site bog turtle habitat represents an immediate and significant threat to the quality of this Site as habitat for bog turtles.

The nearest known bog turtle population is located approximately 1 mile from the Site. As these turtles have small home ranges and typically do not migrate large distances, it is highly unlikely that individuals from this population move onto the Site. A Phase-II bog turtle survey completed in appropriate habitat of HJ-49 on an adjacent parcel failed to locate these turtles. Moreover, preliminary bog turtle survey efforts have not identified these turtles on the Summit Woods Site. Thus, the identified population may be restricted to the southwestern off-site portion of HJ-49 (i.e., the Bailey Tract).

Due to the distance separating known bog turtle populations from the Summit Woods site and the failure of preliminary survey efforts to document these turtles on-site, there is a low likelihood that these turtles occur on-site. To further minimize the limited likelihood of impacts to bog turtles or their habitat associated with this project, the current application proposes to develop only 45% of the Property, primarily the agricultural fields, leaving the remaining 55%, principally wetlands and upland forested watershed, as open space. Moreover, no federal wetland permits are anticipated as no impacts to wetlands are proposed as a part of the current project design. Stormwater quality basins have also been moved outside of the 100 foot adjacent area of NYSDEC Wetland HJ-49 based on earlier comment from the NYSDEC. The Applicant will also provide a 100 foot buffer surrounding HJ-49. The NYSDEC requires a 100 foot buffer around this state-regulated wetland. The USFWS, per the Bog Turtle Northern Population Recovery Plan, recommends a 300 foot buffer surrounding habitats containing known populations of bog turtles. The implementation of a 300 foot buffer would result in the loss of approximately 62 lots, thereby causing the Applicant significant financial hardship. However, the author of this plan, Dr. Michael Klemens, has stated that a 100 foot buffer can be sufficient for this species and has recommended a 100 foot buffer on some projects. The recommendation of a 100 foot buffer by Dr. Klemens appears to apply to projects that have minimal wetland impacts and avoid indirect

impacts to bog turtle habitat. Based on these criteria, the 100 foot buffer provided in the plans for the Summit Woods project provides a reasonable level of protection for this species.

In addition to the mitigation measures already proposed by the Applicant in the DEIS, TCC has conducted a detailed assessment of the potential for impacts to bog turtles and/or their habitat associated with the proposed development plan to identify other measures to further mitigate the limited potential for impacts. The potential for direct impacts to turtles such as mortality via construction activities, traffic, and other human-related activities is minimal as the natural tendency for bog turtles to remain in wetlands inherently limits the relevance of these factors. Moreover, the avoidance of wetlands and the maintenance of a vegetated 100 foot buffer further minimize the potential for direct impacts. There is some potential for the collection of turtles by homeowners. While the potential for direct impacts is limited, TCC suggests a number of measures to further minimize any potential for these impacts. Education of construction workers and homeowners via pamphlets outlining the unique nature of the habitat will help to minimize direct impacts. These pamphlets should not indicate that bog turtles occur in the area, only that the wetland is unique habitat for a number of sensitive species. We also recommend the placement of a continuous silt fence at the edge of the wetland buffer prior to and during construction to prevent impacts to the buffer, keep wildlife from entering the construction area, and prevent siltation in the wetland.

TCC has also evaluated the potential for indirect impacts to bog turtle habitat via altered hydrological patterns and a decrease in water quality of HJ-49. It does not appear that the withdrawal of groundwater via wells will affect the hydrology of HJ-49 as the wells will be drawing from an aquifer that is not hydrologically connected to HJ-49. The outfall from the wastewater treatment plant will also have little to no impact on the hydrology of HJ-49 as extrapolating that outfall over the entire wetland area will lead to an increase in depth of only 0.00396 inches. Moreover, this outfall will not affect water quality in this wetland as it will meet draft SPDES effluent limits established by the NYSDEC.

The vegetated 100 foot buffer will aid in minimizing the potential for the degradation of water quality. Deed restrictions on activities in the buffer such as the prohibition of structures or the cutting of vegetation will ensure that the buffer will remain effective. Additional deed restrictions on the use of pesticides and fertilizers in residential areas will also inhibit the degradation of water quality.

To further compensate for any unforeseen impacts to bog turtles or their habitats, TCC recommends that the Applicant initiate a discussion with the NYSDEC and the USFWS on the potential for funding research on bog turtles or funding the purchase of lands surrounding or containing viable populations of bog turtles. TCC

has recommended this mitigation approach to the Applicant, and the Applicant has expressed a willingness to provide this type of mitigation.

The absence of direct wetland impacts and the inclusion of a 100-foot buffer in the development plan, in conjunction with the propensity of bog turtles to avoid upland habitat, significantly minimizes the potential for direct impacts to these turtles (if present on-site) or their habitat. The potential for indirect impacts to potential bog turtle habitat can also be significantly reduced assuming the incorporation of TCC's recommendations into the proposed development plan. It should be noted that despite these recommendations, TCC feels that there is a low likelihood that bog turtles currently occur on the Summit Woods site as the exchange of individuals from nearby off-site populations is remote due the large distances separating these areas, and the because preliminary survey efforts have failed to document these turtles on-site. However, as there may be unforeseen impacts associated with the project, we have offered several mitigation strategies to offset and/or compensate for these impacts. Thus, we feel that this Property can be developed according to the Applicant's specifications while preserving the bog turtle habitat on-site.

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1.0 Introduction

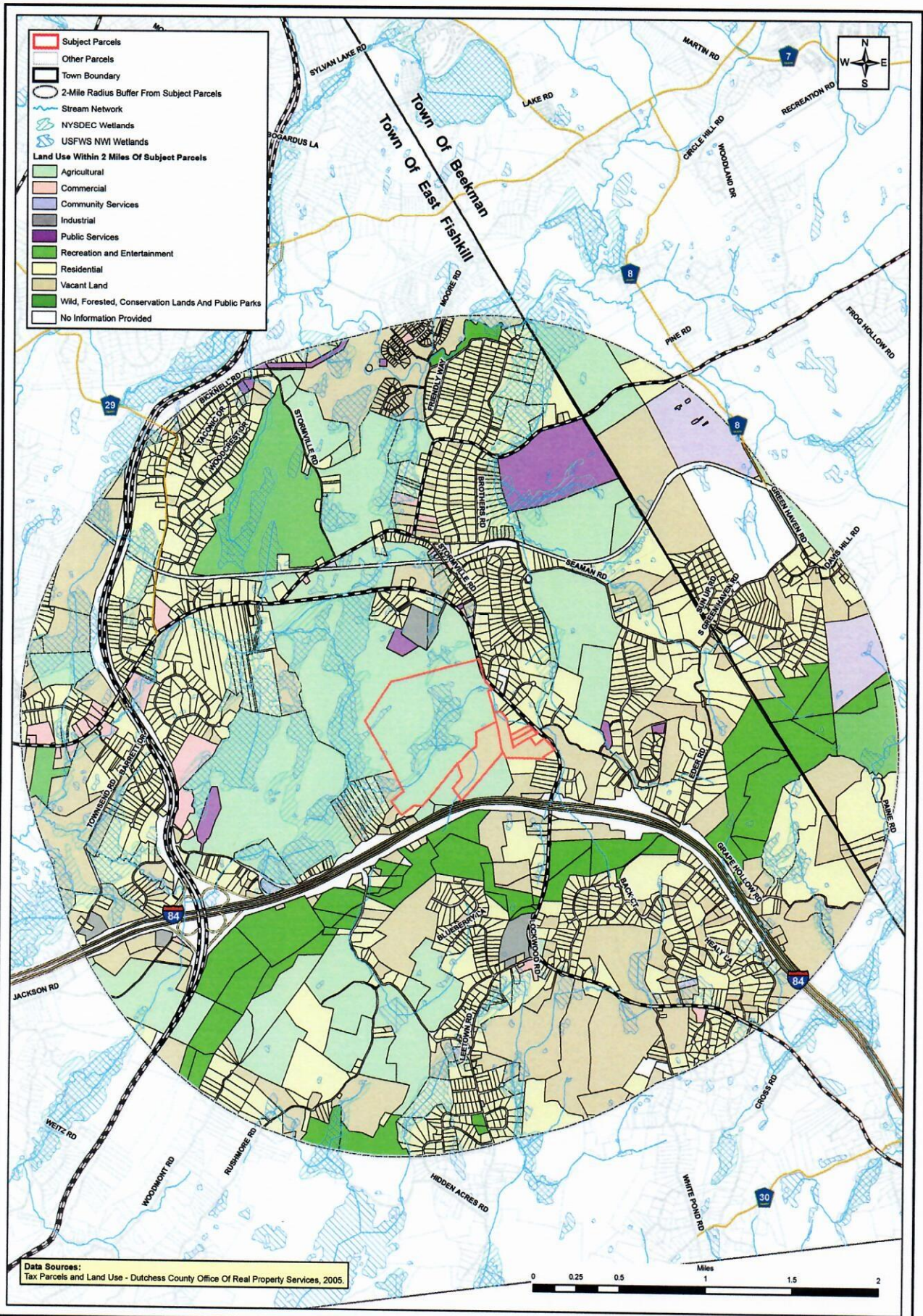
This Endangered and Threatened Species (ETR) Report was completed by The Chazen Companies (TCC) for Teahan and Constantino for the proposed Summit Woods 175-lot single family residential development located on +/-325 acres (hereafter referred to as the Property or the Site) in the Town of East Fishkill, Dutchess County, New York. Figure 1.0-1 "Site Location and Surrounding Land Use" illustrates the location of the Property. The Site is composed of a relatively equal mix of agricultural fields (approximately 125 acres or 38%), successional hardwood forest (approximately 100 acres or 31%), and wetlands (approximately 100 acres or 31%). The wetland areas on-site are comprised solely by New York State Department of Environmental Conservation Wetland HJ-49. This wetland is composed of a mix of emergent, scrub/shrub, and forested habitats.

The proposed development plan would result in disturbance to 148 acres, or 45% of the project area, and provide 177 acres, or 55% of the area, as open space. The "Open Space Map" of the Draft Environmental Impact Statement for the Summit Woods Project (hereafter DEIS) identifies the locations of the proposed open space areas. No impacts to wetlands are proposed as part of the entire development plan.

During the environmental review process, it was determined that Indiana bats (*Myotis soldalis*), bog turtles (*Clemmys muhlenbergii*), and Blanding's turtles (*Emydoidea blandingii*) may potentially occur on the Property. The bog and Blanding's turtle issues were initially raised by the USFWS and NYSDEC in correspondence to Mr. Mike Nowicki as indicated in Ecological Solutions Natural Resource Survey (Appendix I of the DEIS). The USFWS contacted Mr. Nowicki by telephone on September 29, 2004, at which time Mr. Nowicki stated that an off-site portion of NYSDEC Wetland HJ-49 was now a known bog turtle site based on survey work completed in 2004. In Ecological Solution's July 8, 2002 Natural Resources Survey, Mr. Nowicki also stated that his field investigation "revealed evidence of potential bog turtle habitat in the existing NYSDEC regulated wetland on the site...". The USFWS also indicated in a November 30, 2004 letter to Mr. Mark Day of M.A. Day Engineering that Indiana bats may also occur on the Site, and that there were concerns over direct and indirect impacts to bog turtles and/or their habitat associated with the proposed project. As the information pertaining to bog turtles was not included/addressed in the text of the DEIS, the USFWS requested that these concerns be addressed in a supplemental document. Appendix A "Correspondence" contains copies of the aforementioned communications.

To address the ETR-related issues at the proposed Summit Woods site, TCC was retained by Teahan & Constantino, to: (1) contact agency representatives (both USFWS and NYSDEC) to determine the full extent of the ETR issues at the

Summit Woods Site, (2) identify and document the potential for ETR species or their habitat on-site, (3) assess the potential impacts to ETR species associated with the proposed project, and (4) suggest alternatives and/or design mitigation strategies to minimize and compensate for these potential impacts. This report presents a summary of these efforts.



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Summit Woods Residential Subdivision
Figure 1.0-1
Site Location And Surrounding Land Use
Town Of East Fishkill, Town Of Beekman
Dutchess County, New York

Drawn:	CLC
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2.0 Endangered, Threatened, and Rare Species

Previous correspondence with the USFWS and NYSDEC indicated that the federally- and state-endangered Indiana bat, the state-threatened Blanding's turtle, and the federally-threatened and state-endangered bog turtle may occur within the project area. As the Indiana bat and Blanding's turtle issues were previously addressed, we present a brief review of these issues and their status as of the date of this report. However, as USFWS indicated that the bog turtle issue was not addressed in sufficient detail, we thoroughly review this issue in this report.

2.1 Indiana bats

The USFWS requested that the Property be surveyed to determine the presence, amount, and distribution of suitable summer roosting/maternity habitat, and the presence of any mines/caves that could serve as hibernacula. Indiana bat summer roosting habitat is given by wooded areas with trees that have a southern exposure, are ≥ 5 inches in diameter, and exhibit specific physical characteristics (e.g., exfoliating bark, crevices, dead limbs, snags).¹ During a 2005 site visit, representatives from USFWS determined that potential Indiana bat habitat exists on the Site in HJ-49 and on the forested hillside along the Site's southern border. No mines and caves were observed on the Property. However, as the footprint of development will be limited to old field habitats, and as HJ-49 and the wooded hillside occur in areas designated as open space, no impacts to bat habitat will occur according to the proposed development plan. USFWS staff verbally agreed with the assessment of no impacts to bats based on the current site plan and indicated that no further evaluation of the bat issue is warranted.

2.2 Blanding's Turtles

According to the Natural Resource Survey conducted by Ecological Solutions, LLC (Appendix I of DEIS), USFWS and NYSDEC indicated that Blanding's turtles may occur in the project area. Primary Blanding's turtle habitat is characterized by kettle shrub pools or other deep water wetlands.² In Dutchess County, these habitats are characterized by water depths ranging between 12-40 inches, Hoosic gravelly loam substrates, and abundant emergent vegetation (e.g., buttonbush: *Cephalanthus occidentalis*). These turtles also use a variety of wetland types (i.e. red maple swamps) for migration and drought refuges, and open uplands for nesting.³ Based on numerous field investigations, primary Blanding's turtle habitat does not occur on-site as no deepwater pools occur on the Property. Furthermore,

¹ Indiana Bat Project Review Fact Sheet. USFWS New York Field Office. August 2005.

² Kiviat, Erik and Gretchen Stevens. 2001 Biodiversity Assessment Manual for the Hudson River Estuary Corridor. Hudsonia LTD. Annandale, NY 12504

³ Ibid.

the only Hoosic-series soils on-site occur on steep upland slopes (see Site Soils Plan, DEIS), which are not suitable turtle habitat. However, as noted in the Natural Resources Survey, secondary habitat (migratory and nesting) is present. An intensive trapping program conducted for Blanding's turtles in appropriate habitat on an adjacent parcel concluded that this property either "does not support resident adult Blanding's turtles or supports a very small number." (see Appendix B, page 9). Therefore, due to their non-detection in primary habitat on an adjacent parcel, and the lack of suitable primary habitat on-site, it is unlikely that these turtles occur on, or in the immediate vicinity of, the Summit Woods Site. Furthermore, the nearest known occurrence of Blanding's turtles is approximately 2.5 miles from the Site. According to Dr. Erik Kiviat (a recognized expert on these turtles), this distance "exceeds documented seasonal movements of Blanding's turtles in Dutchess County" (Appendix B, page 7). Thus, due to the absence of primary habitat on-site, the lack of known populations in the surrounding area, and significant barriers (i.e., Route 52) preventing turtles from entering the Property, TCC does not feel that Summit Woods Site is used in any manner by Blanding's turtles and that further evaluation of this issue is not necessary.

2.3 Bog Turtles

In addition to Indiana bats and Blanding's turtles, USFWS and NYSDEC indicated that bog turtles have been documented within approximately 1 mile of the Site. The Natural Resources Survey prepared by Ecological Solutions also indicated that potential bog turtle habitat occurs on the Property. In a meeting at NYSDEC Region 3 Headquarters on October 18, 2005, representatives from USFWS indicated that there were concerns over potential impacts to bog turtles and/or bog turtle habitat associated with the development of the Site. Therefore, supplementary research on the Site was conducted to further describe the potential on-site habitat, assess potential impacts to bog turtles and/or their habitat, and develop mitigation to offset and/or compensate for unforeseen impacts. This information is presented below.

3.0 Bog Turtle Ecology and Natural History

The bog turtle is fairly small (approximately 4 inches in length) with a carapace that is slightly domed and weakly keeled.⁴ The shell can vary in coloration, but is typically light brown and lacks significant coloration. The most prominent morphological feature of these turtles is a yellow-orange-red blotch located on each side of the head. Males can be discerned from females by the presence of a concave plastron, and a long, thick tail with the vent located posterior to the edge of the

⁴ U.S. Fish and Wildlife Service. 2001. Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan. Hadley, Massachusetts. 103 pp.

carapace.⁵ This turtle is fairly unique among freshwater North American turtles as its entire life cycle, including nesting, occurs within wetlands.⁶ Bog turtles typically become active in late March/early April and remain active until approximately mid-September. Peak surface activity frequently occurs during daylight hours (i.e., 0800-1700 h) throughout April to July.⁷ However, activity patterns are closely tied to weather conditions.

Mating occurs in mid-May/early June, with nesting occurring during the late afternoon or early evening during mid-late June.⁸ Three to five eggs are laid upon sedge tussocks. In contrast to other turtles, no nest is dug. Nesting habitat occurs in areas with no woody vegetation and low cover of herbaceous vegetation. In New York, hatching commonly occurs in the fall (i.e., September).⁹

Bog turtles hibernate in densely vegetated areas frequently adjacent to fens and wet meadows. Hibernation sites include hummocks covered with woody vegetation or spring-fed rivulets with mucky substrates.

3.1 Habitat

Bog turtles typically inhabit calcareous fens and wet meadows. These emergent wetlands can be quite small (e.g., < 1 acre), commonly occurring as transitional areas between uplands and forested wetlands.¹⁰ Indicator vegetation of bog turtle habitat includes species such as shrubby cinquefoil (*Potentilla fruticosa*), grass-of-parnassus (*Parnassia glauca*), and low sedges (*Carex spp.*). Bog turtle sites are also commonly associated with headwater streams and seeps that feed mucky rivulets that flow throughout the wetland. Kiviat and Stevens (2001) identify the following crucial components of bog turtle habitat: (1) calcareous groundwater discharge in springs or seeps, (2) deep soft sediments, (3) low vegetation less than 3.3 feet tall, (4) the lack of a continuous shade-casting canopy of tall shrubs or trees, and (5) small areas of shallow, standing or flowing surface waters. Moreover, Kiviat and Stevens (2001) have determined that bog turtles are commonly associated with the following soil types: Palms muck, Carlisle muck, Sun silt loam, and Wayland silt loam. In addition to open, emergent wetland habitat, bog turtles commonly inhabit large wetland complexes that provide a mosaic of habitats including shrub swamps and forested wetlands. These other wetland types are used as hibernation sites and migratory corridors for turtles.

⁵ Ibid.

⁶ Kiviat, Erik and Gretchen Stevens. 2001 Biodiversity Assessment Manual for the Hudson River Estuary Corridor. Hudsonia LTD. Annandale, NY 12504

⁷ U.S. Fish and Wildlife Service. 2001. Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan. Hadley, Massachusetts. 103 pp.

⁸ U.S. Fish and Wildlife Service. 2001. Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan. Hadley, Massachusetts. 103 pp.

⁹ Ibid

¹⁰ Ibid

3.2 Spatial Ecology

Bog turtles are fairly distinct among North American freshwater turtles in that they rarely leave wetland complexes.¹¹ Moreover, these turtles do not typically migrate large distances. Carter et al.¹² radio-tracked 35 adult bog turtles and determined that 75% of all movements by bog turtles in a Virginia population were less than 70 feet. While some individuals may move larger distances (i.e., > 0.5 mile) across unsuitable habitat¹³, these movements appear fairly uncommon. It is believed that longer distance migrants may be dispersing juveniles or individuals leaving areas of decreasing habitat quality.¹⁴

The home range of bog turtles also appears fairly small. Radio-telemetry data show home ranges of 0.007-7.71 acres¹⁵ and 0.37-1.28 acres¹⁶ in Maryland and Virginia, respectively. The large variation in the Maryland data appears to be the result of invasive species decreasing site quality, thereby forcing turtles to expand their home ranges to locate suitable habitat.¹⁷

3.3 Distribution

Bog turtles occur in two disjunct populations in the northeastern and southeastern United States. The northern grouping is composed of populations in Pennsylvania, Maryland, Delaware, New Jersey, Connecticut, Massachusetts, and New York. The New York population is composed of 37 individual populations that occur as discontinuous pockets in the southeastern and north-central portions of the state. Of the 37 extant populations, 33 occur in southeastern New York.¹⁸

3.4 Status and Threats

The bog turtle was federally listed as threatened in 1973, and is currently listed as endangered by the NYSDEC. Currently, the primary threats to bog turtle populations throughout their range include habitat loss and degradation. Habitat loss occurs via the conversion of wetlands to anthropogenic land-uses (e.g.,

¹¹ Kiviat, Erik and Gretchen Stevens. 2001 Biodiversity Assessment Manual for the Hudson River Estuary Corridor. Hudsonia LTD. Annandale, NY 12504

¹² Carter, S.L., C.A. Haas, and J.C. Mitchell. 2000. Movements and activity of bog turtles (*Clemmys muhlenbergii*) in southwestern Virginia. *Journal of Herpetology* 34:75-80.

¹³ U.S. Fish and Wildlife Service. 2001. Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan. Hadley, Massachusetts. 103 pp.

¹⁴ Morrow, J.L., J.H. Howard, S.A. Smith, and D.K. Poppel. Home range and movements of the bog turtle (*Clemmys muhlenbergii*) in Maryland. *Journal of Herpetology* 35:68-73.

¹⁵ Ibid.

¹⁶ Carter, S.L., C.A. Haas, and J.C. Mitchell. 2000. Movements and activity of bog turtles (*Clemmys muhlenbergii*) in southwestern Virginia. *Journal of Herpetology* 34:75-80.

¹⁷ Morrow, J.L., J.H. Howard, S.A. Smith, and D.K. Poppel. Home range and movements of the bog turtle (*Clemmys muhlenbergii*) in Maryland. *Journal of Herpetology* 35:68-73.

¹⁸ U.S. Fish and Wildlife Service. 2001. Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan. Hadley, Massachusetts. 103 pp.

residential, commercial, industrial) or through the natural progression of succession. Historically, grazing, beaver activity, and fire would create or restore open habitat for these turtles. However, it appears that fire suppression policies and the decline of agriculture have inadvertently led to emergent wetlands being replaced by forested habitats. Moreover, the establishment of invasive species in many wetlands has led to the loss and/or degradation of bog turtle habitat. Species such as purple loosestrife and the common reed grow in dense, tall, monotypic stands that significantly decreasing the quality of habitat for bog turtles by increasing shading and eliminating basking areas.¹⁹ Habitat degradation is typically given by an alteration in the hydrological functioning of wetlands or by decreases in water quality (e.g., eutrophication).

3.5 Conservation and Management

As habitat degradation/loss is currently the primary reason for the decline of bog turtles, conservation efforts have focused on maintaining appropriate habitat. To maintain water quality, vegetated buffers have been employed around bog turtle wetlands. The USFWS recommends up to a 300 foot buffer around bog turtle wetlands to protect these turtles and their habitats.²⁰ The author of the recovery plan, Dr. Michael Klemens, however, has stated that “100 foot wetland setbacks...are generally sufficient for this species” (Appendix C).

A variety of techniques have also been proposed to manage wetlands specifically for bog turtles. The vast majority of these techniques are based upon reversing succession by eliminating woody vegetation. Practices such as prescribed burns, the cutting of vegetation, and livestock grazing have all been used in bog turtle sites.^{21,22} The use of herbicides has also been used to eliminate invasive species. However, there are concerns with the use of the chemicals and their impacts on non-target flora and fauna. While the potential for management appears promising, the effectiveness of these techniques has yet to be adequately determined.

4.0 Distribution in Project Area

As described above, bog turtles are known to occur in the southwestern off-site section of NYSDEC Wetland HJ-49. This known population occurs on what is referred to as the “Bailey Tract” and is located approximately 1.0 mile to the southwest of the Summit Woods Site. According to a report by Mr. Jason Tesaro of

¹⁹ Kiviat, Erik and Gretchen Stevens. 2001 Biodiversity Assessment Manual for the Hudson River Estuary Corridor. Hudsonia LTD. Annandale, NY 12504

²⁰ U.S. Fish and Wildlife Service. 2001. Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan. Hadley, Massachusetts. 103 pp.

²¹ Ibid.

²² Morrow, J.L., J.H. Howard, S.A. Smith, and D.K. Poppel. 2001. Habitat selection and habitat use by the bog turtle (*Clemmys muhlenbergii*) in Maryland. Journal of Herpetology 35:545-552.

Jason Tesauro Ecological Consulting (see Appendix D), Dr. James Utter of SUNY-Purchase has identified a minimum of three turtles on the Bailey Tract and is currently radio-tracking turtles. This population was first identified in 2004 (New York State Natural Heritage Program, *personal communication*). TCC visited the location of this population with Dr. Utter on February 25, 2006. Based on our observations, this population occurs approximately 1 mile from the proposed Summit Woods Site. To date, no turtles have been identified in alternate sections of appropriate habitat in HJ-49. A number of preliminary surveys for bog turtles have been conducted on the Summit Woods Site, and Mr. Tesauro conducted a Phase II survey for bog turtles in HJ-49 on a parcel adjacent to the Summit Woods site (i.e., Tucker Tract). Neither survey documented the presence of bog turtles despite appropriate habitat (Appendix I of DEIS, Appendix D of this document). Therefore, it is not clear if this population occurs throughout HJ-49 or if it is restricted to the southwestern off-site section of this wetland, as is suggested by current information.

The potential for additional populations in off-site wetlands to utilize the project area, and vice-versa, is extremely limited as the Property occurs in a fairly developed area. HJ-49 is isolated from other wetland habitats by dispersal barriers represented by the heavily traveled Route 52, Taconic Parkway, and I-84 (Figure 1.0-1). Therefore, the bog turtle population in HJ-49 is most likely restricted to this wetland complex.

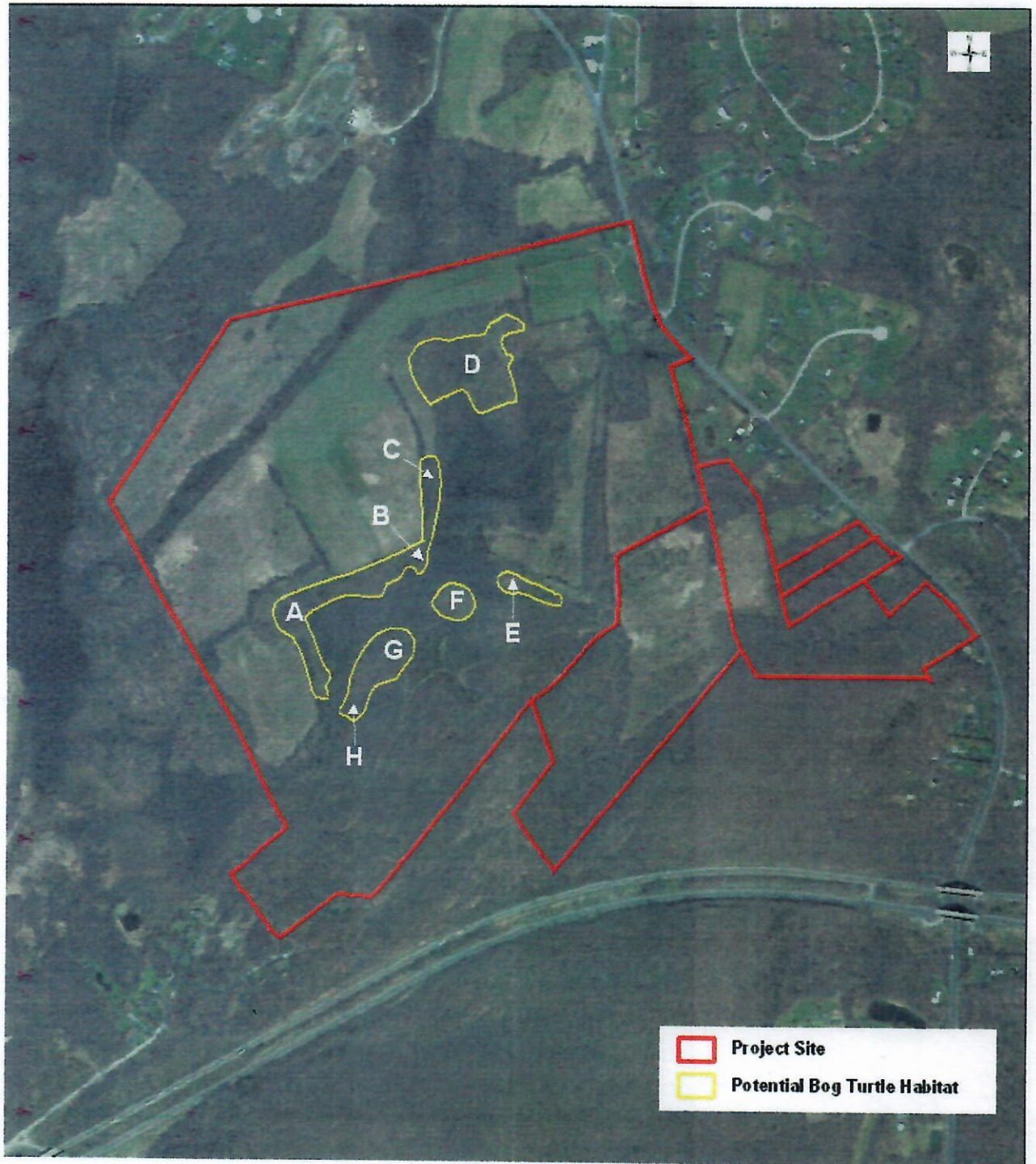
5.0 On-site Habitat

TCC conducted site visits on October 6 and on December 6 and 12, 2005 at which time it was determined that potential bog turtle habitat does occur on-site. Based on our observations, potential on-site habitat for bog turtles occurs in portions of NYSDEC Wetland HJ-49. Figure 5.0-1 "Locations of Potential Bog Turtle Habitat", identifies these areas. The on-site soil types in HJ-49 include Carlisle muck (Cc) and Sun Silt Loam (Su). These soil types are considered indicative of potential bog turtle habitat (see Section 2.1). Figure 3.2.1-1 "Soils Map" of the DEIS identifies the soil types on the project area. According to the project hydrogeologist, the primary hydrologic inputs to this wetland are "precipitation; surface-water runoff and inflow from streams; and base flow from the upland areas which flank both sides of the wetland" (Appendix E). Furthermore, the hydrogeologist states that "the most significant recharge feature would be surface water/base flow from Stormville Mountain". Small streams that range in width from approximately 1-4 feet and in depth from 6 inches to over 1 foot flow throughout this wetland (Figure 1.0-1). The substrate of these streams is typically silt/muck. Wetland HJ-49 incorporates a mosaic of wetland types including open emergent areas, scrub/shrub habitat, and forested swamp. Generally, there is a transition in vegetation from emergent, to scrub/shrub, to forested moving into the interior of the wetland. However, a number of small emergent and scrub/shrub pockets occur throughout

the interior of the wetland. The potential bog turtle habitat occurs in three principle areas: (1) in an open emergent area located in the northeastern corner of HJ-49, (2) in a thin strip along the upland-wetland edge along the northern/western borders of HJ-49, and (3) in a number of emergent/shrubby wetland pockets located along the southern edge of HJ-49 adjacent to a small stream. The scrub/shrub and forested areas in the interior of the wetland may provide hibernation sites and migratory corridors for turtles. The Area designations below correspond to the letters on Figure 5.0-1 "Approximate Locations of Potential Bog Turtle Habitat".

Figure 5.0-1 Locations of Potential Bog Turtle Habitat

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Areas A, B, and C

This wet meadow habitat is a transitional strip along the wetland's northern/western borders (Figure 5.0-1). This strip is approximately 20-50 feet wide and encompasses approximately 5.0 acres. A small stream (see above for description) is located immediately south of this habitat. This stream enters the Site to the east and flows to the west through wooded areas along the northern border of the wetland (Figure 1.0-1). Small pockets of standing water (approximately 3-6 inches deep) were observed among sedge tussocks. This area is likely a floodplain of the adjacent stream. Woody vegetation including both shrubs and small trees occurs throughout these areas, especially in Areas B and C (i.e., 10-20% cover). Red cedars (*Juniperus virginiana*) that range in diameter from 4-6 inches in diameter were common throughout these locations. Emergent vegetation in these areas included sedges, cattail (*Typha angustifolia*), and purple loosestrife (*Lythrum salicaria*). This herbaceous layer varied in height from 2-3 feet. Area A contained a significant amount of purple loosestrife (i.e., 30-40% cover). The establishment of woody vegetation throughout these areas and the abundance of purple loosestrife are indicative of lower-quality bog turtle habitat.

Area D

This open canopy, emergent wet meadow in the northeastern corner of HJ-49 is approximately 4 acres in size and lacks significant woody vegetation. Saturated soil conditions and pockets of standing water to a depth of greater than 6 inches were observed. The vegetation was composed generally of herbaceous species such as sedges; however, dense stand of purple loosestrife were observed in the south/southeast sections of this habitat. The loosestrife in these sections is common, 40-60% coverage, and is approximately 2-4 feet tall. While this area appears to provide habitat for bog turtles, there are concerns with the establishment, and potential, spread of the purple loosestrife. This herb can dominate a wetland, and reduce the quality of habitat for bog turtles.²³ Therefore, this area is also considered marginal quality habitat.

Areas E-H

Additional bog turtle habitat is located along the southern border of HJ-49. These areas are located at the base of a wooded hillside. Invasive plants were generally rare to absent in these areas. A stream enters this section of the Site from the southeast, and flows through the wetland to the west. This stream converges with another in the south-central portion of HJ-49 and then flows off-site to the

²³ Kiviat, Erik and Gretchen Stevens. 2001 Biodiversity Assessment Manual for the Hudson River Estuary Corridor. Hudsonia LTD. Annandale, NY 12504

southwest (Figure 1.0-1). The stream that flows through these areas feeds a number of rivulets that also flow through these wetland areas. Hydrologic inputs from the base of the hillside (i.e., Stormville Mountain) appear to provide additional inputs of water to these wetlands.

Area E

This area is a small (approximately 1.0 acre) tussock sedge (*Carex stricta*) meadow that surrounds the stream. Tussock sedge covers approximately 60% of this area. There is also a significant amount (i.e., 15-30% cover) of woody vegetation such as red maple (*Acer rubrum*), poison sumac (*Rhus vernix*), and various dogwoods (*Cornus spp.*) in this area. Trees in this area are approximately 4-8 inches in diameter. While this area appears to be potential habitat, the abundance of woody vegetation may decrease its quality as bog turtle habitat.

Area F

A small pocket (± 0.5 acres) of fen that is composed of low growing sedges and woody vegetation occurs approximately 100 feet to the southwest of Area E. Shrubs such as various dogwoods and poison sumac occupy approximately 10-20% cover in this area. The herbaceous layer is fairly low (i.e., approximately 1-2 feet) and is composed of various sedges and cattail. A number of shallow (i.e., 2-4 inches deep), mucky rivulets also flow throughout this area. This area appears to provide fairly high-quality habitat for these turtles.

Area G

This section appears to be the highest quality potential bog turtle habitat on-site, and is separated from Area F by an approximately 50 foot band of red maple/shrub swamp. This area is an approximately 1.5 acre fen that is composed primarily of low growing (i.e., ≤ 1 foot) herbaceous species such as sedges. This section is bordered by a red maple swamp to the north, east, and west, and a forested hillside to the south. However, a small number of red cedars (2-4 inches in diameter) occur in this area. Similar to Area F, a number of mucky rivulets also flow throughout this habitat. The lack of significant woody vegetation and the absence of invasive species enhance the quality of this habitat.

Area H

This area is located to the southwest of Area G and is primarily a shrub swamp. Woody species such as dogwoods and poison sumac cover approximately 30% of this area. The overstory canopy covers approximately 5% of this area and is composed of species such as red cedar and red maples that are approximately 4-6 inches in diameter. This area represents a transitional zone from the open fen areas to the northeast and the forested wetlands/uplands to the southwest.

The remaining habitat to the west as well as the immediate off-site habitat appears to be primarily wooded, and therefore not suitable for bog turtles. However, the canopy appears to open up further off-site to the southwest moving towards the area where bog turtles have been identified (see Figure 5.0-1).

6.0 Potential Impacts

As potential bog turtle habitat exists on the Property, an evaluation of potential impacts to this species and its habitat associated with the proposed development is required as part of the environmental review process. TCC has assessed potential impacts to bog turtles and has categorized these impacts as either direct or indirect.

6.1 Direct Impacts

Potential direct impacts to turtles associated with any land development project include mortality via construction activities, vehicular traffic, domestic pets, entrapment in various structures (e.g., catch basins, window wells), or through other human-related activities (e.g., drowning in in-ground swimming pools). However, as bog turtles rarely leave wetland complexes, and as a 100 foot buffer will be maintained around the wetland, we do not feel that a significant potential for direct impacts exists. Conversely, collection by homeowners is a possible direct impact on the turtle population in this area.

We also do not anticipate any direct impacts via the loss of habitat as there will be no direct loss of wetland habitat associated with this project. Wetland impacts have been reduced/eliminated through the establishment of a vegetated 100 foot buffer, the use of spans for crossings and directional bores for the installation of utilities, and the general avoidance of the wetland and its associated buffer.

6.2 Indirect Impacts

Indirect impacts to bog turtles are typically given by degradation in the quality of their habitat. These impacts can include the following:

Water Quality Effects

Water quality impacts associated with any development can result from surface runoff from roads and residential areas. This runoff may contain high levels of salt, hydrocarbons, and grease from roads and driveways. We do not anticipate water quality impacts from road runoff as the Storm Water Pollution Prevention Plan developed by M.A. Day Engineering has been designed according to NYSDEC standards. Moreover, it should be noted that the effluent from the proposed wastewater treatment plant will not affect water quality in HJ-49 as it will meet draft SPDES limits set forth by the NYSDEC. However, sediment from construction activities can also lead to siltation in wetlands. The use of fertilizers in residential areas may also affect bog turtle habitat by increasing the nutrient loads in wetlands, leading to an increase in the plant productivity. This increase in plant growth can be manifested by elevated growth rates of woody or invasive vegetation, leading to canopy closures and the loss of habitat for bog turtles. Pesticide use in residential areas can also affect water quality. Section 7.0 details a number of measures that can be implemented to minimize the potential for indirect impacts to bog turtle habitat at the Summit Woods Site.

Hydrological Impacts

The USFWS has asked if the use of groundwater wells to supply water for the Summit Woods development may indirectly affect turtles by altering the hydrological state of wetland HJ-49. The hydrogeologic analysis of the Property conducted by Leggette, Brashears and Graham, Inc. indicated that the results of a 72-hour pump test of on-site wells showed no "direct hydrologic connection with the bedrock aquifer during the testing event". This study concluded that "groundwater withdrawal from the deep bedrock aquifer will have no discernable impact on the wetland features". Moreover, as the hydrogeologist states that "the more significant recharge feature would be surface water/base flow from Stormville Mountain", it does not appear that developing the uplands surrounding HJ-49 will alter its hydrology as the Stormville Mountain watershed area will remain as open space. Appendix E "Hydrogeologic Evaluation" provides the opinion of the project hydrogeologist on these issues.

Excess inputs of surface water may also affect the hydrology of HJ-49. The increase in impervious surfaces associated with the development of this Property will lead to an increase in overland flow and a decrease in infiltration of surface water. Below we suggest techniques to minimize this potential impact. TCC would like to note that we looked into channeling the runoff from roof and footing drains into infiltrators; however, per Mark Day Engineering, the Town of East Fishkill requires that these drains be tied into the storm sewer system whenever possible. It should

also be noted that all proposed stormwater management features will be designed according to NYSDEC guidelines and subject to NYSDEC approval.

It is also not anticipated that the proposed sewage treatment plant will affect the hydrology of HJ-49. This plant will discharge approximately 85,000 gpd of treated effluent into the stream (Van Anden Kill) that flows through this wetland. To evaluate the potential for this impact, Mark Day Engineering determined that the total size of the immediate watershed receiving this effluent is approximately 790 acres. Extrapolating the 85,000 gpd over this entire area yielded an increase in the depth of surface water of only 0.00396 inches. As this potential change is minimal, it is unlikely that the sewage treatment plant will cause any significant impacts to bog turtles and/or their habitat.

7.0 Minimization of the Potential for Impacts

To minimize the potential impacts associated with the proposed project, the Applicant, after consultation with the NYSDEC, has chosen the project layout that incorporates the least degree of environmental impacts based on three alternative layouts (see DEIS for alternative designs). The current plan proposes to develop only 45.4% of the Property, leaving the remaining 54.6%, principally wetlands and upland watershed, as open space. No federal wetland permits are anticipated as no impacts to wetlands are proposed as a part of the current project design. Moreover, stormwater quality basins have been moved outside of the 100 foot adjacent area of NYSDEC Wetland HJ-49 based on earlier comment from the NYSDEC. These basins are designed as infiltration basins and will protect water quality in wetlands by intercepting runoff prior to it entering the wetlands. Although the USFWS has expressed some concern over the use of infiltration basins, this is a recommended practice in New York State. Erosion control measures, their monitoring, and maintenance are outlined in the Erosion Control Plan developed by M.A. Day Engineering (see DEIS). We would also like to note that the Applicant has previously proposed a number of mitigation measures (section 1.6 of the DEIS) to compensate and/or minimize impacts associated with the proposed project.

TCC does not anticipate a significant potential for direct impacts to bog turtles because they rarely leave wetlands; however, we recommend the following to further limit any potential for direct impacts to these turtles as well as to other wildlife:

- The installation of a continuous silt fence outside of the 100 foot buffer prior to and during construction to minimize the potential for disturbance to the buffer and to keep wildlife from entering the construction zone. This fence should be installed prior to any construction activities and prior to April 1 in the year of proposed construction. Silt fencing is currently identified in

specific areas according to the Erosion Control Plan; however, this fencing is not continuous. A continuous line of fencing along the northern, eastern, and western borders of the wetland will inhibit the movement of wildlife into construction areas thereby preventing accidental mortality. This fence will also serve to prevent siltation in the wetland. This fencing will not be necessary along the southern border of the wetland as it is unlikely that wildlife will move up the wooded hillside and then onto the project area. This fence should be maintained and inspected according to appropriate erosion and sediment control guidelines.²⁴ This fence should be removed immediately upon completion of the project and the complete re-vegetation of all disturbed areas.

- The distribution of an informative pamphlet to construction personnel that will identify the unique nature of the area that they are working in and reinforce the cautions that should be taken when working in the vicinity of the wetlands. While this booklet will not mention bog turtles directly, it will indicate that sensitive species of wildlife occur in the area.
- The use of grates on catch basins with an opening size small enough to prevent wildlife from falling in and becoming trapped.
- The requirement that all in-ground swimming pools be fenced with a barrier, a minimum of 6 inches in height, which will prevent access to these pools by wildlife.
- The distribution of an informative pamphlet to homeowners identifying the unique habitat in the area and the need for the protection of this habitat. This pamphlet should also emphasize the importance of the buffer and the reasons for deed restrictions on the use of chemicals (see below).
- The elimination of basement window wells or the requirement that these window wells be covered or surrounded by a barrier (e.g., curbing) to prevent wildlife from becoming trapped.

The following suggestions are aimed at minimizing the potential for indirect impacts to turtles or their habitat:

- The provision of a vegetated buffer (100 foot minimum) to maintain water quality in the wetland. See Section 7.1 for additional detail on the rationale for this buffer.

²⁴ New York Guidelines for Urban Erosion and Sediment Control, Empire State Chapter, Soil and Water Conservation Society, October 1991.

- Deed restrictions on the use of fertilizers and pesticides to maintain water quality.
- The recommended use of pavers in driveways to minimize the amount of impervious surfaces, thereby increasing the potential for infiltration.

7.1 Buffer

The most significant measure that TCC recommends to minimize potential indirect impacts to bog turtles is the use of a densely planted buffer. Buffers provide significant benefits to wetlands and watercourses as they attenuate runoff and provide water quality filtration.²⁵ As the wetlands on-site are state-regulated, they require a 100 foot buffer area. However, as potential bog turtle habitat exists in this wetland, and as a population has been identified approximately 1 mile away in an off-site portion of this wetland, the USFWS recommends up to a 300 foot buffer zone.²⁶ Incorporating a 300 foot buffer does not appear feasible given the Applicant's needs as it will result in the loss of approximately 62 lots or 35% of total proposed (see Appendix E), thereby causing significant financial hardship to the Applicant. After reviewing the Bog Turtle Recovery Plan, it is not clear what data were used to arrive at the 300 foot designation. This number likely reflects a conservative estimate for protecting bog turtles and their habitat. However, to protect water quality and avoid indirect impacts, a 100 foot buffer is generally believed to provide significant water quality benefits.^{27,28} Moreover the United States Forest Service²⁹ recommends a 100 foot buffer to maintain water quality.

Once again, we would like note that the author of the recovery plan, Dr. Michael Klemens, has recommended the use of 100 foot buffers on other projects in this region and has previously stated that "100 foot setbacks...are generally sufficient for this species" and that "if the wetland and 100 buffer zone were maintained and preserved" this species could survive (Appendix C). Moreover, this recommendation has been applied to what Dr. Klemens referred to as "quite pristine" fens (Appendix C). The recommendation of a 100 foot buffer by Dr. Klemens appears to apply to projects that have minimal wetland impacts and avoid indirect impacts to bog turtle habitat. Based on these criteria, the Summit Woods project is ideally suited for a 100 foot buffer.

We would like to note that enhancement plantings of native vegetation in the buffer have been previously proposed by the Applicant (see Page 30 of the DEIS). The

²⁵ Correll, D.L. 2005. Principles of planning and establishment of buffer zones. *Ecological Engineering* 24:433-439.

²⁶ U.S. Fish and Wildlife Service. 2001. Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan. Hadley, Massachusetts. 103 pp.

²⁷ Correll, D.L. 2005. Principles of planning and establishment of buffer zones. *Ecological Engineering* 24:433-439.

²⁸ Welsch, D.J. 1991. Riparian forest buffers. Publ. NA-PR-07-91. US Department of Agriculture, Radnor, PA, 24 pp.

²⁹ Ibid.

species to be used should be similar to species currently found on the Property and should be planted in a sufficient density so as to prevent the further establishment of invasive species. Moreover, we recommend that deed restrictions be placed on the buffer areas preventing the cutting of woody vegetation and the establishment of any structures. We also recommend that stone blocks (*sensu*, Calhoun and Klemens³⁰) be placed at the edge of the buffer on each lot to allow homeowners to clearly identify its boundary. The buffer should also be clearly labeled on survey maps provided to each property owner.

8.0 Mitigation

In addition to the mitigation efforts already proposed by the Applicant (see Section 1.6 of the DEIS), TCC has developed additional mitigation activities aimed specifically at bog turtles to offset any unforeseen impacts. We have recommended these measures to the Applicant, and the Applicant has expressed a willingness to provide this type of mitigation. These mitigation measures are as follows:

- TCC recommends that Applicant fund a study of bog turtles. Despite their high-profile nature, relatively little is known of the ecology of these turtles in developed landscapes. A pre- and post-development study of the response of bog turtles and their habitat to development would provide data critical to designing conservation and management plans for this species. We recommend that the Applicant consult with Dr. Utter on the possibility of funding his work as this population lies within the same watershed as the Summit Woods Site.
- In addition, we recommend that the Applicant fund the purchase of land surrounding a known bog turtle site. We highly recommend that the Applicant coordinate this purchase with NYSDEC and USFWS.

9.0 Conclusions

After reviewing the Natural Resources Survey prepared by Ecological Solutions and the DEIS prepared by M.A. Day Engineering, and conducting numerous Site visits as well as conversing with representatives from the NYSDEC and USFWS, TCC presents our conclusions on the ETR-issues at the Summit Woods Site below.

Potential Indiana bat summer roosting habitat occurs in various forested areas on the Summit Woods Site. However, the proposed designation of these areas as open space will preserve this habitat. Conversely, primary Blanding's turtle habitat does

³⁰ Calhoun, A.J.K., and M.W. Klemens. 2002. Best development practices: Conserving pool-breeding amphibians in residential and commercial developments in the northeastern United States. MCA Technical Paper No. 5, Metropolitan Conservation Alliance, Wildlife Conservation Society, Bronx, New York.

not occur on the Property. As these turtles have not been found in nearby areas of primary habitat, and as the nearest known population of these turtles is outside of the known dispersal capability for this species in the area, it is unlikely that the Site is used by these turtles. Therefore, further evaluation of the Indiana bat and Blanding's turtle issues is not warranted.

Potential bog turtle habitat does occur in NYSDEC Wetland HJ-49 with some areas of potential habitat on the proposed Summit Woods site. However, preliminary survey efforts have not documented the presence of these turtles on the Summit Woods Site. Moreover, there are current and significant threats to this habitat such as the establishment of invasive species and woody vegetation. It is our opinion that in the absence of any disturbance (e.g., farming) this habitat will progress to a forested state that will ultimately be unsuitable for bog turtles.

To our knowledge, the nearest known bog turtle population occurs in an area approximately 1 mile to the southwest of the Summit Woods Site. This population was discovered in 2004 and is known to be composed of at least 3 individuals. Due to the small home ranges and limited dispersal tendencies of bog turtles (see Section 2.2) it is highly unlikely that turtles from this population migrate onto the Summit Woods Site. Moreover, it is unlikely that turtles from other off-site populations (if any) move onto the Site, and vice-versa, as HJ-49 is surrounded by heavily trafficked roads (i.e., Route 52, Taconic Parkway, I-84). Thus, the bog turtle population in HJ-49 is likely isolated to this wetland and the occurrence of turtles within this wetland complex may be restricted to its southwest section.

The absence of direct wetland impacts and the inclusion of a 100-foot buffer in the development plan, in conjunction with the propensity of bog turtles to avoid upland habitat, significantly minimizes the potential for direct impacts to these turtles (if present on-site) or their habitat. The potential for indirect impacts to potential bog turtle habitat can also be significantly reduced assuming the incorporation of TCC's recommendations into the proposed development plan. It should be noted that despite these recommendations, TCC feels that there is a low likelihood that bog turtles currently occur on the Summit Woods site as the exchange of individuals from nearby off-site populations is remote due to the large distances separating these areas, and the because preliminary survey efforts have failed to document these turtles on-site. However, as there may be unforeseen impacts associated with the project, we have offered several mitigation strategies such as the funding of research on bog turtles and/or the funding of a purchase of land surrounding known populations of bog turtles to offset and/or compensate for these impacts. Thus, we feel that this Property can be developed according to the Applicant's specifications while preserving the bog turtle habitat on-site.