

DESCRIPTION OF LAND

Exhibit VIII. C.1.f

Below are summaries of a Phase I report, geotechnical reports, a groundwater well investigation report, and wildlife reports, and an Environmental Assessment Form (Part 1) conducted with respect to the RW Hudson Valley site. As provided in Question and Answer number 322, full versions of the reports summarized below are contained in electronic format submitted along with this Application as identified in the Application table of contents. RW Orange County LLC has run searches of the federal and New York State threatened and endangered species databases and has conducted or is in the process of conducting all environmental, geotechnical, and wildlife surveys recommended by its expert team. No impediments to completion of the project have been found.

Project Site Phase I Environmental Assessment (ESA)

GEI Consultants, Inc., P. C. ("GEI") conducted a Phase I ESA of the Hudson Valley site in June 2014. Following the Phase I ESA, GEI concluded that no remedial action is warranted.

Most of the Project Site is undeveloped, being comprised of forest and fields, many of which appear to have been used for farming in the past. Two streams trend north-south in the western and eastern portions of the site. Ponded water is present in the north-central portion of the Project Site, and wetlands are present in the southeastern portion of the Project Site and along its southwestern boundary. A small pond is also present in the south-central portion of the Project Site. Overgrown roadways and paths are present throughout the Project Site.

A residence is present in the northeastern portion of Lot 70.2 along Route 747. An unoccupied residential structure is present in the northwestern portion of the Project Site on Lot 58. The area surrounding the residence was overgrown and forest is present in the rear portion of this lot.

An abandoned farm silo is present in the mid-central portion of the Project Site along Route 17K on Lot 64.

Remnants of a former metal fabrication company staging area is present adjacent to the southeastern corner of Lot 70.2 on Lot 65.1, near the southeastern corner of Lot 65.22. These remnants include approximately eight box storage containers, a parts roller, and other metal structures. Open containers were observed to contain metal parts and structures. A pile of truck tires was also present in this area. No evidence of spillage or staining was observed in this area.

A farmhouse complex is present in the south-central portion of the Project Site in Lot 74.2. The complex is comprised of one unoccupied residential structure, one occupied residential structure, and a barn. An underground fuel oil storage tank was indicated to be present on the eastern side of the abandoned residential structure as evidenced by a fill port and vent pipe. There was no evidence of chemicals handling or distressed vegetation observed at the farmstead complex.

Remnants of a farmstead are present in the south-western portion of the Project Site in Lot 75.2. These remnants are comprised of partial stone foundations and structures.

A very limited amount of discarded materials were observed on the Project Site during GEI's site visit. These materials included a discarded metal 55-gallon drum, a metal pail, a yard canopy, appliances, and a pile of asphalt roofing shingles. An approximate 1,000-gallon steel tank was observed on the ground in the northern portion of the Project Site in the vicinity of Route 17K in Lot 64. The tank contained a few inches of an oil/water mixture.

Other than the two tanks noted above, no evidence of hazardous materials was observed on the Project Site during the site visit to indicate an environmental concern for the Project Site.

The majority of the site historically has been undeveloped or used for farming. By 1903, the only development appears to have been a farmstead in the southwestern portion of the Project Site on Lot 75.2. Sometime between 1903 and 1942, a second farmstead in the southern portion of the Project Site on Lot 75.2 was constructed. Sometime between 1903 and 1957, a couple of small buildings were constructed on the northern portion of the Project Site on Lots 58, 64, and 65.22 along Route 17K. Circa 1985, the

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northern portion of the site in Lot 65.22 appears cleared. By 1994, the area of the trailers and metals fabrication staging area in the eastern portion of Lot 70.2 appears active; fields in the western portion of the site appear more segmented; since at least 2006 the Project Site is similar to current characteristics and the fabrication staging area has been inactive.

The environmental database search conducted as part of this Phase I ESA did not identify the Project Site in any database and no adjacent or nearby sites within the database search are considered to pose an environmental concern for the Project Site.

Based on GEI's findings and opinions, environmental and business related issues identified for the project are as follows:

- One Recognized Environmental Condition (REC) was identified for the Project Site; an underground heating oil storage tank (UST) associated with the unoccupied farmstead residence on Lot 74.2.
- It is noted that an approximate 1,000-gallon aboveground storage tank is abandoned in the northern portion of the Project Site on Lot 64, and contains a few gallons of a water/oil mixture.
- Business related items are identified for the few residential buildings present on the Project Site in Lots 58, 70.2 and 74.2. Since these buildings were constructed prior to 1970, it is possible that they contain asbestos-containing materials and lead-based paint.
- Water supply wells are reported to be present on the property.

Recommendation to address the REC and business related items noted above are as follows:

- A subsurface investigation should be conducted to confirm the presence of the residential underground heating oil tank on Lot 74.2, and to characterize any potential impacts to soil and groundwater when the site is redeveloped.
- Remove and properly disposed off-site the limited contents of the abandoned 1,000-gallon aboveground storage tank in the northern portion of the Project Site in Lot 64 when the site is redeveloped.
- For the few residential buildings on the Project Site in Lots 58, 70.2, and 74.2, since it is possible that they contain SACM and lead-based paint, any renovation or demolition of these structures should be conducted consistent with associated regulations and good industry work practices when the site is redeveloped. Any subsurface disposal systems associated with these residences should also be closed at the same time.
- Additionally, if water supply wells on the Project Site are not planned to be used they should be properly abandoned consistent with regulatory requirements when the site is redeveloped.

Project Site Geotechnical Assessment and Geotechnical Report

At this time, there is no known geological or structural defect for the Resorts World Hudson Valley site. Two geotechnical investigations were performed on portions of the site in the past, in support of prior development proposals. A geotechnical investigation performed specifically in support of the proposed Resorts World Hudson Valley development is underway.

A geotechnical investigation was conducted in 1998 to obtain sufficient information so recommendations for the design and construction of feasible foundation types and earthworks could be incorporated into the final design of the Verticon Warehouse that was previously proposed on a portion of the project site. The following information was taken from the resulting report and presented here to provide an idea of the geological/geotechnical conditions on the corresponding Resorts World Hudson Valley project site parcels.

The proposed location of this facility included elements in the three southernmost project site parcels. This area is characterized by several rolling meadows with wooded hedgerows in between. Federal and New York State Department of Environmental Conservation (NYSDEC) wetlands are located to the north, east, and west of the area, and I-84 borders the area to the south. A pond with a small stream flowing in the northward direction is present at the center of the area, and a residence is located east of the pond.

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The Resorts World Hudson Valley parcel area included in this investigation is approximately 760 feet in length and 500 feet in width at its longest and widest areas, respectively. This investigation did include borings in two additional development parcels to the north, but these borings were not of a quantity or in locations suitable to determine the surface/subsurface conditions in either one.

No visual signs of contamination were observed during the investigation. Soil conditions in this area generally consisted of the following:

- Stratum 1: A thin layer of silty-sandy topsoil ranging from 0.2 to 2 feet thick.
- Stratum 2: A layer of sand with some silt or clayey silt, and a trace to some gravel. This layer had a thickness ranging from 2 to 8 feet, and is dense to very dense.
- Stratum 3: A layer composed of weathered shale, some sand, and trace amounts of silt with a general depth range of 2 to 10 feet was observed in some investigation locations.
- Stratum 4: A layer of sandy till with trace to some quantities of gravel and silt. This layer extends between 4 and 12 feet in depth, and is also very dense.
- Stratum 5: Weathered bedrock

At locations where the weathered shale stratum is not present, the sandy soil extends to a similar sandy till and then to weathered bedrock.

Refusal in shale bedrock was encountered at depths between 2 and 15 feet bgs, and in a few locations bedrock extends above the ground surface. The surface of the shale was described as very weathered and should be rippable in the upper 3 to 5 feet in general excavations.

Based on groundwater levels measured during the boring program and the moisture condition of the samples recovered from the boring locations, groundwater water is present in the overburden between the depths of 3.5 to 8 feet. In wetland areas, water was observed at or near the ground surface. Perched groundwater tables may be present at higher elevations in the soil profile due to retention by lenses or layers of silt or clay soils.

The construction recommendations yielded by this investigation included recommendations for stabilizing the subgrade, the type and application of controlled fill, grading, building foundations, floor slabs, and dealing with construction procedures and problems.

Three options were suggested for subgrade stabilization:

- Proof-rolling with a ten ton or larger roller after all organic topsoil, vegetation, peat, organic silt or pond sediments, and uncontrolled fill have been removed from the site to identify soft spots, which should then be excavated and backfilled with controlled fill material;
- Roll in coarse fill such as cobbles or crushed rock materials, ensuring that all of the voids are filled completely with fines; and
- Place a reinforcement or separation type of geotextile on the subgrade and follow with lift of clean, granular fill with a thickness ranging from 1 to 2.5 feet, as necessary, to create a working mat upon which to construct the remainder of the controlled fill.

Investigation in these parcels showed the presence of large pieces of shale within the upper 2 to 8 feet of soil. Large pieces should be broken into pieces 1 foot in diameter or less and placed in the lower portions of the deeper fill areas. Nesting should not occur, and fill should be placed around each piece such that voids are not present. All controlled fill should be free of organic and/or frozen material, and free-draining controlled fill should have less than ten percent fines passing the #200 sieve. Options for controlled fill included:

- Relatively clean granular fill can be placed in lifts not exceeding 12 inches in loose thickness and should be compacted to a minimum of 95 percent of the maximum ASTM Specification D 1557-91 density, modified proctor.
- Material containing significant percentages of fine-grained soil or cohesive material should be placed in lifts not exceeding 9 inches in loose thickness and compacted to a minimum of 90 percent of the same density standard.

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Factors to consider during fill work include:

- The ability to compact on-site material during wet weather or under poor drying conditions;
- The length of the construction schedule and the weather conditions (i.e., winter or rainy conditions) expected during the placement of fill; and
- Placement of rock fill in the upper elevations to create a solid working mat for winter and spring construction, as the on-site soils may develop soft, wet areas and require additional work. This rock fill should not exceed 6 inches in diameter to allow for easier fine-grading and placement of footing and utilities.

The report recommended that cut or fill slopes composed of on-site materials be graded on a 3:1 slope or shallower. If groundwater is encountered in cut slopes, slope drains should be installed to lower the water level or the slope should be graded at 4:1 or shallower.

In the case of building foundations, it was recommended that the proposed structure be supported by spread-footing foundations resting on undisturbed, inorganic soils or on controlled fill which has been placed over the undisturbed material. The footings can be designed for a maximum net allowable soil-bearing pressure of 3,000 psf. Additional footing recommendations include:

- For load-bearing strip footings, a minimum width of 2 feet is recommended.
- Isolated footings should be at least 3 feet wide.
- A minimum of two #5 bars should be placed in strip footings resting on rock and soil, placed at the top and the bottom and separated by a minimum of 12 inches vertically or an equivalent amount of reinforcement from the foundation walls.
- Exterior footings or footings in unheated areas should be embedded a minimum of 4 feet for protection from frost action.
- Interior footings should be embedded a minimum of 2 feet below the finished grade to develop the bearing value of the soils.

Like foundations, floor slabs should rest on undisturbed, inorganic soils or on controlled fill placed over the undisturbed material. A 6-inch layer of well-graded, free-draining granular material should be placed beneath the floor slab to provide drainage, act as a moisture barrier, and provide better and more uniform support. If vehicle loadings will be applied to the floor slab, the proposed slab and supporting soils should be treated as a pavement structure.

The following recommendations for construction procedure were included:

- Excavations more than a few feet should be sheeted and braced or laid back to prevent sloughing in of the sides.
- Sump-pit and sump-pump-style dewatering may be required in excavations or in low areas during wet weather, or if groundwater is encountered.
- Temporary paving may be required for moving around the site during wet or thaw weather. Suggested paving materials include coarse fill material or a combination of separation/reinforcement geotextile and coarse material.
- Subgrades should be kept from freezing during construction, and water, snow, and ice should not be allowed to collect and stand in excavations or low areas of the subgrade.
- Obstacles, including old foundations or building rubble, bedrock, and boulders may be encountered in excavations. Hydraulically-operated rippers, pneumatic tools, or drilling and blasting may be necessary to remove bedrock or large boulders.
- Design and construction procedures should include measures to limit the potential for slab curl through control of the shrinkage and curing properties of the concrete.

A second geotechnical assessment was conducted in 2007 to assess development potential for the proposed development by HIBC, which was planned for lots 70.2 and 89. The following information was taken from the resulting report and presented here to provide an idea of the geological/geotechnical conditions on the corresponding RW Hudson Valley parcels.

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The parcels are bounded by South Drury Lane and State Highway 747 to the east, Interstate 84 to the south, and additional RW Hudson Valley parcels (described above) to the north and west.

The topography of the access parcels is defined by a north- to south-oriented drumlin located in the northern portion of both parcels; the access parcel area is approximately 750 feet in length and 650 feet in width at its longest and widest areas, respectively.

The 2007 investigation did not include any observations of bedrock, however the Geologic Maps of New York indicate that the bedrock beneath these parcels is part of the Normanskill Formation. The United States Geological Survey (USGS) indicates that the Normanskill Formation is a shale composed of minor mudstone and sandstone.

No visual signs of contamination were observed during the investigation. Soils were predominantly granular – glacial till visually classified as sandy silt and silty sand with gravel. Occasional cobbles and/or boulders were encountered, and may be present in greater quantities in the soils of the area. Groundwater was observed in the overburden in the northeastern portion of the parcels investigated between 7.5 and 9 feet below the existing grade.

USGS soil survey maps indicated that soils within the boundaries of the access parcels is composed of gravelly silt loam and/or “very stony” soils, however “very stony” soils were not encountered at the test pit locations.

These subsurface conditions were considered favorable for the proposed HIBC development from a geological standpoint based on the available information reviewed and the preliminary subsurface investigation. The presence of predominantly granular soils and observed undisturbed glacial till should provide adequate bearing capacity for the installation of shallow, spread footings rather than deep foundations, depending on the anticipated structural loads. However, additional specific explorations were recommended by the study. These include a more comprehensive subsurface investigation, as the 2007 work was limited to the upper 12 feet and may not be adequate for design of the final structures, and an evaluation of settlement potential, as some of the observed subsurface soils contained high percentages of clay.

Project Site Groundwater Well Investigation Report

A 26-hour aquifer pumping test was performed on April 2 and 3, 2008 to assess whether an existing site well can support a sustained yield of 10 gallons per minute (gpm). Observation well OW -1 is situated 300 feet from the test well to allow monitoring of near-well drawdown, and observation well OW -2 is situated approximately 1,500 feet from the test well in the direction of the nearest known off-site wells installed at off-site residences. The depths of the OBS wells were not reported.

To identify background aquifer conditions before the test, water levels were recorded in OW-1 and OW -2 over a three-day period prior to the start of testing. In general, there appeared to be a slight upward trend in the regional water table at a rate of approximately 0.12 feet per day.

The water level in the Mathieu well ceased to drop quickly (~33 feet of drawdown) and began stabilizing approximately 4 hours into the 26-hour pumping test. OW -1 showed approximately

10.6 feet of stabilized drawdown, and the water level recovered normally following the conclusion of the test within approximately eight hours. OW-2 showed approximately one foot of stabilized drawdown and recovered normally following the conclusion of the test within approximately eight hours.

The MPA analysis indicates that surface water may contribute partially to the recharge. According to EA, the groundwater is considered to be a moderate EPA risk. Primary surface water indicators observed in the sample included green algae, blue-green algae, diatoms and plant debris without chlorophyll.

Project Site Phase 1 & 2 Bog Turtle Survey Report

Bagdon Environmental conducted Phase 1 and Phase 2 Surveys for the state-listed endangered and federally-listed threatened bog turtle (*Clemmys muhlenbergii*) on the Project Site and delivered a Phase 1 & 2 Bog Turtle Survey Report dated August 2008. A Phase I habitat assessment of the site was conducted on April 2, 3 and 15, 2008 pursuant to the “Bog Turtle (*Clemmys muhlenbergii*), Northern Population,

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Recovery Plan” (dated May 15, 2001) and revisions dated April 2006. 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 the U. S. Fish and Wildlife Service (USFWS). The results of the Phase 1 survey indicated that a relatively small area of the site’s wetland (approximately 3.5 acres) was potentially suitable for bog turtles necessitating a Phase 2 survey.

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.

Only a small portion of the wetlands (approximately 3.5 acres of emergent/scrub-shrub wetland) on the site have potentially suitable habitat for bog turtles. This area was investigated and searched during the phase 2 survey.

Most of the wetlands onsite have been disturbed as a result of farming and beaver activity, as evidenced by the dominance of invasive plant species, high water levels and eutrophic water conditions. The dominance of invasive species (primarily purple loosestrife) severely reduces the overall habitat suitability for bog turtles due to the height and density of the plants. The canopy created by purple loosestrife and phragmites shades out sunlight and the plant density inhibits movement. The sustained high water levels and eutrophic conditions found in these wetlands are also not conducive to bog turtle inhabitation. Given the highly degraded condition and low habitat suitability of most of the wetlands, bog turtles are very unlikely to be present.

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

- Most of the wetlands that are on or contiguous to the site consist of flooded forested and emergent wetlands dominated by dense stands of invasive species (*Lythrum salicaria* and *Phragmites australis*). These invasive species are also prevalent in the large wetland complex that borders the southeast site boundary, Drury Road and I-84. The extensive wetlands in this area have likely been affected by hydrological alteration and nutrient enrichment as a result of I-84 construction and operation. These areas do not constitute suitable bog turtle habitat.
- A mixed emergent/scrub-shrub wetland area of approximately 3.5 acres (located in the center of the site) 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. Reed canary grass, an invasive wetland plant, is dominant throughout much of the area.
- 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.

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Project Site Federal Protocol Survey for Indiana Bats

Stearns & Wheler conducted federal protocol summer surveys for the federally-listed endangered species Indiana bat (*Myotis sodalis*) at the Project Site and delivered a report dated September 2008. The surveys were done in compliance with the federal protocol outlined in Appendix 5 of the *Indiana Bat (Myotis sodalis) Draft Recovery Plan: First Revision (2007)*.

Mist nets for capturing bats were set up at two net sites of two net locations each (for a total of four nets) for two nights. 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.

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 waning gibbous throughout the sampling period. Nets were set up in early evening, but were left in collapsed position to prevent bycatch of birds. Two net sites (four net locations) were selected on the site and 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 it was photographed and then released.

Based on the cover types identified, there is potentially suitable habitat for Indiana bats on this site. The site contains mature northern successional hardwood and red maple-northern hardwood swamp forest habitat, which contains large trees and snags with cavities and exfoliating bark. The upland wooded areas also contain trees and snags of a variety of species, which receive direct sunlight during at least part of each day and provide exfoliating bark for roosts. There is a north/south-oriented hedgerow along a marsh headwater stream and other hedgerow connected forested areas along the western side of the property. Wooded areas on the eastern side of the property were younger growth with a dense understory. As such, the eastern side of the property did not yield suitable flight, foraging, or roost habitat for Indiana bats. No subterranean habitats (caves or mines) were found on the site.

Based on the suitability of habitat on the site, mist nets were set in probable travel corridors for bats. The net site west of Maple Avenue included one net set in an opening of mature deciduous forest between successional old field and a flooded swamp, and another set perpendicular to the edge of mature deciduous forest at the edge of a flooded swamp. Nets east of Maple Avenue were set perpendicular to the stream. No nets were set in association with the eastern side of the property, as the density of vegetation made travel corridors improbable.

The Project Site was sampled on July 21 and 22, 2008, with four net locations monitored, yielding eight net nights over the course of the study period. Habitats sampled included successional northern hardwoods. On the first sampling night (July 21, 2008), nets were deployed at 2120 EDT and were taken down at 0220 (July 22, 2008), for a total netting time of five hours. Temperatures ranged from 25.6°C to 20.9°C, with overcast skies which began to clear at 2310 EDT. Winds were calm. Fourteen bats of 2 species were captured, including 4 Big Brown bats (*Eptesicus fuscus*) and 10 Little Brown bats (*Myotis lucifugus*). No Indiana bats were captured. On the second sampling night (July 22, 2008) nets were deployed at 2050 EDT and were taken down at 0150 EDT (July 23, 2008) for a total netting time of five hours. Temperatures ranged from 24.3°C to 22.1°C, with overcast skies which began to clear at 2400 EDT. Winds were calm. Ten bats of 3 species were captured, including 4 Big Brown bats, 4 Little Brown bats, and 2 Northern Long-Eared bats (*Myotis septentrionalis*). No Indiana bats were captured.

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The fact that no Indiana bats were captured on site is not definitive proof that they do not use the site to roost or forage. It is not statistically possible to demonstrate that an event has not occurred. However, having completed the federal protocol surveys in habitat deemed suitable to support Indiana bats, and having obtained a negative result, it may be reasonably assumed that Indiana bats do not use the site to any great extent. While Indiana bat use is therefore considered unlikely, it would be prudent to implement measures to avoid or minimize adverse impacts to bats and loss of habitat. As such, the following precautions are recommended for proposed development on this site to avoid incidental or direct take of Indiana bats:

- Disturbance of mature forested habitats along the western side of the property should be avoided and along the eastern part of the property adjacent to the flooded swamp should be minimized to the extent practicable. Disturbance of flooded mature deciduous swamp along the stream corridor should also be minimized as three different species of bat used these areas as travel and forage corridors.
- Clearing of trees during spring and summer months, when Indiana bats may potentially use forested habitat, may yield incidental take. To avoid this possible incidental take, forest clearing activities should take place between the months of October and March, when Indiana bats will be hibernating and will not be using habitats on the site.

Federal protocol mist net surveys did not yield the capture of any Indiana bats on the Project Site, despite the presence of potentially suitable habitat for the species. Although no Indiana bats were captured, minimized clearing and seasonal restrictions on clearing are recommended to avoid incidental take of Indiana bats.

New York State Environmental Quality Review (SEQR)

In accordance with SEQR, the Town of Montgomery is evaluating whether or not proposed project elements would result in significant adverse environmental impacts. RW Hudson Valley has initiated the SEQR coordinated review process. The Environmental Assessment Form (Part 1) was submitted electronically to the Town of Montgomery on June 27, 2014, and in hard copy on June 30, 2014. RW anticipates completion of the SEQR process on or before November 24, 2014. Timing of completion and likelihood of no significant impacts being found are buttressed by a prior Environmental Assessment Form process which was undertaken for a vast majority of the Project Site in April 2008.

RW Hudson Valley has been designed to minimize and avoid environmental impacts to the greatest extent practicable. As detailed in Exhibit IX.A.3, RW Orange County LLC has developed a comprehensive mitigation strategy for potential environmental impacts identified through the SEQR coordinated review process, and is committed to meeting or improving environmental quality through mitigation measures.

The proposed action under SEQR would consist of various local, state and federal discretionary approvals to allow the construction of Resorts World Hudson Valley. Discretionary approvals include site plan review and a special use exception from the Town of Montgomery Planning Board for the parcels associated with the Resorts World Hudson Valley identified by the Orange County Tax Map as Section 31, Block 1, Lots 54.211, 58, 64, 65.22, 70.2, 74.2, 75.2, 89, 94 and 95. The proposed action also includes a zoning amendment to establish a Gaming Zoning Overlay District, which would allow a gaming facility and related resort development in Montgomery. Additional government approvals and/or permits that will be necessary for the RW Hudson Valley Project are detailed in EXHIBIT VIII.C.3.c. Necessary Permits.

The proposed action is considered a Type I action under SEQR because it meets the following criteria specified in 617.4 SEQR:

- the adoption of changes in the allowable uses within any zoning district, affecting 25 or more acres of the district;
- a project or action that involves the physical alteration of 10 acres;
- parking for 1,000 vehicles; and

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- in a city, town or village having a population of 150,000 persons or less, a facility with more than 240,000 square feet of gross floor area.

The Montgomery Town Board is the requested Lead Agency for SEQR review. Anticipated Involved and Interested agencies are listed below, yet are subject to change pending further discussions with the Town.

Involved Agencies (anticipated):

- Town of Montgomery Planning Board
- Orange County Planning Department
- Orange County Health Department
- New York State Department of Environmental Conservation (NYS DEC)
- New York State Department of Transportation (NYS DOT)
- New York State Office of Parks, Recreation and Historic Preservation (NYS OPRHP)
- New York State Gaming Commission (NYS GC)

Interested Agencies (anticipated):

- U.S. Army Corps of Engineers (USACE)
- U.S. Fish & Wildlife Service (USFWS)
- Federal Aviation Administration (FAA)

Additional Reports/Surveys Expected

The following additional surveys have been or are in the process of being conducted. Reports will be produced in the coming weeks and will be submitted if needed to update the Application. Results to date have not suggested any impediments to completion of the project.

- Updated Indiana Bat Report
- Updated Geotechnical Report

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SUPPORT EXHIBIT VIII. C.1.f-1

Executive Summary

The findings of this Phase I Environmental Site Assessment (ESA) are based on the following: visual inspection of the project site, visual survey of adjacent/contiguous and nearby properties, and review of available historical property and environmental regulatory agency records of the project site described as the RW Hudson Valley Site, located in Montgomery, Orange County, New York. The project site is comprised of ten Lots in Section 31, Block 1. These Lot numbers include 54.211, 58, 64, 65.22, 70.2, 74.2, 75.2, 89, 94, and 95.

The project site occupies most of the area located south of Route 17K to Interstate 84, and between Route 747 and Maple Avenue. A portion of the project site is also located west of Maple Avenue just north of Interstate 84.

The project site is irregular-shaped. It fronts on Route 17K on its north boundary for approximately 1,000 feet with intervening properties in its western portion. It occupies approximately 2,800 feet on Maple Avenue along its west boundary, approximately 4,100 feet on Interstate 84 along its southern boundary, and approximately 3,000 feet along Lot 65.22 and a portion of Lot 70.2 along its eastern boundary.

Most of the project site is undeveloped, being comprised of forest and fields, many of which appear to have been used for farming in the past. Two streams trend north-south in the western and eastern portions of the site. Ponded water is present in the north-central portion of the project site, and wetlands are present in the southeastern portion of the project site, and along its southwestern boundary. A small pond is also present in the south-central portion of the project site. Overgrown roadways and paths are present throughout the project site.

A residence is present in the northeastern portion of Lot 70.2 along Route 747. An unoccupied residential structure is present in the northwestern portion of the project site on Lot 58. The area surrounding the residence was overgrown and forest is present in the rear portion of this lot.

An abandoned farm silo is present in the mid-central portion of the project site along Route 17K on Lot 64.

Remnants of a former metal fabrication company staging area is present adjacent to the south-eastern corner of Lot 70.2 on Lot 65.1, near the southeastern corner of Lot 65.22. These remnants include approximately eight box storage containers, a parts roller, and other metal structures. Open containers were observed to contain metal parts and

structures. A pile of truck tires was also present in this area. No evidence of spillage or staining was observed in this area.

A farmhouse complex is present in the south-central portion of the project site in Lot 74.2. The complex is comprised of one unoccupied residential structure, one occupied residential structure, and a barn. An underground fuel oil storage tank was indicated to be present on the eastern side of the abandoned residential structure as evidenced by a fill port and vent pipe. There was no evidence of chemicals handling or distressed vegetation observed at the farmstead complex.

Remnants of a farmstead are present in the south-western portion of the project site in Lot 75.2. These remnants are comprised of partial stone foundations and structures.

A very limited amount of discarded materials were observed on the project site during GEI's site visit. These materials included a discarded metal 55-gallon drum, a metal pail, a yard canopy, appliances, and a pile of asphalt roofing shingles. An approximate 1,000-gallon steel tank was observed on the ground in the northern portion of the project site in the vicinity of Route 17K in Lot 64. The tank contained a few inches of an oil/water mixture.

Other than the two tanks noted above, no evidence of hazardous materials was observed on the project site during the site visit to indicate an environmental concern for the project site.

The majority of the site historically has been undeveloped or used for farming. By 1903, the only development appears to be a farmstead in the southwestern portion of the project site on Lot 75.2. Sometime between 1903 and 1942, a second farmstead in the southern portion of the project site on Lot 75.2 was constructed. Sometime between 1903 and 1957, a couple of small buildings were constructed on the northern portion of the project site on Lots 58, 64 and 65.22 along Route 17K. Circa 1985, the northern portion of the site in Lot 65.22 appears cleared. By 1994, the area of the trailers and metals fabrication staging area in the eastern portion of Lot 70.2 appears active; fields in the western portion of the site appear more segmented; since at least 2006 the project site is similar to current characteristics and the fabrication staging area has been inactive.

The environmental database search conducted as part of this Phase I ESA did not identify the project site in any database and no adjacent or nearby sites within the database search are considered to pose an environmental concern for the project site.

Based on GEI's findings and opinions, environmental and business related issues identified for the project are as follows:

- One Recognized Environmental Condition (REC) was identified for the project site; an underground heating oil storage tank associated with the unoccupied farmstead residence on Lot 74.2.
- It is noted that an approximate 1,000-gallon aboveground storage tank is abandoned in the northern portion of the project site on Lot 64, and contains a few gallons of a water/oil mixture.
- Business related items are identified for the few residential buildings present on the project site in Lots 58, 70.2 and 74.2. Since these buildings were constructed prior to 1970, it is possible that they contain asbestos-containing materials and lead-based paint.
- Water supply wells are reported to be present on the property.

Recommendation to address the REC and business related items noted above are as follows:

- A subsurface investigation should be conducted to confirm the presence of the residential underground heating oil tank on Lot 74.2, and to characterize any potential impacts to soil and groundwater when the site is redeveloped.
- Remove and properly disposed off-site the limited contents of the abandoned 1,000-gallon aboveground storage tank in the northern portion of the project site in Lot 64 when the site is redeveloped.
- For the few residential buildings on the project site in Lots 58, 70.2, and 74.2, since it is possible that they contain SACM and lead-based paint, any renovation or demolition of these structures should be conducted consistent with associated regulations and good industry work practices when the site is redeveloped. Any subsurface disposal systems associated with these residences should also be closed at the same time.
- Additionally, if water supply wells on the project site are not planned to be used they should be properly abandoned consistent with regulatory requirements when the site is redeveloped.

DESCRIPTION OF LAND

Support Exhibit VIII. C.1.f-1

See Support Exhibit VIII.C.1.f-1 submitted electronically on the USB for Support Material for the supporting material for this document.

DESCRIPTION OF LAND

SUPPORT EXHIBIT VIII. C.1.f-2

DESCRIPTION OF LAND

Support Exhibit VIII. C.1.f-2

See Support Exhibit VIII.C.1.f-2 submitted electronically on the USB for Support Material for the Geotechnical Assessment and Report.

DESCRIPTION OF LAND

SUPPORT EXHIBIT VIII. C.1.f-3

EXECUTIVE SUMMARY

Savanna Asset Management, LLC (Savanna), of New York City, New York, retained The Chazen Companies (TCC) to evaluate the yield and quality of an existing well on a ~281 parcel in the Town of Montgomery (Figure 1). Proposed water requirements are approximately 9 gpm and the proposed use would fall into NYSDOH categorization for a Noncommunity, Nontransient Public Water System.

A 26-hour flow test was successfully completed between April 2 and 3, 2008, using the existing well ("Mathieu well") at a flow rate of 10 gpm. The test suggested there will be no significant off-site aquifer drawdown influences. Water samples met NYSDOH Sub-Part 5 standards. Microfiltration may be required to manage any parameters characteristic of surface water.

During the pumping test, the rate of aquifer drawdown observed in the Mathieu well and the nearest observation well, situated 300 feet from the test well (OW-1), began stabilizing within 4 hours of the beginning of the test. Stabilized drawdown in these wells were approximately 35 feet and 10 feet, respectively. A more distant observation well (OW-2), situated approximately 1,500 feet from the test well, stabilized ten hours into the test period with one foot of drawdown. Existing homeowner wells further from the Mathieu than observation well OW-2 would therefore be expected to experience less than one foot of drawdown, which is not expected to influence capacity or quality of these wells.

Site geology consists of shallow soils overlying shale and siltstone bedrock formations. Structural fractures and bedding deformation in the shale suggest the likelihood of preferential groundwater pathways along a general north-south orientation. The Mathieu well is installed in the bedrock formation. Wetlands are present on the site.

DESCRIPTION OF LAND

Support Exhibit VIII. C.1.f-3

See Support Exhibit VIII.C.1.f-3 submitted electronically on the USB for Support Material for the supporting material for this document.

DESCRIPTION OF LAND

SUPPORT EXHIBIT VIII. C.1.f-4

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 the Savannah Properties site. The 280± acre site is located in the Town of Montgomery, Orange County, New York, as shown on the attached location map (Figure 1).

A Phase I habitat assessment of the site was conducted on April 2, 3 and 15, 2008 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 the U. S. Fish and Wildlife Service (USFWS). The results of the Phase 1 survey indicated that a relatively small area of the site’s wetland (approximately 3.5 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
- Orange 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)
- Robyn A. Niver, USFWS - Endangered Species Biologist

Bagdon Environmental met with Mr. Breisch of the NYSDEC Endangered Species Unit 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 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 Ms. Niver.

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:

- The site contains approximately 3.5± acres of emergent and mixed emergent scrub-shrub 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.

- 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 16–20 person hours/day. The search effort will be conducted on 4 separate days for a total search effort of 64–80 person hours. (Note: The required minimum search effort is 56 person hours, based upon Guidelines for Bog Turtle Surveys (Revised April 2006) which recommends 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.
- 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

Amy Goodstine – Bagdon Environmental
Ecologist

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

David J. Griggs – The Chazen Companies
Biologist

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 undeveloped with areas of mature forest, successional forest, old-field, mowed areas and wetland. Much of the site has been actively farmed in recent years for row crops and hay. 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 wetlands during Bagdon Environmental's field surveys is attached as Appendix C. A more comprehensive list of plants in the phase 2 search area is also provided in Appendix C. Photographs of the site are included as Appendix D.

The results of the Phase 1 survey indicated that an area of wetland (See Figure 2) contained some of the components of bog turtle habitat including mucky soils, spring-fed rivulets and open emergent and scrub-shrub cover types. A variety of wetland herbaceous species were present in the phase 2 area, however, there were no strong calciphites (indicative of alkaline conditions with a pH greater than 8.0) present that are typical of fens. Water pH in the phase 2 area was circum-neutral ranging from 6.6 to 7.3. The primary dominants in the emergent portions of this wetland are reed canary grass (*Phalaris arundinacea*), purple loosestrife and wooly sedge (*Carex lasiocarpa*). Several spotted turtles (*Clemmys guttata*), a co-genera of the bog turtle, were observed in this area. Spotted turtles are listed as a "Species of Special Concern" by the NYSDEC, but are not federally listed.

Extensive forested wetland is present immediately east of the phase 2 area with large areas of emergent wetland to the north. These areas have been inundated by beaver activity for a number of years. Beyond the edge of the phase 2 study area, the water levels increase significantly and most of the emergent wetland is dominated by *Lythrum salicaria*. Several areas of open water are present within the adjacent wetlands. Most of the open water areas are the result of beaver activity. Eutrophic conditions (including filamentous algae, stagnant water and dense duckweed *Lemna* sp.) were noted in some of the open water areas. Painted turtles (*Chrysemys picta*) were also observed indicating more permanent inundation. These areas were deemed unsuitable habitat and were excluded from the Phase 2 search.

Common woody species in the forested wetland include red maple, American elm (*Ulmus americana*), pin oak (*Quercus palustris*), red ash (*Fraxinus pennsylvanicus*), 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, pin oak, 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 wetlands (approximately 3.5 acres of emergent/scrub-shrub wetland) on the site have potentially suitable habitat for bog turtles. This area was investigated and searched during the phase 2 survey.

Most of the wetlands onsite have been disturbed as a result of farming and beaver activity, as evidenced by the dominance of invasive plant species, high water levels and eutrophic water conditions. The dominance of invasive species (primarily purple loosestrife) severely reduces the overall habitat suitability for bog turtles due to the height and density of the plants. The canopy created by purple loosestrife and phragmites shades out sunlight and the plant density inhibits movement. The sustained high water levels and eutrophic conditions found in these wetlands are also not conducive to bog turtle inhabitation. Given the highly degraded condition and low habitat suitability of most of the wetlands, bog turtles are very unlikely to be present.

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

- Most of the wetlands that are on or contiguous to the site consist of flooded forested and emergent wetlands dominated by dense stands of invasive species (*Lythrum salicaria* and *Phragmites australis*). These invasive species are also prevalent in the large wetland complex that borders the southeast site boundary, Drury Road and I-84. The extensive wetlands in this area have likely been affected by hydrological alteration and nutrient enrichment as a result of I-84 construction and operation. These areas do not constitute suitable bog turtle habitat.

- A mixed emergent/scrub–shrub wetland area of approximately 3.5 acres (located in the center of the site) 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. Reed canary grass, an invasive wetland plant, is dominant throughout much of the area.
- 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.

DESCRIPTION OF LAND

Support Exhibit VIII. C.1.f-4

See Support Exhibit VIII.C.1.f-4 submitted electronically on the USB for Support Material for the supporting material for this document.

DESCRIPTION OF LAND

SUPPORT EXHIBIT VIII. C.1.f-5

**FEDERAL PROTOCOL SURVEY FOR
INDIANA BATS (*MYOTIS SODALIS*) AT THE
PROPOSED HIBC SITE
TOWN OF MONTGOMERY, ORANGE COUNTY, NEW YORK**

SECTION 1 – INTRODUCTION

Stearns & Wheler was retained by The Chazen Companies to conduct federal protocol summer surveys¹ for the federally-listed endangered species. Indiana bat (*Myotis sodalis*), at the site of the proposed HIBC site, Montgomery, NY.

This report summarizes the survey conducted by Stearns & Wheler in July 2008. It includes a description of the study area, methods used and their compliance with federal protocol, the natural history of the Indiana bat, and findings from the survey. The report is based on a review of recent literature and on data collected in the field.

SECTION 2 – STUDY AREA

2.1 SITE LOCATION

The ±280-acre HIBC site is located on both the east and west side of Maple Avenue, about 1/2 mile south of State Route 17K, and north of Interstate 84, in the Town of Montgomery, Orange County, NY. The site was formerly a farm. Reference is made to a location map in Figure 1.

2.2 COVER TYPES

Overall, the site is dominated by early successional old field habitat that is dissected by hedgerows of mature trees. Some of the old field habitat is wetland area and might be more accurately classified as shallow emergent marsh or wet meadow cover type. The parcel west of Maple Avenue is comprised of mature northern successional hardwood forest, flooded swamp, and successional old field. A trenched, stagnant, beaver dammed stream runs through a mature forested hedgerow for much of its length in the middle of the property east of Maple Avenue,

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

feeding an unnamed stream to the north. East of the stagnant stream is successional old field with dense flooded mature deciduous forest to its west. Reference is made to Figure 2, which depicts the locations of these cover types on an aerial photograph.

Vegetation cover types identified on the property during this survey included the following (as defined by Edinger, *et al.* [2002]):

1. Shallow emergent marsh.
2. Successional old field.
3. Successional shrubland.
4. Successional northern hardwoods.
5. Red Maple-hardwood swamp.
6. Paved road/path.
7. Rural structure exterior/interior.
8. Marsh headwater stream.

All habitat types 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 (New York State Department of Environmental Conservation [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° to 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, 1999) 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).

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 hibernacula 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 200 percent increase (USFWS, 2007).

SECTION 4 – FIELD METHODS

4.1 FEDERAL PROTOCOL FOR INDIANA BAT SUMMER SURVEYS

Surveys for Indiana bats at the HIBC site were done in compliance with the federal protocol outlined in Appendix 5 of the *Indiana Bat (Myotis sodalis) Draft Recovery Plan: First Revision* (2007). 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 “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 and polyester nets with 38 mm mesh. The nets were rigged as horizontal nets (having their greatest dimension in the horizontal plane) strung between vertical upright 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). 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.

4.3 NETTING LOCATIONS AND DESCRIPTIONS

Mist nets for capturing bats were set up at two net sites of two net locations each (for a total of four nets) on the subject property for two 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 Figures 1 and 2.

TABLE 1

MIST NET LOCATIONS AND HABITATS FOR HIBC SITE

NET SITE	LOCATION		HABITAT	NET TYPE*	NIGHT
	LATITUDE	LONGITUDE			
1a	41.51654°N	074.14854°W	Mature deciduous hardwood forest adjacent to flooded swamp	3 x 6m H	2
1b	41.51676°N	074.14867°W	Mature deciduous hardwood forest adjacent to flooded swamp	3 x 6m H	2
2a	41.51809°N	074.14319°W	Stagnant (beaver dammed) stream through dense flooded mature deciduous swamp	2 x 6m H	2
2b	41.51851°N	074.14300°W	Stagnant (beaver dammed) stream through dense flooded mature deciduous swamp	2 x 6m H	2

*H=horizontally suspended between poles.

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.

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 waning gibbous throughout the sampling period.

Nets were set up in early evening, but were left in collapsed position to prevent bycatch of birds. Two net sites (four net locations) were selected on the site and 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 it was photographed and 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
ON-SITE SURVEY PROCEDURES AS COMPARED TO
FEDERAL PROTOCOL REQUIREMENTS

PROCEDURAL ELEMENT	FEDERAL PROTOCOL	ON-SITE PROCEDURES
Netting season	May 15 through August 15	July 21 and 22, 2008
Equipment	Mist nets, 2 ply, 50 denier nylon, 38 mm mesh	Mist nets, 2 ply, 50 denier nylon or polyester, 38 mm mesh
Net placement	On corridors or not; perpendicular to corridors; filling openings	On corridors; perpendicular to corridors; filling openings
Net spacing	One per km of stream or two sites per sq. km. of forest.	1 net site per sq. km. of forested habitat and 1 net site per km of stream
Net-nights (1 net for 1 night = 1 net-night)	Minimum four net-nights unless an Indiana bat is caught sooner	4 net nights
Number of net locations	Minimum of two per site; 30 m apart	Two net locations per net site; at least 30 m apart
Number of sampling nights	Minimum of two, unless Indiana bat is caught sooner	Two netting 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	No precipitation
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	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. The site contains mature northern successional hardwood and red maple-northern hardwood swamp forest habitat, which contains large trees and snags with cavities and exfoliating bark. The upland wooded areas also contain trees and snags of a variety of species, which receive direct sunlight during at least part of each day and provide exfoliating bark for roosts. There is a north/south-oriented hedgerow along a marsh headwater stream and other hedgerow connected forested areas along the western side of the property. Wooded areas on the eastern side of the property were younger growth with a dense understory. As such, the eastern side of the property did not yield suitable flight, foraging, or roost habitat for Indiana bats. No subterranean habitats (caves or mines) were found on the site.

Based on the suitability of habitat on the site, we decided to sample the site with mist nets set in probable travel corridors for bats. The net site west of Maple Avenue included one net set in an opening of mature deciduous forest between successional old field and a flooded swamp, and another set perpendicular to the edge of mature deciduous forest at the edge of a flooded swamp. Nets east of Maple Avenue were set perpendicular to the stream. No nets were set in association with the eastern side of the property, as the density of vegetation made travel corridors improbable. Reference is made to a photograph of the watercourse and other habitats on the site in Appendix A.

5.2 NETTING RESULTS

The site was sampled on July 21 and 22, 2008, with four net locations monitored, yielding eight net nights over the course of the study period. Habitats sampled included successional northern hardwoods. The data sheets from the two nights of sampling, and photos of the sampling sites are contained in Appendix A.

On the first sampling night (July 21, 2008), nets were deployed at 2120 EDT and were taken down at 0220 (July 22, 2008), for a total netting time of five hours. Temperatures ranged from 25.6°C to 20.9°C, with overcast skies which began to clear at 2310 EDT. Winds were calm. Fourteen bats of 2 species were captured, including 4 Big Brown bats (*Eptesicus fuscus*) and

10 Little Brown bats (*Myotis lucifugus*). No Indiana bats were captured. On the second sampling night (July 22, 2008) nets were deployed at 2050 EDT and were taken down at 0150 EDT (July 23, 2008) for a total netting time of five hours. Temperatures ranged from 24.3°C to 22.1°C, with overcast skies which began to clear at 2400 EDT. Winds were calm. Ten bats of 3 species were captured, including 4 Big Brown bats, 4 Little Brown bats, and 2 Northern Long-Eared bats (*Myotis septentrionalis*). No Indiana bats were captured.

SECTION 6 – DISCUSSION

The Endangered Species Act (ESA) prohibits the “take” of endangered species. “Take” is defined in the ESA as:

“Take – to harass, harm, pursue, hunt, shoot, wound, kill, trap, capture, or collect or attempt to engage in any such conduct. ESA §3(19)] **Harm** is further defined by FWS to include significant habitat modification or degradation that results in death or injury to listed species by significantly impairing behavioral patterns such as breeding, feeding, or sheltering. **Harass** is defined by FWS as actions that create the likelihood of injury to listed species to such an extent as to significantly disrupt normal behavior patterns which include, but are not limited to, breeding, feeding or sheltering. [50 CFR §17.3]”

The fact that no Indiana bats were captured on site is not definitive proof that they do not use the site to roost or forage. It is not statistically possible to demonstrate that an event has not occurred. However, having completed the federal protocol surveys in habitat deemed suitable to support Indiana bats, and having obtained a negative result, it may be reasonably assumed that Indiana bats do not use the site to any great extent. While Indiana bat use is therefore considered unlikely, it would be prudent to implement measures to avoid or minimize adverse impacts to bats and loss of habitat. As such, the following precautions are recommended for proposed development on this site to avoid incidental or direct take of Indiana bats as defined in the ESA.

6.1 MINIMIZE IMPACTS TO MATURE FORESTED HABITATS

Disturbance of mature forested habitats along the western side of the property should be avoided and along the eastern part of the property adjacent to the flooded swamp should be minimized to the extent practicable. Disturbance of flooded mature deciduous swamp along the stream corridor should also be minimized as three different species of bat used these areas as travel and forage corridors.

6.2 SEASONAL RESTRICTION ON FOREST CLEARING

Clearing of trees during spring and summer months, when Indiana bats may potentially use forested habitat, may yield incidental take. To avoid this possible incidental take, forest clearing activities should take place between the months of October and March, when Indiana bats will be hibernating and will not be using habitats on the site.

SECTION 7 – CONCLUSION

Federal protocol mist net surveys did not yield the capture of any Indiana bats on the subject site, despite the presence of potentially suitable habitat for the species. Although no Indiana bats were captured, minimized clearing and seasonal restrictions on clearing are recommended to avoid incidental take of Indiana bats.

SECTION 8 - REFERENCES

- Callahan, E.V., R.D. Drobney, and R.L. Clawson. 1997. Selection of summer roosting sites by Indiana bats (*Myotis sodalis*) in Missouri. *Journal of Mammalogy*. 78(3) 818-825.
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DESCRIPTION OF LAND

Support Exhibit VIII. C.1.f-5

See Support Exhibit VIII.C.1.f-5 submitted electronically on the USB for Support Material for the supporting material for this document.