

STATE OF CONNECTICUT
CONNECTICUT SITING COUNCIL

IN RE: :
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 :
 APPLICATION OF NTE CONNECTICUT, LLC : DOCKET NO. 470
 FOR A CERTIFICATE OF ENVIRONMENTAL :
 COMPATIBILITY AND PUBLIC NEED FOR :
 THE CONSTRUCTION, MAINTENANCE AND :
 OPERATION OF AN ELECTRIC POWER :
 GENERATING FACILITY OFF LAKE ROAD, :
 KILLINGLY, CONNECTICUT : NOVEMBER 28, 2016

**APPLICANT'S RESPONSE TO MEMORANDUM REGARDING REQUESTS,
MOTIONS AND THE CONTINUATION OF THE EVIDENTIARY HEARING**

In its November 4, 2016 Memorandum Regarding Requests, Motions and the Continuation of the Evidentiary Hearing, the Siting Council (Council) asked the applicant, NTE Connecticut LLC (NTE), to submit (1) additional information regarding the Vernal Pool Analysis; (2) a correction to the Amphibian and Reptile Table A-2, Tab F of Volume II of the Docket No. 470 Application; and (3) information relative to the feasibility of using gray water at the proposed Killingly Energy Center (KEC). The additional information requested in items (1) and (2) above is provided below.

Information relative to the feasibility of using gray water is being assembled and will be filed with the Council shortly, but in no case later than December 8, 2016.

1. Submission of a Vernal Pool Analysis (including, but not limited to, a tabular format) per the Klemens and Calhoun, "Best Development Practices: Conserving Pool-Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States" for Wetland A1, Wetland B and the vernal pool located on the Wyndham Land Trust property.

A Vernal Pool Analysis per the Calhoun and Klemens (2002): "*Best Development Practices: Conserving Pool-Breeding Amphibians in Residential and Commercial Developments in the Northeastern United States*" has been completed for Wetland B's embedded vernal pool

habitat and the vernal pool located on the Wyndham Land Trust property to the west of the KEC site. In addition, similar calculations have been completed for the man-made pond within Wetland A1, as requested by Dr. Klemens, although it has been determined through extensive field investigation and assessment not to be a vernal pool. Relevant information from the Ecological Assessment Report as well as specific calculations to address the “vernal pool envelope” and “critical terrestrial habitat” are provided below.

Vernal Pool Analysis

Two potential amphibian breeding areas were identified on the KEC site in February of 2016, during initial reconnaissance field investigations by REMA Ecological Services LLC (REMA). Specifically, these were the man-made pond (Wetland A1), and a small (+/- 2,500 square feet) flooded portion of the approximately 1.8-acre Wetland B. In addition, during the amphibian breeding pool investigations, an off-site pool was encountered at the adjacent Wyndham Land Trust property. This off-site pool is a small (+/- 2,100 square feet), fishless impoundment of the seasonal stream that flows out of Wetland B. This small pond holds up to three feet of water, and is about 100 feet upstream of the Quinebaug River, and about 400 feet downstream of the KEC site. On March 25, 2016, about 20 wood frog egg masses were observed via a perimeter survey, but no spotted salamander egg masses. It is possible that spotted salamanders laid egg masses at this pond in April, but no further confirmation surveys were performed, as this vernal pool was not located within the KEC site.

A considerable level of effort was focused on investigation of the on-site man-made pond (Wetland A1) in order to accurately determine whether or not it was a vernal pool habitat. Investigations at the man-made pond began on February 4 and continued on February 19, 2016, when it was still covered with ice. During the surveys, smallmouth bass (*Micropterus*

dolomieu), a few large tadpoles (i.e., green frog [*Lithobates clamitans*]), and a variety of aquatic invertebrates were identified. REMA returned to the pond on March 11, 2016 because movement of wood frogs (*Lithobates sylvaticus*) to other amphibian breeding habitats had been reported in the region. However, no amphibian breeding activity was observed.

In the early evening of March 24, 2016, six minnow traps were set at the man-made pond. These were placed in a variety of microhabitats within the pond, including an area on the western shore with much submerged large woody debris. These traps were pulled out the next morning (March 25, 2016) and their contents were examined. In all, 73 smallmouth bass were trapped, ranging from about 1.5 to 2.75 inches in length (from snout to tail). In addition, one backswimmer (*Notonecta sp.*) was trapped. The size of the minnow trap entrance hole would not allow larger fish to enter, but two or three larger adult fish, presumably also smallmouth bass, were observed on several occasions. No amphibian egg masses had been observed to date, but two spring peepers (*Pseudacris c. crucifer*) were heard calling from the pond, and a few were observed near the pond perimeter later in the year. On March 31, 2016, no amphibian egg masses were observed during a perimeter viewing of the pond.

On April 13, 2016, a formal count of egg masses took place at both the Wetland B vernal pool habitat and the man-made pond within Wetland A1. The small embedded vernal pool habitat within Wetland B held up to 12 inches of water at the time of the survey. The survey was conducted at the edge of the pool, without entering its core, due to the presence of over 3 feet of organics (i.e., muck). However, the water was very clear, not covered with pollen, and conditions were optimal for an egg mass count. A raft of 25 to 30 wood frog egg masses was observed in 9 to 10 inches of water, while five more egg masses were found in two other locations. All of the wood frogs had hatched and most of the larvae were still present at or near

the hatched egg masses (i.e., foraging had not begun). Additionally, a total of 22 spotted salamander (*Ambystoma maculatum*) egg masses were observed in two distinct clusters in about 8 to 9 inches of water. Several spring peepers were observed at the breeding pool during the survey.

The man-made pond was also investigated from its perimeter on the same date (April 13, 2016) as the survey at the Wetland B breeding pool. A filamentous alga bloom somewhat obscured potential egg masses, but a minimum of 18 spotted salamander egg masses were counted. No wood frog egg masses were observed.

REMA returned to the KEC site on May 4, 2016, to again count spotted salamander egg masses at the man-made pond; this was conducted while floating with a kayak in order to not disturb the silty/organic substrate, which would obscure any egg masses. Most of the egg masses previously observed could not be found, and the few that were found had been predated, presumably by fish or other predaceous invertebrates. On the same date, REMA also visited Wetland B's vernal pool habitat and recounted the spotted salamander egg masses. One additional egg mass was found, likely missed during the April 13, 2016 survey. The wood frog hatchlings had dispersed throughout the pool and were observed feeding.

The man-made pond was visited on May 20 and June 4, 2016, but no additional herptile activity was observed, except for a few spring peeper neomorphs at the pond perimeter. Gray tree frogs (*Hyla versicolor*) were heard calling near the pond, but also throughout the KEC site, near wetlands. In the evening of June 12, 2016, a flashlight survey of the pond was conducted from its perimeter, and five minnow traps were set. During the survey five adult smallmouth bass (size class: +/- 5 to 7 inches), several adult and juvenile green frogs, one juvenile bullfrog (*Lithobates catesbeianus*), and seven crayfish (*Cambarus* sp.) (size class: +/- 3 to 5 inches) were

observed. The following morning (June 13, 2016), the minnow traps were pulled. Thirty-seven smallmouth bass and one bull frog tadpole had been trapped.

By the next visit to the KEC site on July 21, 2016, for the purpose of observing the amphibian breeding habitats, the embedded vernal pool at Wetland B was not found with any inundation. Wood frog neomorphs would be expected to have emerged from this pool before the pool went “dry,” based on typical wood frog reproductive behavior and observations at other pools with similar hydroperiods in the region (which also had dried up by the end of June of 2016). However, due to the moderate drought that was experienced in May through July 2016 in the region, it is not likely that this was a successful reproductive year for spotted salamanders, except in semi-permanent pools or pools with more than 2 feet of seasonal inundation.

Based upon the extensive field investigation over varying seasonal conditions, the embedded vernal pool habitat of Wetland B is the only viable on-site habitat for the breeding and reproduction of wood frogs and spotted salamanders, which are considered obligate “vernal pool” amphibians. While spotted salamander egg masses were observed at the man-made pond (Wetland A1), predation by fish, green frogs and bullfrogs, and other predators (e.g., crayfish, water scorpions, predaceous diving beetles), preclude successful reproduction. In fact, the pond is an “ecological sink” or “trap,” which due to the surrounding suitable terrestrial habitat and the favorable hydroperiod attracts spotted salamanders to a poor quality habitat for breeding, with only a slight possibility of reproductive success. However, the pond appears to be suitable breeding habitat for green frogs, to a lesser extent for bullfrogs, and also for spring peepers.

On September 22, 2016, and again on September 23, 2016, sweeping with an aquatic net took place along the edge of the man-made pond (Wetland A1). Approximately 70% of the pond edge was covered during each survey day. The most abundant species collected (captured in

roughly 60% of the sweeps) was green frog, both juveniles and larvae. The second most abundant species captured was smallmouth bass, all fingerlings.

The Wetland B embedded vernal pool habitat, does not appear to have optimal hydrology for the reproduction of spotted salamanders, yet even if reproduction fails every other year for these mole salamanders, a sizeable population will persist at the Generating Facility Site, and its environs, for these long-lived amphibians.

Dr. Klemens has suggested that the man-made pond (Wetland A1) could be a vernal pool (habitat), even though there is no recruitment of vernal pool obligate amphibians (and, thus, would be considered impaired). The primary reason for the lack of recruitment is the documented presence of a large population of smallmouth bass which are highly effective predators of larvae in egg masses and of amphibian hatchlings. Although definitions for vernal pools vary within different jurisdictions, Calhoun and Klemens (2002) include guidance for identification of Connecticut vernal pools that includes:

- a. *Water for approximately 2 months during the growing season,*
- b. *A confined depression that lacks a permanent outlet stream,*
- c. *No fish, and*
- d. *Dries out in most years.*

The United States Army Corps of Engineers (USACE) definition of vernal pools also includes that vernal pools “should preclude sustainable populations of predatory fish.” The Connecticut Department of Energy and Environmental Protection (DEEP) also refers to vernal pools as experiencing hydrological cycles “that prevent the establishment of permanent fish populations”¹ and states that “Because they are periodically dry, vernal pools do not support fish,

¹ http://www.ct.gov/deep/lib/deep/water_inland/wetlands/2012vernalpoolecologygruner.pdf

which are major predators of young amphibians,”² as well as including the following draft definition of a vernal pool from a Connecticut Association of Wetland Scientist Fact Sheet on its website: “Vernal pool means a seasonal watercourse in a defined depression or basin, that lacks a fish population...”³ In this location, water certainly is available during the growing season; however, the intermittent stream corridor within Wetland A2 provides a permanent outlet, the man-made pond is populated with fish that were not stocked, and – although the property owner reported that the pond has dried out on occasion since 1959 – the pond does not dry out in most years (and continued to hold water in the summer of 2016, during a documented drought).

Although vernal pools have significant ecological value, the Wetland A1 man-made pond is currently providing habitat value for fish, green frog and bullfrog, which are effective predators of salamander larvae, and many other wetland-dependent and wetland-associated wildlife, and all part of the aquatic and terrestrial food chain. Dr. Klemens acknowledged the presence of fish in this location but seemed to imply that the man-made pond’s current value should be adjusted to change its existing habitat function (for example, when he asked “*If one Rotenoned that pond and removed the fish, what would happen?*”). REMA’s assessment thoroughly examined the man-made pond’s hydrology, water quality and faunal assemblage as it now stands, and KEC has integrated its protective measures on the basis of its current function – not as a vernal pool – which has been well-supported with frequent and intensive investigations.

Physical Impact to Vernal Pools and the Surrounding Terrestrial Habitat

This section first details the methodology for analyzing the potential impact development may have on a particular vernal pool and its surrounding upland (terrestrial habitat), and then

² http://www.ct.gov/deep/cwp/view.asp?a=2720&q=325676&depNav_GID=1654.

³ Connecticut Association of Wetland Scientists. ‘CAWS Vernal Pool Monitoring Program.’ Retrieved from <http://www.ctwetlands.org/vpmonitoring.html> on November 11, 2016.

discusses the physical impacts to the vernal pools and the surrounding terrestrial habitat.

To evaluate the potential impacts to the vernal pool habitat and the surrounding terrestrial habitats, the resources were assessed using the methodology developed by Calhoun and Klemens (2002) and the USACE.⁴ These methodologies each assess the ecological significance of the vernal pool based on: 1) biological value of the vernal pool; and 2) conditions of the critical terrestrial habitat. The biological rating is based on the presence of federal or state-listed species and the abundance and diversity of obligate vernal pool amphibians. For the purposes of this assessment, it is conservatively assumed that the highest biological value is supported at the vernal pools. The terrestrial habitat is assessed based on the integrity of the vernal pool envelope, which is defined as within 100 feet of the pool's edge, as well as the critical terrestrial habitat, which is defined in both methodologies as extending from 100 feet to 750 feet of the pool's edge.

A priority rating of Tier I is assigned to vernal pool habitats considered to have relatively high breeding activity and relatively intact terrestrial habitat (Tier II and Tier III pools represent lower amphibian productivity and fragmented terrestrial habitat). Pools with 25 percent or less developed areas in the critical habitat are identified as having high priority for maintaining 25 percent or less development within this terrestrial habitat, including site clearing, grading and construction. While Calhoun and Klemens (2002) note the potential restriction of habitat use due to barriers such as roadways, the document does not clearly specify how such features should be considered in the analysis; however, Dr. Klemens clearly stated on November 3, 2016 his preference that natural and/or existing barriers that would preclude habitat use should be added to any potential proposed development in calculating the percentage of critical terrestrial

⁴ U.S. Army Corps of Engineers – New England District. 'Vernal Pool Assessment (Draft)', September 10, 2013. Retrieved from <http://www.nae.usace.army.mil/Missions/Regulatory/Vernal-Pools/> on September 29, 2016.

habitat potentially lost. The USACE methodology differs in that it states: "...if one or more barriers are present, the percentage of the zone that is beyond the barrier(s) should be noted and the remaining percentage of land use types should be completed for the portion of the zone which is accessible from the pool." Therefore, two sets of calculations have been provided for each resource area, in order to provide the most appropriate broad understanding of potential effect.

On-Site Vernal Pool (within Wetland B)

Results of the analysis reveal that development of the KEC will not degrade the integrity of the vernal pool envelope nor the critical terrestrial habitat surrounding the on-site vernal pool.

More specifically, 100 percent of the vernal pool envelope (approximately 1.3 acres) will not be physically impacted by KEC development activities, including clearing, grading, and construction. This satisfies the best development practice recommendation to avoid impact to the vernal pool envelope.

Prior to KEC development, 100 percent of the critical terrestrial habitat is undeveloped. However, the Quinebaug River acts as a barrier, preventing vernal pool species from access to approximately 7.7 percent of the critical terrestrial habitat. KEC development will impact 5.8 percent of the critical terrestrial habitat. In total, post-KEC development, 13.5 percent of critical terrestrial habitat will be either impacted by KEC development or inaccessible due to the presence of the Quinebaug River. The total area of impact remains below the 25 percent development threshold under either calculation framework. The information is summarized in Figure 1, Table 1, and Table 2.

Table 1. On-Site Vernal Pool – Wetland B – Critical Terrestrial Habitat Area (100- to 750-foot radius) 100% based on 43.1 acres in the Critical Terrestrial Habitat

	Developed/Unavailable		Undeveloped/Available	
	Acres	Percent	Acres	Percent
Existing	3.3	7.7	39.8	92.3
Proposed	5.8	13.5	37.3	86.5

Table 2. On-Site Vernal Pool – Wetland B – Critical Terrestrial Habitat Area (100- to 750-foot radius) 100% based on 39.8 acres currently accessible in the Critical Terrestrial Habitat

	Developed		Undeveloped	
	Acres	Percent	Acres	Percent
Existing	0	0	39.8	100
Proposed	2.5	6.3	37.3	93.7

Off-Site Vernal Pool

Results of the analysis reveal that development of the KEC will not degrade the integrity of the vernal pool envelope or the critical terrestrial habitat surrounding the off-site vernal pool, as KEC development does not occur within these areas. The 100-foot wide vernal pool envelope currently consists of undeveloped forested area (97.6 percent) and a small fraction of the Quinebaug River (2.4 percent). As previously stated, this vernal pool envelope will not be impacted by development, thereby satisfying the best development practice recommendation to avoid impact to the vernal pool envelope.

Similarly, the critical terrestrial habitat will not be impacted by KEC development. More significantly, the Quinebaug River acts as a barrier, preventing vernal pool species from accessing approximately 42 percent of the critical terrestrial habitat. The remaining, approximately 58 percent of the critical terrestrial habitat area is a forested area accessible to vernal pool species. The information is summarized in Figure 2, Table 3, and Table 4.

Table 3. Off-Site Vernal Pool – Critical Terrestrial Habitat Area (100- to 750-foot radius)

100% based on 41.9 acres in the Critical Terrestrial Habitat

	Developed/Unavailable		Undeveloped/Available	
	Acres	Percent	Acres	Percent
Existing	17.6	42	24.3	58
Proposed	17.6	42	24.3	58

Table 4. Off-Site Vernal Pool – Critical Terrestrial Habitat Area (100- to 750-foot radius)

100% based on 24.3 acres currently accessible in the Critical Terrestrial Habitat

	Developed		Undeveloped	
	Acres	Percent	Acres	Percent
Existing	0	0	24.3	100
Proposed	0	0	24.3	100

Wetland A1 (Man-Made Pond)

Although the 0.25-acre man-made pond within Wetland A1 was not determined to be a vernal pool, a similar analysis was conducted to assess the physical impact on the area surrounding the pond.

KEC will result in impact of approximately 20.3 percent of the 100-foot radius around the man-made pond on one side of the pond only. Approximately 79.7 percent of the 100-foot radius will remain intact forest.

Work is proposed in association with KEC that avoids direct impact to wetlands and maintains a greater than 25-foot buffer in accordance with local requirements. A considerable amount of area around the man-made pond will continue to be available for habitat use. The information is summarized in Figure 3, Table 5, and Table 6 for the change in use within the area from 100 feet to 750 feet surrounding the man-made pond.

Table 5: Wetland A1 (Pond only) – Man-made Pond – Analysis for the 100- to 750-foot radius

100% based on the entire 43.8 acres within the radius

	Developed/Unavailable		Undeveloped/Available	
	Acres	Percent	Acres	Percent
Existing	2.3	5.3	41.5	94.7
Proposed	23.1	52.7	20.7	47.3
Existing conditions conservatively assume that Lake Road and land on the opposite side of Lake Road are developed/unavailable.				

Table 6: Wetland A1 (Pond only) – Man-made Pond – Analysis for the 100- to 750-foot radius

100% based on the 42.0 acres currently accessible

	Developed		Undeveloped	
	Acres	Percent	Acres	Percent
Existing	0.5	1.2	41.5	98.8
Proposed	21.3	50.7	20.7	49.3
Existing conditions conservatively assume that Lake Road and land on the opposite side of Lake Road are developed/unavailable.				

2. Correction to the Amphibian and Reptile Table A-2 under Tab F of Volume II of the application.

During the evidentiary hearing on November 3, 2016, Dr. Klemens asked why a number of amphibians and reptiles, while not observed at the subject site, had not been listed as “possible” in Table A-2, together with other species, such as the four-toed salamander (*Hemidactylium scutatum*), which had been listed as “possible.” It was agreed to include these other amphibians and reptiles in Table A-2 (an updated version of the species tables is attached); however, several clarifications are pertinent.

REMA used the following criteria when deciding whether to list species that might be expected at the proposed KEC site as “possible”, even though the species were not observed: (1) presence of suitable habitat; (2) regional abundance; (3) records for the Town of Killingly or surrounding towns; (4) search effort in suitable habitats; and (5) professional experience with the herptile species. The species originally listed as “possible” were expected species, that is, species with a good likelihood of occurring at the subject site. While the additional species have

been added to the list per Dr. Klemens' request, the occurrence of these species at the KEC site, with the exception of the eastern worm snake, is considered *unlikely* or *highly unlikely*.

REMA staff have logged over 124 hours of fieldwork at the KEC site since February 2016. A significant portion of this effort was conducting amphibian and reptile cover searches and active trapping (i.e., minnow traps in Wetland A1). The updates to Table A-2 are discussed below.

Spring salamander (*Gyrinophilus porphyriticus*) – Occurrence at KEC Site: Highly Unlikely

This CT-listed species (Threatened) is a very conspicuous, large-bodied, semi-aquatic salamander of cold and clean freshwater springs and streams. At the KEC site, REMA searched often in suitable habitats, including the Wetland A1 springhouse, flowing streams, and the small cistern at the headwaters of Wetland A3's intermittent watercourse. Nighttime searches by flashlight, at the springhouse, cistern, and seepage wetlands and watercourses, took place in June 2016, just prior to and during the owl call-back survey. A query to the CT DEEP's Natural Diversity Database (NDDB) did not indicate the presence of this species at the site or its environs. According to AmphibiaWeb, an online database, only one occurrence of spring salamander has been recorded for the general vicinity of the KEC site, approximately 8.6 miles east-southeast, in North Foster, Rhode Island. While REMA cannot completely rule out spring salamander from the KEC site, it is *highly unlikely* that it occurs here, particularly since perennial seepage and springs are limited to those associated with Wetland A1 and the upper portion (southerly) of Wetland A2.

Marbled salamander (*Ambystoma opacum*) – Occurrence at KEC Site: Possible, but Unlikely

This medium-sized salamander is a denizen of deciduous woodlands and breeds in vernal pools. Since it breeds in late summer to early fall, larvae are encountered during searches of

vernal pools in the spring. At the KEC site, dip-netting at Wetland A1 (pond), in Wetland B, and in large flooded tree tips within Wetland A3 did not yield any marbled salamander larva, and neither did cover searches in upland areas. While suitable habitat for this amphibian occurs at the KEC site, its presence is considered *possible, but unlikely*.

Red-spotted newt (*Notophthalmus viridescens*) – Occurrence at KEC Site: Possible, but Unlikely

Adults of this species are fully aquatic. Therefore, the only suitable habitats with perennial or semi-perennial inundation are the Wetland A1 pond and the small cistern at Wetland A3. Both were searched carefully numerous times in the spring and summer of 2016. Moreover, the two sessions of active trapping with minnow traps, in March and June 2016, did not yield any newts. In REMA's professional experience, using minnow traps in ponds and vernal pool habitats in the past two-plus decades, this technique is highly effective in trapping newts. REMA notes that juvenile red-spotted newts (i.e., efts) are highly conspicuous, yet none were observed during any of REMA's numerous field visits. Therefore, occurrence of this amphibian at the KEC site is considered *possible, but unlikely*.

The following four turtle species were added to Table A-2:

- **Snapping turtle (*Chelydra serpentina*)** – Occurrence at KEC Site: Possible, but Unlikely
- **Painted turtle (*Chrysemys picta*)** – Occurrence at KEC Site: Possible, but Unlikely
- **Spotted turtle (*Clemmys guttata*)** (CT Species of Special Concern) – Occurrence at KEC Site: Possible, but Unlikely
- **Musk turtle (*Sternotherus odoratus*)** – Occurrence at KEC Site: Possible, but Unlikely

The preferred, and only, on-site habitats for these turtle species, are the Wetland A1 man-made pond and the vernal pool habitat of Wetland B. These areas were thoroughly and repeatedly searched since February 2016. The man-made pond, which with permanent inundation would be the preferred habitat, was searched from the shoreline, by wading through it, and from a kayak. At no time did REMA observe turtles basking or swimming, nor was turtle sign observed at the pond edge. Moreover, turtle nesting activity was not observed within uplands at the Generating Facility Site or the Switchyard Site. Therefore, occurrence of these turtle species at the KEC site is considered *possible, but unlikely* (if not *highly unlikely*). Suitable habitat for the turtle species (i.e., permanent ponds) occur off-site to the east and northeast, ranging from just over 1,000 feet to roughly 1,600 feet away, from which migration is possible but unlikely.

Eastern worm snake (*Carphophis amoemus*) – Occurrence at KEC Site: *Possible*

This small, round-bodied burrowing snake, resembling an earthworm, is likely the most difficult snake to find through standard cover searching. There are no records of this species in Killingly but a specimen was encountered in Rhode Island, just over the border (Klemens 1993). The assessment for this species has been revised to *possible* for the KEC site.

Northern water snake (*Nerodia sipedon*) – Occurrence at KEC Site: *Possible, but Unlikely*

While water snakes are widespread in Connecticut, they are always associated with water (as their name would indicate). All of the suitable and preferred habitats were searched on numerous occasions, including the man-made pond (Wetland A1), the Wetland B vernal pool, and the KEC site's streams, yet no water snakes were observed. Therefore, occurrence of this reptile at the KEC site is considered *possible, but unlikely*.

Ribbon snake (*Thamnophis sauritus*) (CT Species of Special Concern) – Occurrence at KEC

Site: *Possible but Unlikely*

Ribbon snakes are seldom found far from aquatic habitats including ponds, seasonally flooded wooded swamps, and streams. These types of habitats at the KEC site, including the Wetland B vernal pool, the man-made pond (Wetland A1), and Wetlands A2 and A3, were searched over a period of several months, yet ribbon snakes were not observed. Grassy habitats near wetlands, such as the open field at the Switchyard Site, were also carefully searched. Occurrence of this snake at the KEC site is considered *possible, but unlikely* (if not *highly unlikely*).

CERTIFICATION OF SERVICE

I hereby certify that on this 28th day of November 2016, a copy of the foregoing was sent via electronic mail and first class U.S. Mail, to the following:

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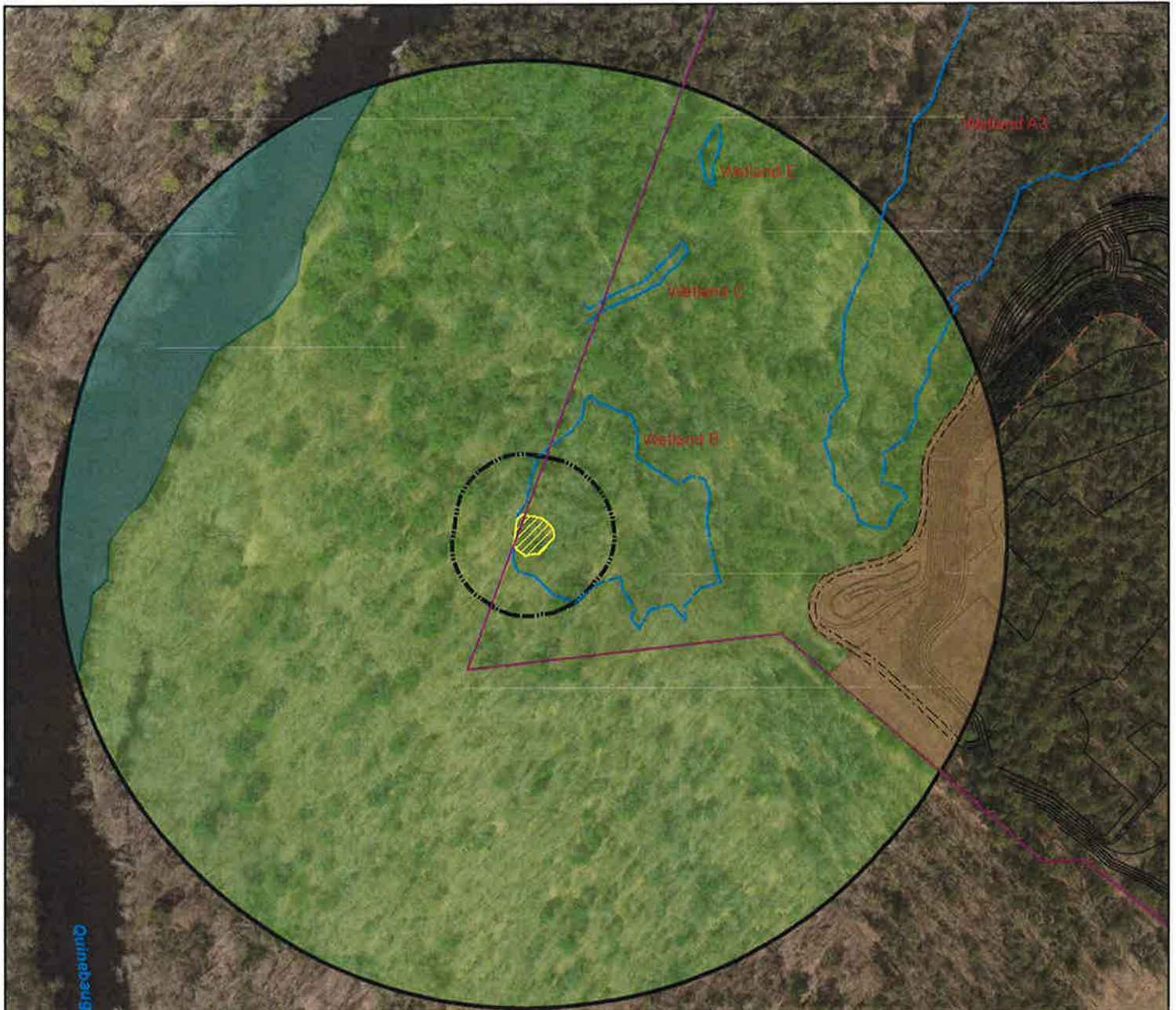
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Kenneth C. Baldwin



Based on 43.1 acres in the Critical Terrestrial Habitat

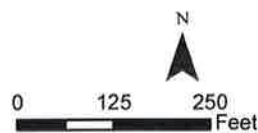
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	Acres	Percent	Acres	Percent
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Based on 39.8 acres currently accessible in the Critical Terrestrial Habitat

	Developed		Undeveloped	
	Acres	Percent	Acres	Percent
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Proposed	2.5	6.3	37.3	93.7

Legend

- Generating Facility Site
- - - Wetland
- Proposed Limits of Grading
- x Fenceline
- Vernal Pool
- 100' Vernal Pool Envelope
- 100' - 750' Critical Terrestrial Habitat Area
- Accessible/Undeveloped
- Existing Inaccessible/Developed
- Proposed Inaccessible/Developed



**Figure 1
On-Site Vernal
Pool Analysis Map**





Based on 41.9 acres in the Critical Terrestrial Habitat

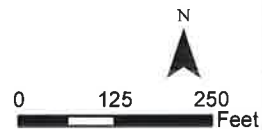
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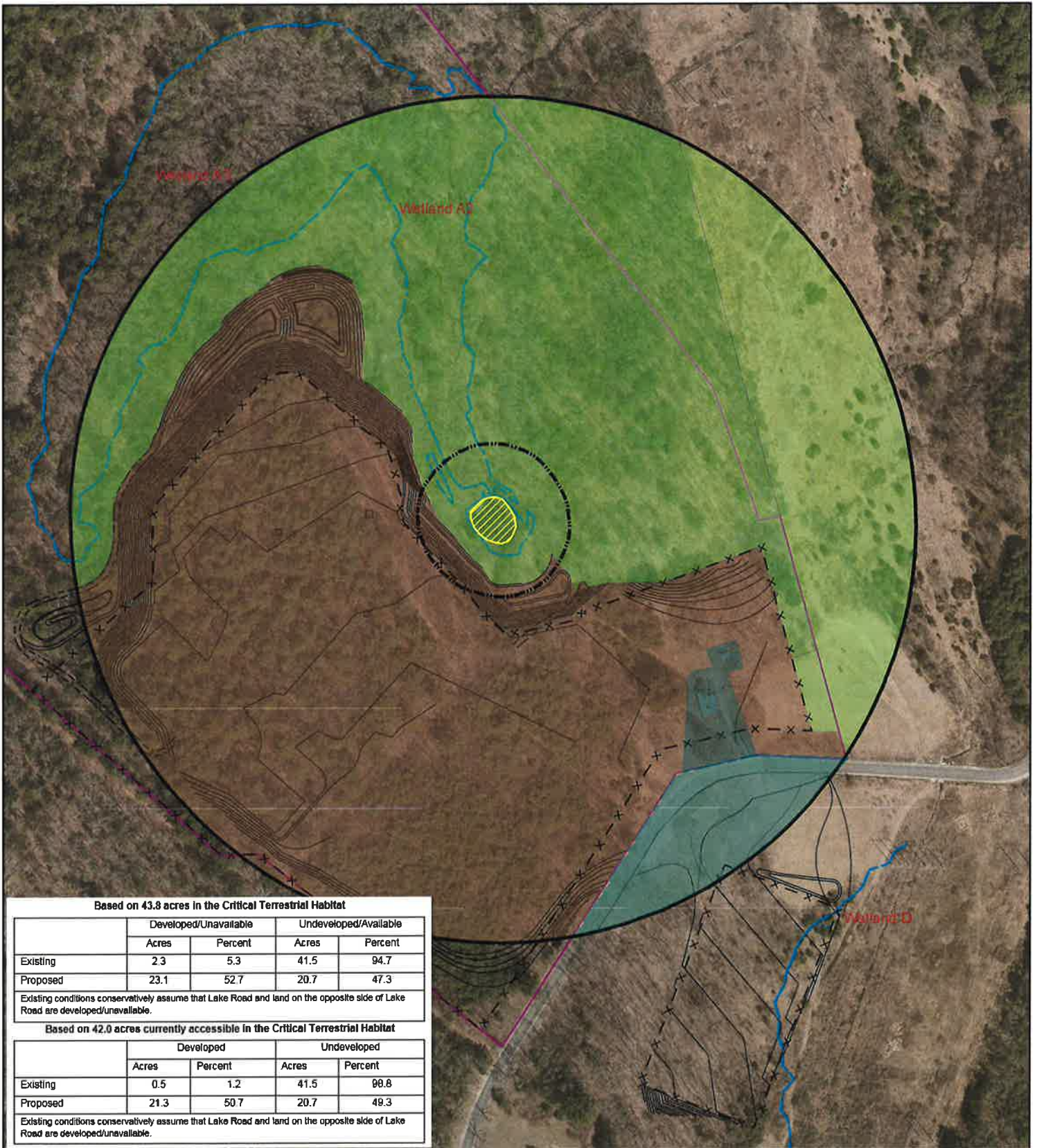
Legend

- Generating Facility Site
- Wetland
- Proposed Limits of Grading
- Fenceline
- Vernal Pool
- 100' Vernal Pool Envelope
- 100' - 750' Critical Terrestrial Habitat Area
- Accessible/Undeveloped
- Existing Inaccessible/Developed



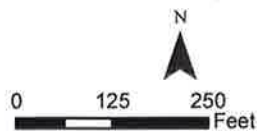
**Figure 2
Off-Site Vernal
Pool Analysis Map**





Legend

- Generating Facility Site
- - - Wetland
- Proposed Limits of Grading
- x — Fenceline
- Wetland A1
- 100' Wetland Envelope
- 100' - 750' Critical Terrestrial Habitat Area
- Accessible/Undeveloped
- Existing Inaccessible/Developed
- Proposed Inaccessible/Developed



**Figure 3
Wetland A1 Pond
Analysis Map**



Attachment E - Table A-1

Breeding Birds Recorded or Expected at the Proposed Killingly Energy Center (KEC)

Town of Killingly, Windham County, Connecticut

Common Name¹	Scientific Name	Breeding Bird Record?²	Observed at Site?³	Listed?⁴	Location/Notes
Canada goose	<i>Branta canadensis</i>	X	X		Flyover
Wood duck	<i>Aix sponsa</i>	X	X		At man-made pond; WA1
Mallard	<i>Anas platyrhynchos</i>	X			Probable user
Northern bobwhite	<i>Colinus virginianus</i>	X			Possible habitat in electric ROW
Ruffed grouse	<i>Bonasa umbellus</i>	X			Possible breeder
Wild turkey	<i>Meleagris gallopavo</i>	X	X		Female/fledglings; Switchyard Site
Rock pigeon	<i>Columba livia</i>	X			Possible user
Mourning dove	<i>Zenaida macroura</i>	X	X		Common
Black-billed cuckoo	<i>Coccyzus erythrophthalmus</i>	X	X		Switchyard Site (SS)
Yellow-billed cuckoo	<i>Coccyzus americanus</i>	X			Possible breeder
Chimney Swift	<i>Chaetura pelagica</i>	X			Probable user
Ruby-throated hummingbird	<i>Archilochus colubris</i>	X	X		
Killdeer	<i>Charadrius vociferous</i>	X	X		SS
American woodcock	<i>Scolopax minor</i>	X	X		SS
Turkey vulture	<i>Cathartes aura</i>	X	X		Flyover
Cooper's hawk	<i>Accipiter cooperii</i>	X			Possible breeder
Red-shouldered hawk	<i>Buteo lineatus</i>	X	X		N. section of Generating Facility Site (GFS)
Broad-winged hawk	<i>Buteo platypterus</i>	X	X	SPEC	
Red-tailed hawk	<i>Buteo jamaicensis</i>	X	X		Both SS and GFS
Eastern screech owl	<i>Otus asio</i>	X	X		SS

¹ Common and scientific names according to AOU (7th Edition) and supplements through 2016 (57th)

² Recorded in any of eight adjacent blocks of the Atlas of Breeding Birds of Connecticut (1994), centered on the block for the subject site, for which preferred habitat exists on-site or immediately adjacent. Date is supplemented by recent BBS data for a nearby route (i.e., Woodstock, CT). Author has included additional species for which sufficient habitat exists, which have been recorded elsewhere in Windham County, or species observed during migration.

³ Observed during the following field survey dates: May 4th, 20th, and 26th, and June 4th, 10th, 12th, 13th, and 19th, 2016

⁴ CT State-Listed: END = Endangered, THR = Threatened, SPEC = Special Concern

Attachment E - Table A-1 (cont.)

Common Name	Scientific Name	Breeding Bird Record?	Observed at Site?	Listed?	Location/Notes
Great horned owl	<i>Bubo virginianus</i>	X			Possible user
Barred owl	<i>Strix varia</i>	X	X		GFS
Red-bellied woodpecker	<i>Melanerpes carolinus</i>	X	X		
Downy woodpecker	<i>Picoides pubescens</i>	X	X		
Hairy woodpecker	<i>Picoides villosus</i>	X	X		
Northern flicker	<i>Colaptes auratus</i>	X	X		
Pileated woodpecker	<i>Dryocopus pileatus</i>	X	X		
American kestrel	<i>Falco sparverius</i>	X		SPEC	Possible in nearby electric ROW
Eastern wood-pewee	<i>Contopus virens</i>	X	X		Common in wooded areas
Willow flycatcher	<i>Empidonax traillii</i>	X	X		SS
Alder flycatcher	<i>Empidonax alnorum</i>	X			Possible breeder; likely off-site
Least flycatcher	<i>Empidonax minimus</i>	X	X		SS
Eastern phoebe	<i>Sayornis phoebe</i>	X	X		
Great crested flycatcher	<i>Myiarchus crinitus</i>	X	X		SS and GFS
Eastern kingbird	<i>Tyrannus tyrannus</i>	X	X		SS
White-eyed vireo	<i>Vireo griseus</i>	X			Possible breeder
Yellow-throated vireo	<i>Vireo flavifrons</i>	X	X		SS
Warbling vireo	<i>Vireo gilvus</i>	X			Possible breeder
Red-eyed vireo	<i>Vireo olivaceus</i>	X	X		Common
Blue jay	<i>Cyanocitta cristata</i>	X	X		Common
Common Raven	<i>Corvus corax</i>				Possible; range is increasing; based on habitat
American crow	<i>Corvus brachyrhynchos</i>	X	X		Common
Tree swallow	<i>Tachycineta bicolor</i>	X			Probable user
N. rough-winged swallow	<i>Stelgidopteryx serripennis</i>	X	X		Flyover; SS
Bank swallow	<i>Riparia riparia</i>	X			Possible user
Barn swallow	<i>Hirundo rustica</i>	X	X		SS
Black-capped chickadee	<i>Poecile atricapillus</i>	X	X		common
Tufted titmouse	<i>Baeolophus bicolor</i>	X	X		common
Red-breasted nuthatch	<i>Sitta canadensis</i>	X			Probable breeder

Attachment E - Table A-1 (cont.)

Common Name	Scientific Name	Breeding Bird Atlas Record?	Observed at Site?	Listed?	Location/Notes
White-breasted nuthatch	<i>Sitta carolinensis</i>	X	X		GFS
Brown creeper	<i>Certhia americana</i>	X	X		GFS
House wren	<i>Troglodytes aedon</i>	X	X		Near existing house
Carolina wren	<i>Thryothorus ludovicianus</i>	X	X		Near existing house and barn
Blue-gray gnatcatcher	<i>Poliophtila caerulea</i>	X			Probable breeder
Eastern bluebird	<i>Sialia sialis</i>	X	X		SS
Veery	<i>Catharus fuscescens</i>	X	X		
Hermit thrush	<i>Catharus guttatus</i>	X			Possible breeder
Wood thrush	<i>Hylocichla mustelina</i>	X	X		
American robin	<i>Turdus migratorius</i>	X	X		common
Gray catbird	<i>Dumetella carolinensis</i>	X	X		
Northern mockingbird	<i>Mimus polyglottos</i>	X	X		
Brown thrasher	<i>Toxostoma rufum</i>	X	X	SPEC	Late summer; outside breeding season
European starling	<i>Sturnus vulgaris</i>	X			Probable breeder or user
Cedar waxwing	<i>Bombycilla cedrorum</i>	X	X		
House sparrow	<i>Passer domesticus</i>	X	X		At existing house bird feeder
House finch	<i>Haemorhous mexicanus</i>	X	X		
Purple finch	<i>Haemorhous purpureus</i>	X			Possible breeder
American goldfinch	<i>Spinus tristis</i>	X	X		SS and nearby
Ovenbird	<i>Seiurus aurocapilla</i>	X	X		Most common bird in wooded areas
Louisiana waterthrush	<i>Parkesia motacilla</i>	X	X		
Northern waterthrush	<i>Parkesia noveboracensis</i>	X			Suitable habitat at GFS
Blue-winged warbler	<i>Vermivora cyanoptera</i>	X	X		SS
Black-and-white warbler	<i>Mniotilta varia</i>	X	X		
Common yellowthroat	<i>Geothlypis trichas</i>	X	X		SS
American redstart	<i>Setophaga ruticilla</i>	X	X		SS, wooded southern section
Magnolia warbler	<i>Setophaga magnolia</i>		X		Late migrant
Yellow warbler	<i>Setophaga petechia</i>	X	X		SS and nearby
Chestnut-sided warbler	<i>Setophaga pensylvanica</i>	X	X		SS and nearby

Attachment E - Table A-1 (cont.)

Common Name	Scientific Name	Breeding Bird Atlas Record?	Observed at Site?	Listed?	Location/Notes
Palm warbler	<i>Setophaga palmarum</i>		X		Migrant
Pine warbler	<i>Setophaga pinus</i>	X	X		
Yellow-rumped warbler	<i>Setophaga coronata</i>	X			Possible but unlikely breeder
Prairie warbler	<i>Setophaga discolor</i>	X	X		SS and ROW nearby
Black-throated green warbl.	<i>Setophaga virens</i>	X	X		GFS; northern section mostly
Canada warbler	<i>Cardellina canadensis</i>	X			Possible breeder
Wilson's warbler	<i>Cardellina pusilla</i>	X			Likely migrant
Eastern towhee	<i>Pipilo erythrophthalmus</i>	X	X		SS
Chipping sparrow	<i>Spizella passerina</i>	X	X		
Field sparrow	<i>Spizella pusilla</i>	X	X		Just off-site of SS in ROW
Song sparrow	<i>Melospiza melodia</i>	X	X		
Scarlet tanager	<i>Piranga olivacea</i>	X	X		GFS
Northern cardinal	<i>Cardinalis cardinalis</i>	X	X		
Rose-breasted grosbeak	<i>Pheucticus ludovicianus</i>	X	X		
Indigo bunting	<i>Passerina cyanea</i>	X	X		SS
Red-winged blackbird	<i>Agelaius phoeniceus</i>	X	X		SS and nearby
Common grackle	<i>Quiscalus quiscula</i>	X	X		
Brown-headed cowbird	<i>Molothrus ater</i>	X	X		
Baltimore oriole	<i>Icterus galbula</i>	X	X		

Attachment E - Table A-2

Amphibians & Reptiles Recorded or Expected at the Proposed Killingly Energy Center (KEC)

Town of Killingly, Windham County, Connecticut

Common Name⁵	Scientific Name	Nearby Record?⁶	Observed at Site?⁷	Listed?⁸	Location/Notes
Spotted salamander	<i>Ambystoma maculatum</i>	X	X		GFS; breeding at Wetland Unit B (WB)
Marbled salamander	<i>Ambystoma opacum</i>	X			Possible but unlikely; preferred habitats searched
Northern dusky salamander	<i>Desmognathus fuscus</i>	X			Possible
N. redback salamander	<i>Plethodon c. cinereus</i>	X	X		Throughout forest areas
Four-toed salamander	<i>Hemidactylium scutatum</i>	X			Possible; searched for but not observed
N. two-lined salamander	<i>Eurycea bislineata</i>	X	X		Wetland Unit A1, and A2 and A3 streams
N. spring salamander	<i>Gyrinophilus p. porphyriticus</i>	X ⁹		THR	Highly unlikely; all preferred habitats searched
Red-spotted newt	<i>Notophthalmus v. viridescens</i>	X			Possible but unlikely; preferred habitats searched
Eastern American Toad	<i>Bufo a. americanus</i>	X	X		Wetlands A1, A2, and A3; also at SS
Gray treefrog	<i>Hyla versicolor</i>	X	X		GFS only; wetlands
Northern spring peeper	<i>Pseudacris c. crucifer</i>	X	X		WB; WA1
Bullfrog	<i>Lithobates catesbeianus</i>	X	X		Wetland Unit A1 (tadpoles and juvenile)
Green frog	<i>Rana clamitans melanota</i>	X	X		Wetland Unit A1 and seasonal streams
Wood frog	<i>Rana sylvatica</i>	X	X		Breeding at Wetland Unit B
Pickering frog	<i>Rana palustris</i>	X	X		Wetland Units A1 and A3
Common snapping turtle	<i>Chelydra s. serpentina</i>	X			Possible but unlikely; preferred habitats searched
Painted turtle	<i>Chrysemys picta</i>	X			Possible but unlikely; preferred habitats searched
Spotted turtle	<i>Clemmys guttata</i>	X ¹⁰		SPEC	Possible but unlikely; preferred habitats searched
Wood turtle	<i>Glyptemys insculpta</i>	X		SPEC	CT NDDB record; not likely on site

⁵ Common and scientific names according to Klemens (1993)

⁶ Recorded in Killingly or in surrounding towns (e.g., Klemens 1993). Author has included additional species for which sufficient habitat exists, and which have been recorded elsewhere in Windham County.

⁷ Observed during the following field survey period: March to July 2016.

⁸ CT State-Listed: END = Endangered, THR = Threatened, SPEC = Special Concern

⁹ Record in Rhode Island to east of subject site

¹⁰ No Killingly or adjacent town record per Klemens (1993)

Eastern box turtle	<i>Terrapene c. carolina</i>		X									CT NDDDB record; possibly at site
Common musk turtle	<i>Sternotherus odoratus</i>		X									Possible but unlikely; preferred habitats searched
Eastern worm snake	<i>Carphophis a. amoenus</i>		X ¹¹									Possible
Northern brown snake	<i>Storeria d. dekayi</i>		X		X							Old barn; Switchyard Site (SS)
Northern redbelly snake	<i>Storeria o. occipitamaculata</i>		X									Possible
Common garter snake	<i>Thamnophis sirtalis</i>		X		X							GFS and SS
Northern ringneck snake	<i>Diadophis p. edwardsii</i>		X		X							Northern section of GFS
Northern black racer	<i>Culuber c. constrictor</i>		X									Possible but unlikely
Eastern milk snake	<i>Lampropeltis t. triangulum</i>		X		X							SS
Northern water snake	<i>Nerodia s. sipedon</i>		X									Possible but unlikely; preferred habitats searched
Ribbon snake	<i>Thamnophis s. sirtalis</i>		X ¹²									Possible but unlikely; spotty distribution in CT

¹¹ Record in Rhode Island northeast of subject site

¹² No Killingly record per Klemens (1993)

Attachment E - Table A-3

Mammals whose range encompasses or have been observed at the Killingly Energy Center Site

Town of Killingly, Windham County, Connecticut

Common Name ¹³	Scientific Name	Site in Range? ¹⁴	Observed at Site? ¹⁵	Listed? ¹⁶	Location/Notes
Virginia opossum	<i>Didelphis virginiana</i>	X	X		SS
Masked shrew	<i>Sorex cinereus</i>	X			Probable
Water shrew	<i>Sorex palustris</i>	X			Possible
Smoky shrew	<i>Sorex fumeus</i>	X			Possible
Northern short-tailed shrew	<i>Blarina brevicauda</i>	X			Probable
Hairy-tailed mole	<i>Parascalops breweri</i>	X			Possible
Eastern mole	<i>Scalopus aquaticus</i>	X	X		GFS, near existing home
Star-nosed mole	<i>Condylura cristata</i>	X			Probable
Little brown myotis	<i>Myotis lucifugus</i>	X	X	END	Acoustic study by Tetra Tech
Big brown bat	<i>Eptesicus fuscus</i>	X	X		Acoustic study by Tetra Tech
Eastern red bat	<i>Lasiurus borealis</i>	X	X		Acoustic study by Tetra Tech
Hoary bat	<i>Lasiurus cinereus</i>	X	X		Acoustic Study by Tetra Tech
Silver-haired bat	<i>Lasionycteris noctivagans</i>	X	X		Acoustic Study by Tetra Tech
Eastern cottontail	<i>Sylvilagus floridanus</i>	X	X		GFS, near existing house; SS field
Eastern chipmunk	<i>Tamias striatus</i>	X	X		throughout
Woodchuck	<i>Marmota monax</i>	X	X		
Eastern gray squirrel	<i>Sciurus carolinensis</i>	X	X		throughout
Red squirrel	<i>Tamiasciurus hudsonicus</i>	X	X		Mixed deciduous/evergreen forest
Northern flying squirrel	<i>Glaucomys sabrinus</i>	X			Possible
Southern flying squirrel	<i>Glaucomys volans</i>	X	X		Wetland Unit A3 (edge)
Meadow jumping mouse	<i>Zapus hudsonius</i>	X	X		SS
White-footed mouse	<i>Peromyscus leucopus</i>	X	X		GFS

¹³ Common and scientific names according to Whitaker and Hamilton (1998)

¹⁴ Range as depicted in Whitaker and Hamilton (1998) and DeGraaf and Yamasaki (2001)

¹⁵ Observed during the following field survey dates:

¹⁶ CT State-Listed: END = Endangered, THR = Threatened, SPEC = Special Concern

Attachment E - Table A-3 (cont.)

Common Name	Scientific Name	Site in Range?	Observed at Site?	Listed?	Location/Notes
Deer mouse	<i>Peromyscus maniculatus</i>	X			Probable
Southern red-backed vole	<i>Clethrionomys gapperi</i>	X			Probable
Meadow vole	<i>Microtus pennsylvanicus</i>	X			Probable
Woodland vole	<i>Microtus pinetorum</i>	X			Possible
Porcupine	<i>Erethizon dorsatum</i>	X	X		Probable; sign by Quinebaug River
Coyote	<i>Canis latrans</i>	X	X		GFS, including a skeleton
Red fox	<i>Vulpes vulpes</i>	X	X		SS and nearby
Gray fox	<i>Urocyon cinereoargenteus</i>	X	X		SS; (not conclusive based on tracks)
Black bear	<i>Ursus americanus</i>	X	X		Late summer; Wetland A-3
Raccoon	<i>Procyon lotor</i>	X	X		Wetlands
Fisher	<i>Martes pennanti</i>	X	X		Heard during owl call-back survey
Short-tailed weasel	<i>Mustela erminea</i>	X			Possible
Long-tailed weasel	<i>Mustela frenata</i>	X			Probable
Striped skunk	<i>Memphitis memphitis</i>	X	X		Vicinity of existing house
Bobcat	<i>Lynx rufus</i>	X			Possible; sighting in Killingly nearby
White-tailed deer	<i>Odocoileus virginianus</i>	X	X		throughout

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