

Appendix E

Reptile Habitat Evaluation and  
Management Recommendations



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## INTRODUCTION

### SITE LOCATION AND DESCRIPTION

Wilder Balter Partners (WBP or the Applicant) plans to build a housing development on the subject 40 acre property located on June Road in the Town of North Salem, Westchester County, New York. WBP is currently going through the environmental review process with the Town of North Salem Planning Board,. The Planning Board has engaged Rudikoff Associates and other consultants to review the documents submitted by WBP and its consultants. During this process, Rudikoff Associates recommended that the applicant provide "...a pre-construction and post-construction reptile protection plan for the proposed action (with emphasis on the box turtle), prepared by and implemented by a professional herpetologist." The applicant has engaged Herpetological Associates, Inc. (HA) for this reason.

During the routine upland and wetland surveying conducted by the project's environmental consultants, a population of eastern box turtles (*Terrapene c. carolina*) was discovered on portions of the subject property. The box turtle is listed as a Species of Special Concern in New York State. The approximate 40 acre property is known as the Salem Hunt Residential Housing project (**Figures 2-1, 2-2, 2-3, and 2-4**).

During the summer season, eastern box turtles, and other terrestrial reptiles, are known to use a variety of habitat types including wetlands. There are four wetland areas on the subject property which are shown as Wetlands "A", "B", "C" and "D" on **Figure 2-2**. In an attempt to identify important reptile habitat, specifically habitat suitable for eastern box turtles, WBP commissioned HA to conduct an intensive one day reptile habitat evaluation and survey. Based upon the site inspection HA would also make recommendations to protect and, in some areas, create important habitat features of the eastern box turtle and other reptiles on the proposed development site.

### ABOUT EASTERN BOX TURTLES

The eastern box turtle is an ectotherm or "cold blooded" animal and therefore depends upon its surrounding ambient environmental temperature for its activity rate and behavior. Their preferred body temperature is between 29 and 38 degrees Celsius. In the heat of the summer, eastern box turtles are most active in the morning or after rain events. When the ambient temperature gets too hot, they hide under decaying logs, moist leaves, crawl into mammal burrows, or bury themselves in wetland mud. They sometimes walk into puddles, small ponds or streams to cool off.

In the northern regions, eastern box turtles emerge from hibernation in late spring (mid-April or May) and go into hibernation in late fall (mid September or October). During the summer they forage during all daylight hours and will bask in the morning sun to warm themselves. Eastern box turtles are active during daylight hours (diurnal) and seek shallow depressions on the forest floor to spend the night. They also hibernate in deep leaf pockets or mammal burrows (Carpenter 1957).

When frightened by a mammalian predator or human, eastern box turtles retract their head, limbs and tail into their hard shell and pull the lower shell (plastron) tightly shut. They can do this because they have a hinged plastron that enables them to clamp their upper and lower shells together. They wait in this position until the perceived threat is gone. While hatchling and juvenile box turtles have

several mammal predators, very few animal species can prey upon adults due to their closed-shell defense technique (Carr 1952; Zappalorti 1976; Ernst, Barbour and Lovich 1994).

The activity area or home-range of eastern box turtles is usually between one acre to 25-acres in which they normally find everything they need to survive (Stickel 1989). Occasionally they journey further out from their preferred habitat area to forage or seek a mate. The home range of different individual eastern box turtles overlap frequently, regardless of age or sex. Adult box turtles are often found together and show no aggression towards each other (Carr 1952; Zappalorti 1976; Ernst, Barbour and Lovich 1994).

## HA'S EXPERIENCE AND QUALIFICATIONS

HA has 30 years experience conducting reptile and amphibian surveys in New York, New Jersey and Pennsylvania, some of which have been reviewed by the NYSDEC. We have conducted bog turtle, wood turtle and box turtle surveys throughout the northeastern United States for a variety of clients (Zappalorti 1976). For instance, in the fall of 1999 HA conducted a northern cricket frog study entitled: "*Cricket Frog Surveys, Habitat Evaluations, and a Review of the Proposed Apple Greens East 9 Hole Golf Course, Lloyd Township, Ulster County, New York.*" During this study we observed a total of 603 cricket frogs between 24 September and 10 November 1999. The greatest frequency of encounters with cricket frogs was during random sampling efforts (578 frogs). HA has conducted other intensive amphibian surveys with the following endangered or threatened species: eastern tiger salamander (*Ambystoma tigrinum*), blue-spotted salamander (*Ambystoma laterale*), Jefferson salamander (*Ambystoma jeffersonii*), southern gray treefrog (*Hyla chrysoscelis*) and Pine Barrens treefrog (*Hyla andersonii*). Based upon our 30-years of biological sampling proficiency and experience we are uniquely qualified to conduct endangered species surveys in general and this box turtle habitat evaluation in particular.

## MATERIALS AND METHODS

### SURVEYORS

The following HA staff were present during the habitat evaluation: Robert T. Zappalorti, Principle Herpetologist/Executive Director and Matthew P. McCort, Herpetologist/Wildlife Ecologist.

### HABITAT EVALUATION METHODS

Eastern box turtles are terrestrial, spending much of their time in deciduous woods and ecotone areas between fields and forests. They inhabit deciduous woodlands, pine barrens, old fields, pastures, and emergent marshes, (Hulse et al., 2001). Critical habitat features for this species include open nesting areas, hibernation sites and summer foraging areas.

On a broad scale, HA has three criteria for judging the value of the existing conditions and habitat available for reptiles. These are:

**1. Structure of Available Habitat:** Both the biotic and abiotic components are considered. These are good indicators for the possible occurrence of eastern box turtles within a particular study area or ecosystem (Zappalorti, 1976; Hulse et al., 2001).

**2. Historic Evidence:** The overall range of the box turtle and historic records on or near a study site are examined. Historic records are important to the overall evaluation of a site (Carr 1952; Zappalorti 1976; Ernst, Barbour and Lovich 1994).

**3. Indicator Species:** The presence of plant and animal species that are often found in association with box turtles is highly informative when evaluating a site. Such species may include food/prey organisms, or species that typically occur in similar or identical habitats as the target species.

## RESULTS

### PROJECT AREA AND PROJECT DESCRIPTION

The project area is located southwest of June Road, which turns into North Salem Road (Putnam County Route 55) just north of the site (**Figures 2-1, 2-2, 2-3, and 2-4**). A residential housing development and a power line easement border to the site to the north, riding stables to the west, and a large residential estate, cleared fields and forested areas to the south and southeast.

### HABITAT AND EXISTING CONDITIONS

Most of the 40-acre property is covered with second and third growth canopied forest (**Photo 1**). There are some old logging roads and foot trails that transect the property (**Photo 2**). With the exception of a few open patches in the canopy, the entire site is forested. However, this primarily forested property is dominated by three easily separated habitat types: **1** successional northern hardwood forest: **2** maple (*Acer rubrum*) hardwood swamp, and: **3** marsh headwater stream (Tim Miller Associates, Inc., 2008). There are small portions on the edge of the site that contain some old field habitat separated by stone walls. Dominant tree species within these habitat types include red maple, black locust (*Robinia pseudoacacia*) and sugar maple (*A. saccharum*). Spicebush (*Lindera benzoin*), along with saplings of the dominant tree species, was common in the understory. The wetland habitats are dominated by red maple (**Photo 3**).

For a more detailed habitat description please see the report entitled: “Biological Survey Report for Salem Hunt, Town of North Salem, Westchester County, New York,” dated May 20 2008. This report was prepared by Tim Miller Associates, Inc., 10 North Street, Cold Spring, New York 10516.

The property has several linear rock walls that extend for hundreds of feet at different locations throughout the site (see site map for locations) (**Photo 4**). These walls are likely relicts from the farm/grazing land use regime that was common in this area of New York many decades ago. Some portions of the available habitat on this property provide foraging areas and potential hibernating sites for eastern box turtles. However, no suitable nesting habitat for box turtles was observed directly on the site. It is likely that the subject property supports a small population of eastern box turtles that uses portions of the site as foraging habitat. Due to the suitability of the habitat, the site is likely home to other reptiles as well.

**DISCUSSION**

Eastern box turtles require upland, open-canopy habitat with loose loamy soil for nesting. One study noted that eastern box turtles tended to move upland to dryer, more open slopes, from their moist bottomland habitat, for egg laying (Stickle, 1989 cited in Hulse et al., 2001). It has also been documented that females have returned to the same general area to nest year after year (Stickle, 1989 cited in Hulse et al., 2001). This illustrates the importance of nesting sites to the long-term survival and viability of eastern box turtle populations. Nesting sites are clearly critical habitat features for this species and should be protected. When suitable nesting sites are not available within a particular habitat area, they can be created as part of a habitat management and improvement plan. HA suggests that this site should receive some mitigation measures in order to improve the habitat for the box turtle population. Specifically, the creation of suitable eastern box turtle nesting habitat at two locations on the subject property is recommended (**Figure 2-4**). This is discussed in detail below.

Although the wetland habitat and stream corridors are suitable habitat for box turtles, none were seen during our one day field inspection. We did however, find several species of amphibians (see **Table 1**).

**Table 1. The following species of Amphibian were Captured or Observed on the Salem Hunt Residential Housing Development Property During this Investigation.**

Wildlife Species	Heard Calling	Observed in Uplands	Observed in Wetlands	Total Number Observed
<i>Amphibians</i>				
Northern Red-backed Salamander	No	12	0	12
Northern Two-lined Salamander	No	0	5	5
Green Frog	Yes	0	20	20
Pickerel Frog	No	0	15	15
Northern Spring Peeper	Yes	2	0	2
American toad	No	8	2	10

## MITIGATION AND MANAGEMENT RECOMMENDATIONS

Ideally, the area of disturbance associated with this development should be enclosed with exclusionary fencing prior to the commencement of any construction activities. This fencing could be the temporary silt fencing that is likely already required by NYSDEC. Once this fencing is erected and the site is secure, all eastern box turtles should be removed from the development area by a trained herpetologist and released in the wetland areas on site. This would ensure that most of the box turtles present on the site would be out of harms way when construction begins.

### *1. Nesting Habitat Creation and Maintenance*

Eastern box turtle nesting areas can be created in areas that will not be developed as a means to greatly improve the habitat quality. Management of the habitat should only be carried-out outside the proposed development area. Portions of the remaining habitat could be enhanced by creating small fields with beds of tilled soil that would make it easy for box turtles to deposit their eggs. These areas could also serve as suitable basking habitat for other reptiles. Open sunny areas with soft soils would be conducive to digging by nesting females.

Protected upland areas adjacent to wetlands are ideal for management. Tree and shrub removal is needed in these selected areas that will need to be mowed every year in order to keep them in open field habitat.

A 1,200 square foot eastern box turtle nesting habitat should be created outside the development area between Wetlands “B” and “C” (**Figure 2-4**). This area should be mowed once per year, and only between November 15<sup>th</sup> and March 15<sup>th</sup> to avoid potential harm to turtles. A second, and much larger (approximately 5.05 acres), area that is suitable for eastern box turtle nesting should be maintained above the proposed SSTS area should be created. The soil in these areas should be soft/loamy (may have gravel component) and the area should be planted with a conservation seed mix. Soil with the appropriate mixture of one half sand and one half humus would be best (sandy loamy soil). The earth should maintain some moisture, but also needs to drain well. These conditions are consistent with the proposed SSTS area and therefore provide an excellent opportunity for a reptile nesting area, particularly for the eastern box turtle. Any regrowth of woody vegetation should be cleared approximately every other year to prevent the establishment of tree saplings or thick weedy plants that would shade to ground surface and make it difficult for the turtles to dig and lay their eggs (Kingsbury and Gibson 2002). Once again, this area should be mowed once per year, and only between November 15<sup>th</sup> and March 15<sup>th</sup> to avoid potential harm to turtles.

### *2. Barriers & Fencing to Keep Turtles and Other Reptiles from Development Areas*

Since the site already has several linear stone walls criss-crossing the property, these could become barriers to keep box turtles and other reptiles out of the proposed development site. Where needed, the existing stone walls should be extended and modified so they form one contentious barrier to preclude eastern box turtles from entering the development portion of the property. This is detailed in **Figure 2-4**. In other areas, such as along the main entrance road, three (3) foot high post-and-rail fencing with 12 to 18 inch-high wire mesh (with a maximum of 1 inch mesh opening) attached at the bottom and buried 6 inches in the soil, should be used to keep turtles and other reptiles, such as nesting snapping turtles, out of the development area. Burying the fence will serve to keep turtles



and other small wildlife from crawling under the fence. Wetland areas will not be developed and should be included as part of the box turtle habitat. **3. *Culvert Under the Roads***

A wildlife tunnel or culvert should be placed under the main access road that leads to and from the proposed housing development as per **Figure 2-4**. Twenty four (24) inch high density plastic (HDPE) pipe should be used for the culvert. Corrugated pipe should not be used because it hinders the ease with which certain reptiles, particularly turtles, can traverse under the road. The installation should be carried out in a manner which facilitates turtles finding the culvert and ultimately passing through them. The culvert location should be carefully engineered and positioned so that they do not serve for drainage during rain events. The post-and-rail fencing should be placed flush with the opening of the pipe to direct the turtles into the tunnels under the roads. As part of a mitigation program, HA recommends the construction of this culvert to reduce road mortality of wildlife.

#### **4. *Mountable Curbs on Entrance Roads or Perimeter Roads***

In many proposed communities, segregating reptiles from the development is not possible or practical. In such situations we would recommend that access roads should not have high curbing. In these cases, clam-shell curbing, or angled Belgium block, is much lower and would allow box turtles to crawl over it. This would prevent turtles that find their way onto the roadbed from being trapped and ultimately run over by vehicles. Given the ability of the recommended fencing and culvert to keep reptiles from the developed areas of the site, HA does not recommend a change to the proposed curbing.

#### **5. *Long Term Monitoring of New Nesting Areas***

Box turtles will have easy access to the created nesting habitat. These mitigation areas should be created during the development process, but will require on-going monitoring by an experienced herpetologist. This would include habitat inspections of the nesting habitat and nest searches during June and early July. This window is the optimal time of year to find eastern box turtle nests (Hulse et al., 2001).

Additional monitoring and inspection of the site by a qualified herpetologist should include the various stone walls and any exclusionary fencing (Kingsbury and Gibson 2002). Their tasks should include searching for breaches in the stone wall or fencing barriers where box turtles could enter the housing development. Any openings in the barrier should be repaired immediately by the owner of the property.

## **SUMMARY**

HA was contracted by William G. Balter of Wilder Balter Partners to conduct a reptile habitat evaluation and mitigation plan (with a specific focus on box turtles) on an approximately 40 acre site associated with the Salem Hunt Residential housing project in the town of North Salem, Westchester County, New York. There are four wetland areas on the subject property.

It is HA's professional opinion that suitable habitat exists for eastern box turtles and other reptiles on the subject property. The upland and wetland areas present provide foraging opportunities as well as habitat that could be used for overwintering. With the abovementioned habitat enhancements and modifications to the site in place, eastern box turtles and other reptiles on site could not only persist, but possibly prosper there due to the enhanced nature of the remaining habitat.

In summation, some portions of the hardwood forest and wetland stream corridors in and around the Wilder Balter Partners property are suitable habitat to support the reptiles and amphibians on site, including the eastern box turtle. Portions of the property also offer ideal summer foraging habitat for box turtles and other reptiles. All wetlands and a portion of the upland edges should remain available as foraging, nesting, basking and overwintering habitat.



**Photo 1.** Upland red maple dominated forest, which contains many other tree species, covers the vast majority of the property.



**Photo 2.** A few old logging roads and foot trails are present on the property.





**Photo 3.** This photo shows a red maple dominated portion of Wetland “C”.



**Photo 4.** Several linear rock walls are present along the perimeter of the site and along the wetlands.



## LITERATURE CITED

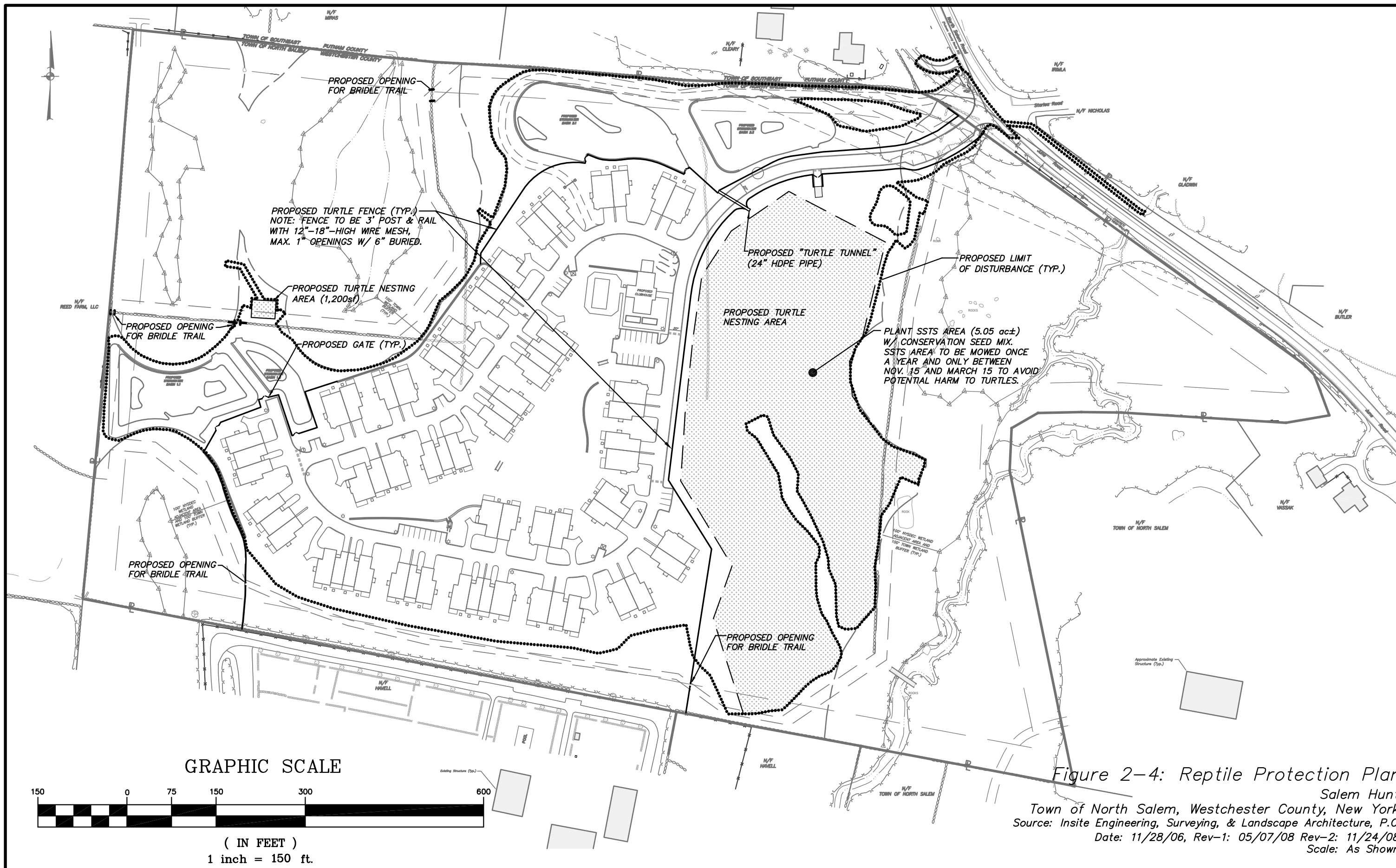
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GRAPHIC SCALE



( IN FEET )  
1 inch = 150 ft.

Figure 2-4: Reptile Protection Plan  
Salem Hunt  
Town of North Salem, Westchester County, New York  
Source: Insite Engineering, Surveying, & Landscape Architecture, P.C.  
Date: 11/28/06, Rev-1: 05/07/08 Rev-2: 11/24/08  
Scale: As Shown

