

Phase I Bog Turtle Habitat Survey

for the Green Brook Flood Risk Management Project Segments C1, C2, and H

Middlesex Borough, Middlesex County, New Jersey

December 19, 2018

Prepared for:

U.S. Army Corps of Engineers – New York District



**US Army Corps
of Engineers®**

Prepared by:

First Environment, Inc.

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1.0 Introduction

First Environment, Inc. (First Environment) was retained by the U.S. Army Corps of Engineers (USACE) to evaluate freshwater wetlands in Segments C1 through C3, and H of the Green Brook Flood Risk Management Project in Middlesex Borough, Middlesex County, New Jersey (Figure 1) for the presence of suitable habitat for the bog turtle (*Glyptemys muhlenbergii*), a federally-threatened and state-endangered species. Under the Green Brook Flood Risk Management Project, the USACE intends to construct a series of levees, floodwalls, and pump stations in Segments C1 through C3, and H along the Bound Brook to attenuate flooding. Bog turtles have been historically documented in the region and in its review of the project, the U.S. Fish and Wildlife Service (USFWS) requested a Phase I Habitat Survey to determine the potential presence of bog turtle habitat within the project area. The results of the Phase I Habitat Survey are presented in this report.

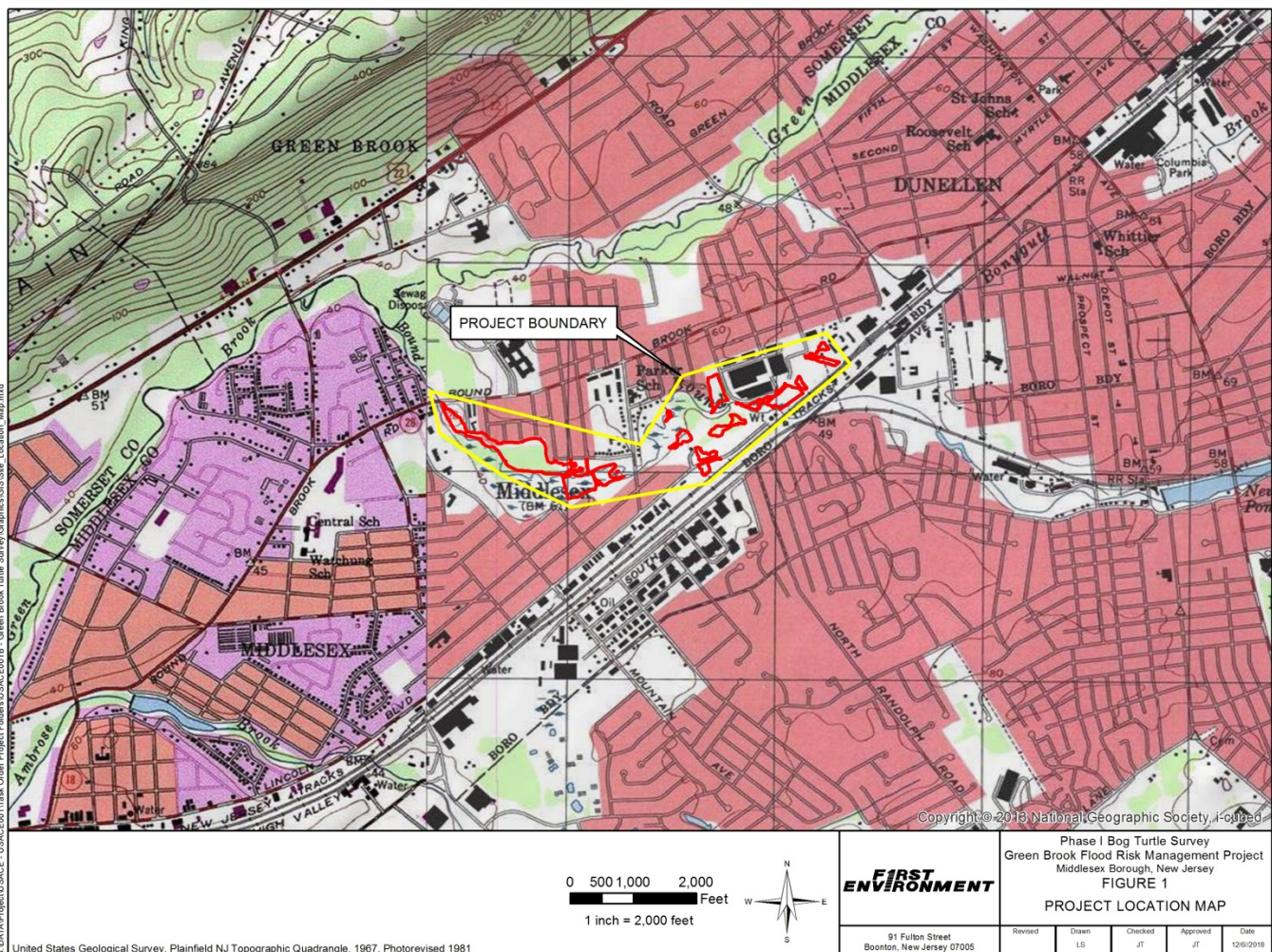


Figure 1 – Project Location Map

1.1 Species Background

The bog turtle is a semi-aquatic, freshwater turtle that prefers shallow, emergent wetlands with highly penetrable substrates saturated by perennial groundwater discharge. Bog turtle habitats fall under several wetland community classifications including freshwater marsh, medium and rich fen, wet meadow, and shrub swamp. Most bog turtle sites support a mosaic of herbaceous and woody-dominated communities. Key habitat

features include soft 'mucky' soils (composed of organic or mineral material), springs and seeps, rivulets, shallow pools, and hummocks, often in the form of tussock-forming vegetation. Common flora of bog turtle habitats in the Mid-Atlantic region include rice cutgrass (*Leersia oryzoides*), cattail (*Typha*), tussock sedge (*Carex stricta*), sedges (*Carex* sp.) wool grass (*Scirpus cyperinus*), common rush (*Juncus effusus*), skunk cabbage (*Symplocarpus foetidus*), jewelweed (*Impatiens capensis*), tearthumb (*Polygonum*), arrowhead (*Sagittaria*) sensitive fern (*Onoclea sensibilis*), tearthumb (*Polygonum* sp.), marsh fern (*Thelypteris palustris*), peat moss (*Sphagnum* sp.), speckled alder (*Alnus serrulata*), willow (*Salix* sp.), silky dogwood (*Cornus amomum*), poison sumac (*Rhus vernix*), spicebush (*Lindera benzoin*), northern arrowwood (*Viburnum dentatum*), red maple (*Acer rubrum*), pin oak (*Quercus palustris*), and gray birch (*Betula populifolia*). Nonnative and/or invasive species including purple loosestrife (*Lythrum salicaria*), common reed (*Phragmites australis*), Japanese stilt-grass (*Microstegium vimineum*), and multiflora rose (*Rosa multiflora*) can also be abundant. Habitats tend to be small and localized, with many sites falling under an acre in size. Bog turtles are generally active April through October. Breeding occurs in the spring, and in June, females lay eggs atop moss-covered sedge tussocks or other raised surfaces in the wetland. Hatchlings emerge in September. Brumation typically occurs in tunnels saturated by groundwater, which provides a thermal buffer. Bog turtles are omnivorous and can live in excess of 50 years and perhaps much longer. The species was listed as threatened by the U.S. Fish and Wildlife Service in 1997 (Ernst and Lovich, 2009; USFWS, 2001).

2.0 Methods

The Phase I Bog Turtle Habitat Survey was conducted over the course of two days in October 2018 and encompassed 16 discrete wetlands (Figure 2). Survey personnel included USFWS Recognized Qualified Bog Turtle Surveyor, Jason Tesauro, and biologists from Louis Berger, Dana Flynn and Craig Hanlon. Each wetland was evaluated on foot for the presence of the following habitat components listed in the USFWS Bog Turtle Phase I Habitat Survey guidelines:

- substrates of saturated organic and/or mineral 'mucky' soils with high penetrability;
- hydrologic regime maintained by a consistent supply of groundwater;
- dominance of herbaceous and scrub-shrub hydrophytic vegetation including sedges and other hummock-forming graminoids.

Representative habitat photographs and GPS coordinates were taken at each survey location. Phase I data sheets were also completed. The weather conditions during the survey were non-inclement with air temperatures between 40° - 50° F.

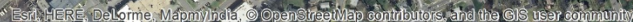


Figure 2 – Wetlands Surveyed for Bog Turtle Habitat

3.0 Results

Of the 16 wetlands evaluated for bog turtle habitat in the Phase I investigation, suitable habitat conditions for bog turtles were documented at one location encompassed by two closely connected wetlands, C1-WE and C1-W1. The majority of the wetlands surveyed were mature floodplain forest heavily influenced by stream overflow and lacked appropriate flora, soils, and hydrology required by bog turtles. Descriptions and photographs of the habitat conditions at each wetland are presented in the following section.

3.1 Bog Turtle Phase I Habitat Survey – Wetland Descriptions and Photographs

3.1.1 Wetland C1-WE/C1-W1

Wetlands C1-WE and C1-W1 were separated by a few meters of uplands and were treated as a single 'site unit' for the Phase I Habitat Survey.

C1-WE/C1-W1 contained forested and emergent wetland habitat. The forested portions consisted of two patches of hardwood swamp, one situated between the NJ Transit railroad and the JCP&L transmission line

right-of-way (ROW), with the other located between an apartment complex and the ROW. Emergent wetland habitat occurred under the ROW; its herbaceous condition was maintained by ROW vegetation management. Hydrology within C1-WE/C1-W1 consisted mostly of flashy surface run-off with a small area of semi-permanent flow supplied partially by groundwater that drained through a narrow swale extending from the railroad into the ROW. The shallow flow within the swale was slow-moving enough to create a 'mucky' substrate that could be penetrated several inches. Substrates in wetland areas outside of the swale contained intermittently saturated mineral soils. Vegetation throughout C1-WE/C1-W1 included red maple and tussock sedge in the forested portions and tussock sedge, common reed, sensitive fern, wool grass, Japanese stilt-grass, jewelweed, tearthumb, common rush, smallspike false nettle (*Boehmeria cylindrica*), yellow flag (*Iris pseudacorus*), arrow arum (*Peltandra virginicum*), marsh purslane (*Ludwigia palustris*) and various mosses in the emergent areas under the ROW. Although isolated and approximately 0.12 acres in size, the mucky, herbaceous swale under the ROW contained enough habitat components to support suitable conditions for bog turtles.



Photos 1 and 2: Representative forested wetland habitat; Photos 3 and 4: emergent wetland under powerline ROW containing suitable bog turtle habitat

3.1.2 Wetland C1-WC

C1-WC consisted of a forested wetland flooded by intermittent surface run-off. Substrates consisted of saturated mineral soils. Vegetation included red maple and Japanese stilt-grass. Suitable bog turtle was not present.



Flooded, canopied conditions of Wetland C1-WC

3.1.3 Wetland C1A-W1

C1A-W1 consisted of a sparsely forested wetland containing a small, flooded depression that supported scrub-shrub and herbaceous vegetation. The hydrology was driven by surface run-off, and much of the shrubby depression held standing water approximately six inches in depth. Substrates consisted of saturated mineral soils. Vegetation included tussock sedge, rice cutgrass, marsh mallow (*Althaea officinalis*), Japanese stiltgrass, smallspike false nettle, arrowhead, water plantain (*Alisma subcordatum*), New York ironweed (*Vernonia noveboracensis*), woodreed (*Cinna*), white snakeroot (*Ageratina altissima*), buttonbush (*Cephalanthus occidentalis*), red maple, black walnut (*Juglans nigra*), black locust (*Robinia pseudoacacia*) and silver maple (*Acer saccharinum*). Flooded portions of Wetland C1A-W1 supported potential habitat for many species of common herpetofauna (e.g., green frog, northern spring peeper, snapping turtle, eastern garter snake), but suitable bog turtle habitat was not present.



Photos 1 and 2: Flooded depression containing a mosaic of emergent, scrub-shrub, and forested habitat; Photo 3: forested wetland with dense undergrowth of Japanese stilt-grass; Photo 4: floodplain forest

3.1.4 Wetland C1-WF

C1-WF consisted of a forested floodplain wetland dominated by silver maple, pin oak, American elm (*Ulmus americana*), box elder (*Acer negundo*), Japanese stilt-grass, white snakeroot, reed canary grass, and Japanese knotweed (*Polygonum cuspidatum*). Soils were dry and firm, and surface water was not present. Hydrology appeared to be driven by stream overflow. A deeply incised channel was present along the western border of the wetland. Suitable bog turtle habitat was not present.



3.1.5 Wetland CH-WB

CH-WB consisted of a mostly forested wetland with scattered pockets of emergent marsh occupying gaps in the forest. Dominant woody vegetation included red maple, pin oak, silver maple, box elder, white ash (*Fraxinus americana*), and black gum (*Nyssa sylvatica*). Japanese stilt-grass, reed canary grass, white snakeroot, and woodreed were the dominant herbaceous species. Substrates were generally dry and firm with small areas of saturation and shallow ponding restricted to old drainage ditches. Hydrology was driven by surface run-off. Suitable bog turtle habitat was not present.



Representative photo of forested habitat conditions with CH-WB



One of several small patches of emergent wetland habitat with CH-WB

3.1.6 Wetland CH-WE

CH-WE contained a hardwood swamp ecologically similar to Wetland CH-WB. (The two wetlands were connected by a drainage ditch that holds water intermittently.) Silver maple and pin oak were dominant and included several very large specimens. Other documented trees included red maple, white mulberry (*Morus alba*), box elder, and white ash. Japanese stilt-grass and white snakeroot were the most abundant herbs growing in the understory and in the sunny gaps left by fallen trees. Soils were dry and firm; very little saturation was detected. Hydrology was driven by surface run-off and stream overflow. Suitable bog turtle habitat was not present.



Forested habitat within CH-WE; drainage ditch in center of photo connects
CH-WE with wetland CH-WB



Sunny patches of herbaceous growth within CH-WE

3.1.7 Wetland CH-WF

CH-WF consisted of a drained oxbow along the floodplain of the Bound Brook. Substrates within the oxbow basin were soft and muddy and showed signs of recent inundation from stream overflow. Vegetation cover was sparse and included a scattered marsh purslane, tearthumb, and aster (*Aster*). A small box elder with signs of past beaver herbivory occurred along the edge of the oxbow. Suitable bog turtle habitat was not present.



CH-WF: A muddy oxbow covered with a sparse carpet of marsh purslane

3.1.8 Wetland CH-WA

CH-WA consisted of a red maple swamp containing a network of old drainage ditches that terminated in a small circular basin. Saturated soils were limited to the ditches, several of which had standing and/or flowing water with areas of soft mud. Hydrology was driven by surface run-off, much of which drained from the adjacent commercial development. Vegetation included Japanese stilt-grass, marsh purslane, woodreed, and cinnamon fern (*Osmunda cinnamomea*). A green frog (*Lithobates clamitans*) was observed retreating into a shallow pool with the upper portion of a drainage ditch. (This was the only amphibian documented during the survey.) The shaded forest canopy and lack of a persistent source of hydrology rendered this wetland unsuitable for bog turtles.



Boggy, shallow ditch within CH-WA



A thick mat of Japanese stilt-grass covering an intermittently flooded basin within CH-WA

3.1.9 Wetland CH-WG

CH-WG consisted of a disturbed, drained wetland situated between the NJ Transit railroad and a paved dead-end road. The wetland habitat included a small remnant of a red maple swamp and an emergent marsh that had been overtaken by the invasive common reed. The soils contained rich, black organic material but lacked the hydrology to create 'mucky' conditions conducive to bog turtles. The hydrology appeared to have been impaired by the dredging of the ditch along the northern border of the wetland. There was also an extensive area of fill dumped along the western border of the site. Other flora documented in CH-WG included cinnamon fern, white ash, Japanese stilt-grass, glossy buckthorn (*Frangula alnus*), and sweetgum (*Liquidambar styraciflua*). The hydrological and physical impairment of the wetland rendered it unsuitable for bog turtles, although the soils suggest that it likely supported suitable habitat historically. An eastern garter snake (*Thamnophis sirtalis*) was observed on the adjacent paved road.



Red maple swamp with cinnamon fern understory in CH-WG



Portion of CH-WG containing a dense stand of common reed

3.1.10 Wetland C2-WC

C2-WC consisted of a small, intermittently flooded oxbow thickly colonized by reed canary grass. Substrates were firm and mostly dry. Other vegetation included box elder and white snakeroot. Suitable bog turtle habitat was not present.



Habitat conditions within C2-WC

3.1.11 Wetland CH-WD

CH-WD consisted of floodplain forest with scattered herbaceous and scrub-shrub vegetation. Dominant flora included pin oak, box elder, red maple, white ash, silver maple, Japanese stilt-grass, and white snakeroot. Downed wood was common. Substrates were clayey and mostly dry. Hydrology was driven by surface run-off. Suitable bog turtle habitat was not present.



Hardwood swamp habitat within CH-WD

3.1.12 Wetland C2-WE

C2-WE consisted of a drainage ditch that carried stormwater from an adjacent residential development into Bound Brook. Vegetation within the ditch was managed by the municipality. Suitable bog turtle habitat was not present.



Habitat conditions within C2-WE

3.1.13 Wetland C2-WA

Wetland C2-WA consisted of an intermittently-wet slough maintained by stream overflow and surface run-off. The area was canopied by the surrounding floodplain forest. Vegetation within the slough included several graminoids, white snakeroot, and climbing hempweed (*Mikania scandens*). Substrates were mostly dry; a small amount of surface water occurred in the outlet drainage. Suitable bog turtle habitat was not present.



Habitat conditions within C2-WA

3.1.14 *Wetland C2-WD*

C2-WD consisted of a small depressional wetland surrounded by mature hardwoods. Vegetation was chiefly herbaceous and included bladder sedge, woodseed, and white snakeroot. Soils were dry and firm; hydrology was driven by surface run-off. Suitable bog turtle habitat was not present.



Habitat conditions within C2-WD

3.1.15 Wetland C2-WB

C2-WB comprised a large contiguous block of lightly-canopied, hardwood swamp on the floodplain of Bound Brook. Hardwoods included red maple, white ash, silver maple, pin oak, and box elder. Understory vegetation included reed canary grass, Japanese stilt-grass, asters, white snakeroot, several graminoids including greater bladder sedge (*Carex intumescens*) and panicgrass (*Panicum*), and yellow flag. The topography was diverse, consisting of saturated basins and hillocks. Several trees had been cut, permitting herbaceous vegetation to flourish. One noteworthy feature within C2-WB was a large, westerly flowing drainage swale bordering the residential properties to the north. This swale, which was fed mostly by surface run-off, was characterized by shallow water and soft muddy substrates and supported a well-developed stand of lizard's tail (*Saururus cernuus*) near its confluence with Bound Brook. Other documented herbaceous species that were associated with the swale included climbing hempweed, swamp beggar's tick (*Bidens*), tearthumb, greater bladder sedge, and common rush. The muddiness of the substrate and some of the herbaceous vegetation 'hinted' at potentially suitable bog turtle habitat occurring in the swale; however, the heavy tree canopy and lack of persistent groundwater-derived hydrology rendered the area unsuitable for the species.



Photo 1: Herbaceous area dominated by reed canary grass; Photo 2: Scrub-shrub/herbaceous habitat with thick cover of Japanese stilt-grass; Photos 3 and 4: drainage swale that occurs along northern border of C2-WB; note presence of lizard's tail in Photo 4

4.0 Conclusions & Recommendations

One small area of suitable bog turtle habitat was found during an evaluation of 16 wetlands identified within the Green Brook Flood Risk Management Project area. The suitable area is depicted in Figures 3 and 4 and is associated with site unit C1-WE and C1-W1. The potential bog turtle habitat consisted of a marshy swale under an active powerline right-of-way maintained by JCP&L near the northeastern boundary of the project. The total size of the habitat was estimated at 0.12 acres. While the habitat is small, isolated from other bog turtle habitats and/or known populations, and sub-optimal in quality, the flood risk management project could have significant impacts to the hydrology and other components of the habitat, and it is therefore recommended that a Phase II Bog Turtle Survey be completed to determine if bog turtles are indeed present. A Phase II survey requires four visual and tactile turtle searches under warm, non-inclement conditions between April 15th and June 15th by a USFWS Recognized Qualified Bog Turtle Surveyor.

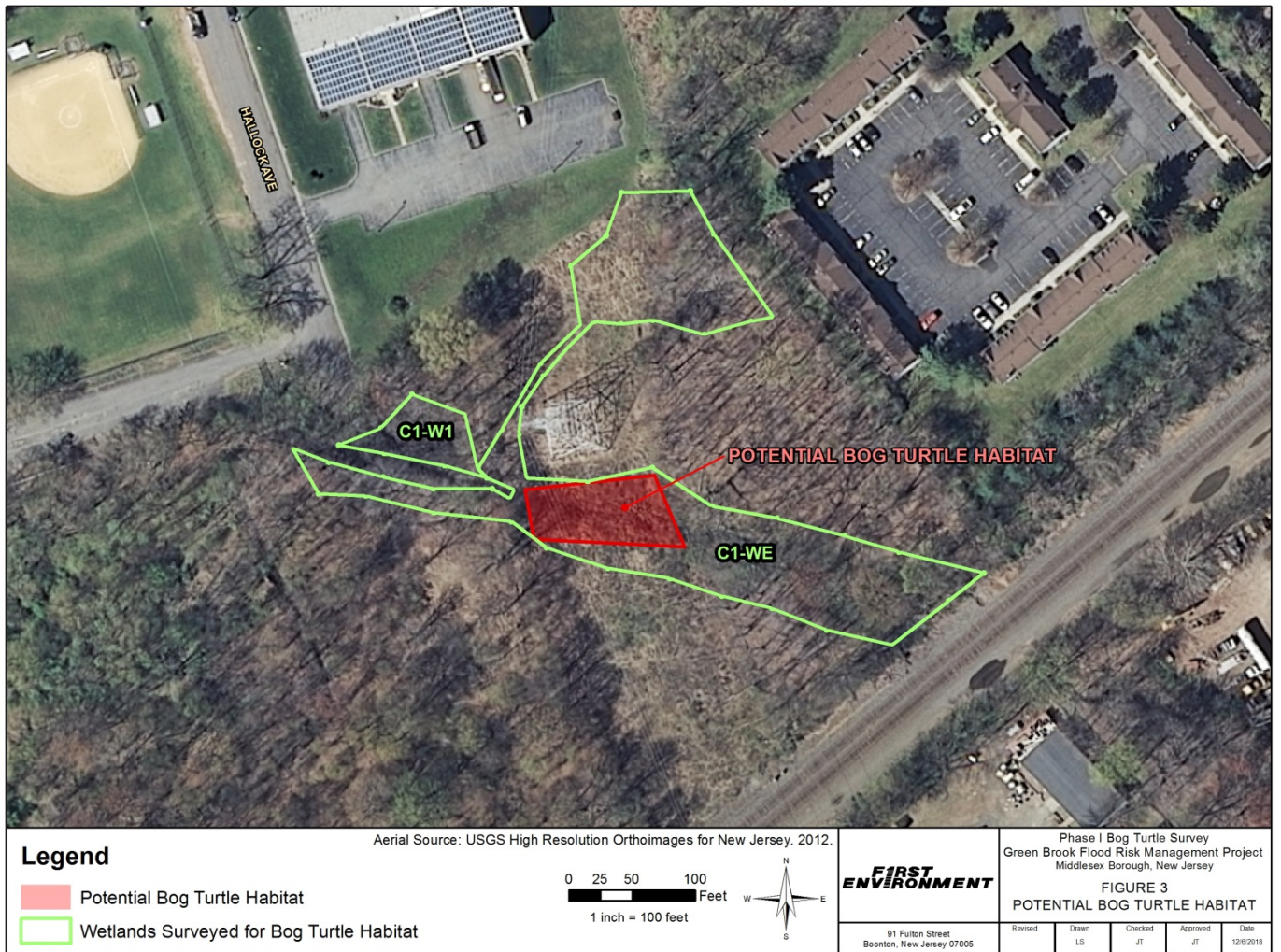


Figure 3: Potential Bog Turtle Habitat



Figure 4: Potential Bog Turtle Habitat

5.0 References

Ernst, C.H. and J.E. Lovich. 2009. Turtles of the United States and Canada. 2nd Edition, Johns Hopkins University Press, Baltimore.)

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

Appendix A: Phase I Survey Photograph Locations

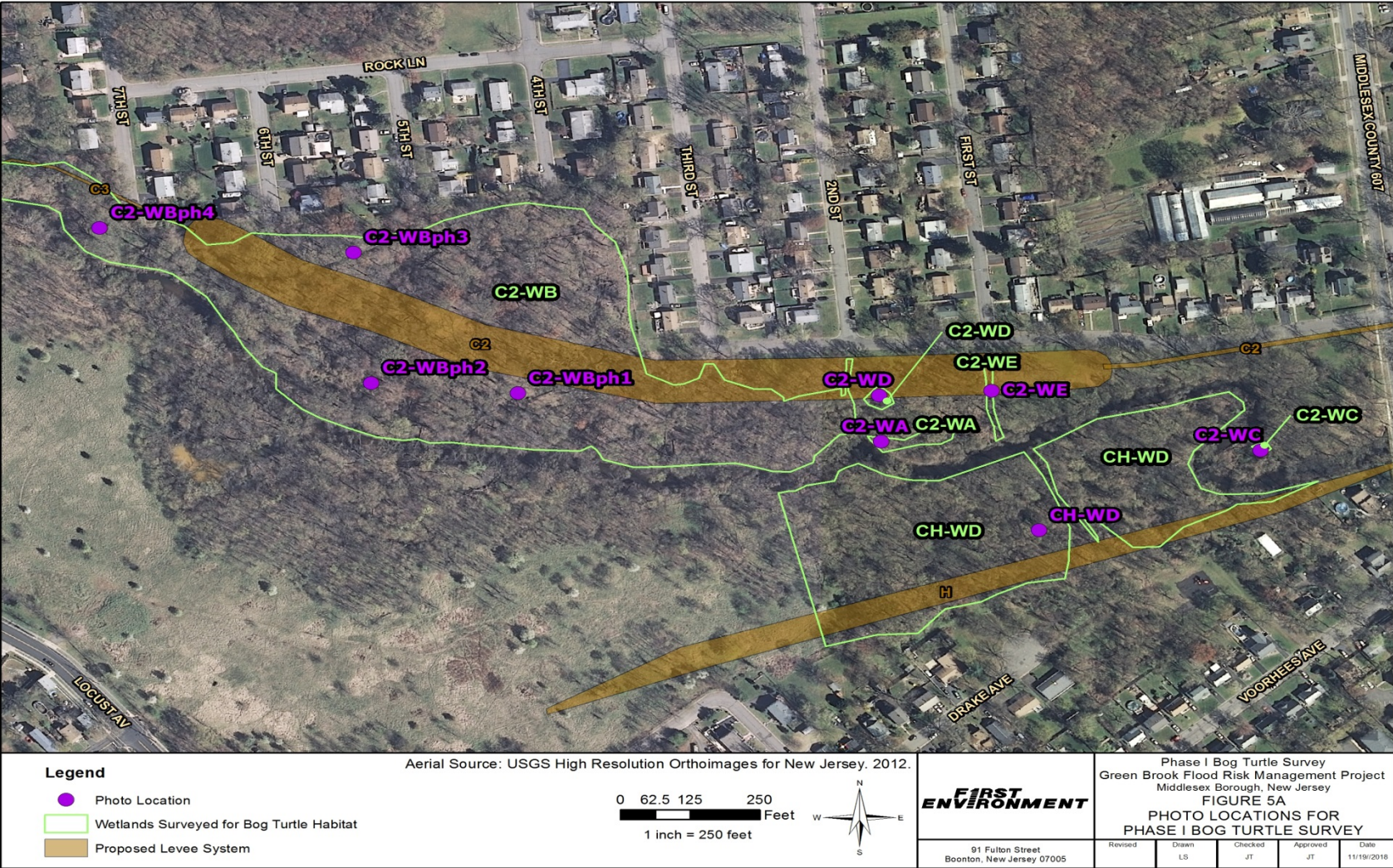


Figure 5A: Photo Locations for Phase I Bog Turtle Survey

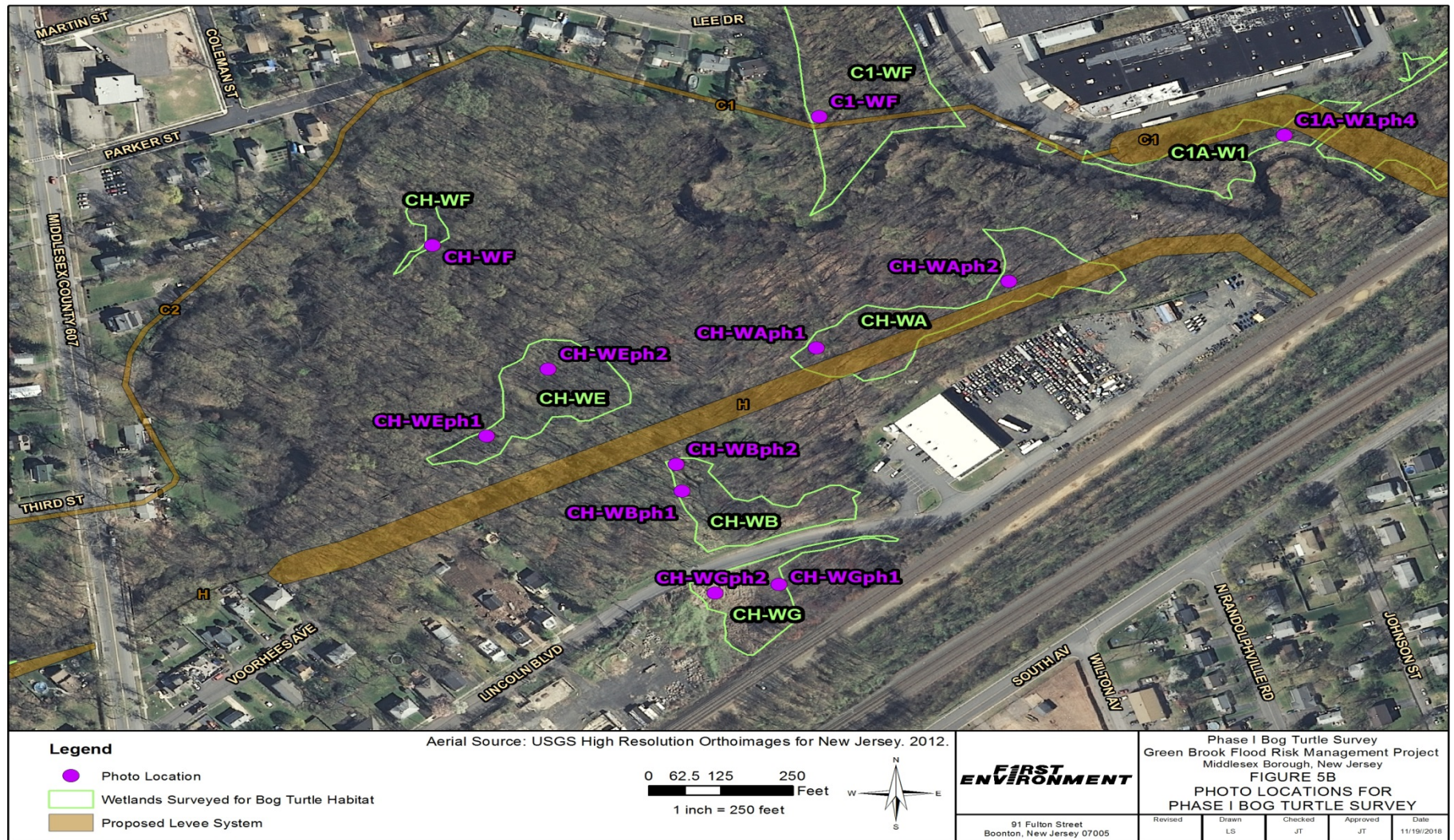


Figure 5B: Photo Locations for Phase I Bog Turtle Survey

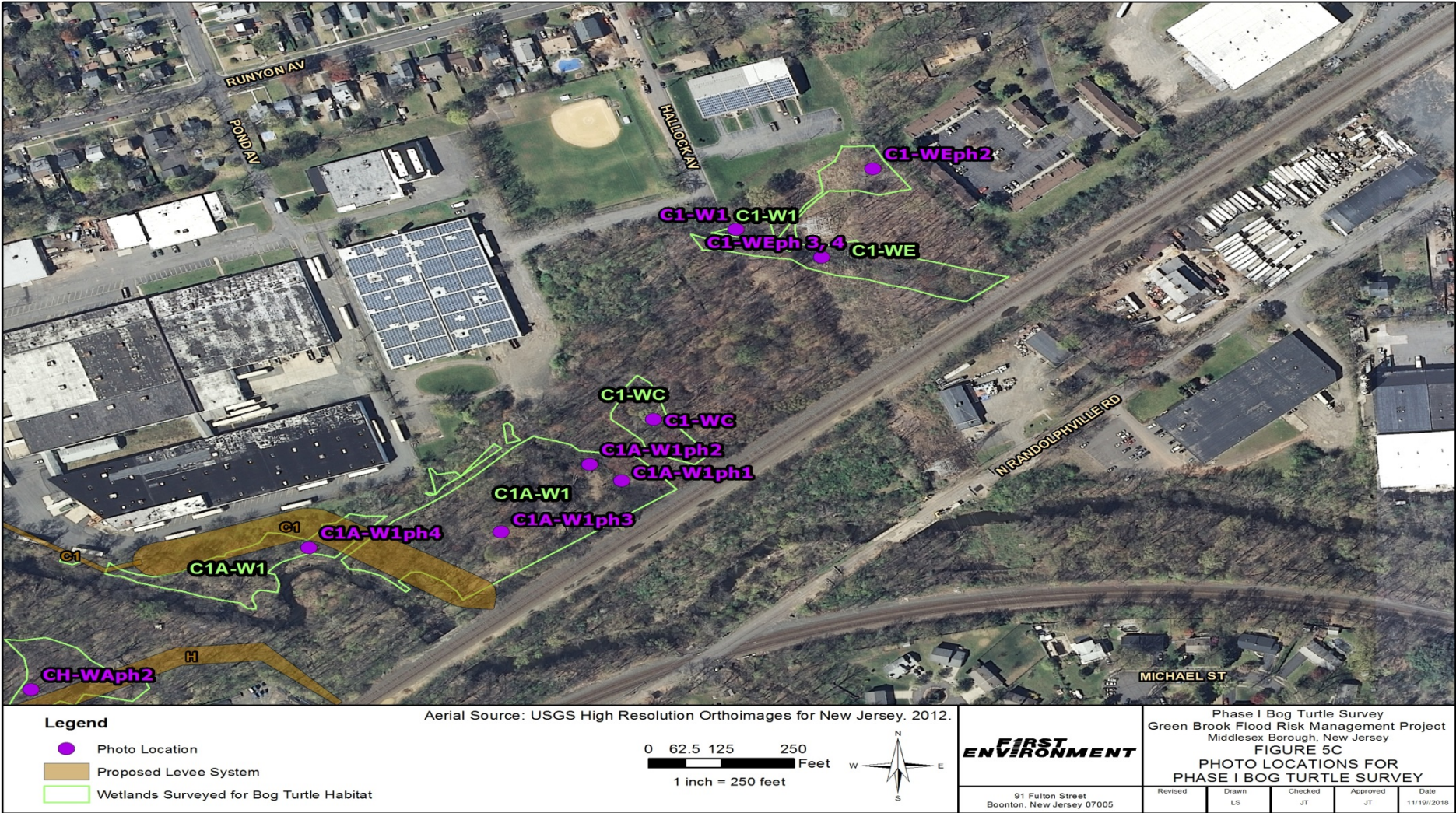


Figure 5C: Photo Locations for Phase I Bog Turtle Survey

Appendix B: Qualifications of Personnel

Jason Tesauro

EDUCATION:

1998 – 2002: Rutgers the State University of New Jersey
Graduate School
M.S. Ecology and Evolution
Advisor: Dr. David Ehrenfeld
Thesis: The Effects of Livestock Grazing on the Bog turtle (*Clemmys muhlenbergii*)

1992 – 1997: Rutgers the State University of New Jersey
Rutgers College
B.A. Anthropology
Minor – Biological Sciences

EMPLOYMENT HISTORY:

Biologist - First Environment, Boonton, New Jersey (2018 - present)

Wildlife Ecologist - Jason Tesauro Consulting, LLC, Millbrook, New York (2003 - present)

Associate Biologist - Hudsonia, Ltd., Annandale, New York (1998 - present)

Wildlife Ecologist - Environmental Defense Fund, Washington, D.C. (2003 - 2010)

Senior Zoologist - New Jersey Division of Fish and Wildlife Endangered & Nongame Species Program, Hampton, New Jersey (1994 - 2003)

PUBLICATIONS/ARTICLES:

Tesauro, J. 2001. Restoring wetland habitats with cows and other livestock. *Conservation Biology in Practice* 2:26-30.

Tesauro, J. and David Ehrenfeld. 2007. The effects of livestock grazing on the bog turtle [*Glyptemys* (= *Clemmys*) *muhlenbergii*]. *Herpetologica* 63:293-300.

Lathrop, R., P. Montesano, J. Tesauro, and B. Zarate. 2005. Statewide mapping and assessment of vernal pools: A New Jersey case Study. *Journal of Environmental Management* 76:230-238.

Bell-Travis, K., I. Haeckel, G. Stevens, J. Tesauro, and E. Kiviat. Bog Turtle (*Glyptemys muhlenbergii*) Dispersal Corridors and Conservation in New York, USA. *Herpetological Conservation and Biology* 13(1):257–272.

PROFESSIONAL CERTIFICATIONS:

U.S. Fish and Wildlife Service Recognized Qualified Bog Turtle Surveyor/Trapper for Pennsylvania, New Jersey, and New York

PROFESSIONAL AFFILIATIONS:

Board of Directors, The Wetlands Trust, Burdett, New York (January 2016 - present)

Board of Directors, The Wetlands Conservancy, Brooktondale, New York (March 2015 - present)

Craig Hanlon

EDUCATION:

1990 – 1992: Slippery Rock University
B.S. Environmental Studies
Minor – Cartography

1988 – 1990: Pennsylvania State University
A.S. Wildlife Technology

EMPLOYMENT HISTORY:

Principal Environmental Scientist – Louis Berger, U.S., Morristown, New Jersey (2000 - present)

Environmental Scientist – Gwin, Dobson & Foreman, Altoona, Pennsylvania (1997 - 2000)

L. Robert Kimball & Associates, Ebensburg, Pennsylvania (1994 - 1997)

PUBLICATIONS/ARTICLES:

N/A

PROFESSIONAL CERTIFICATIONS:

Certified Ecologist, Ecological Society of America

Professional Wetland Scientist – Society of Wetland Scientist

Envision Sustainability Professional - Institute for Sustainable Infrastructure

PROFESSIONAL AFFILIATIONS:

Ecological Society of America (2007 - present)

Society of Wetland Scientist (2004 - present)

Pennsylvania Association of Environmental Professionals (2010 - present)

Dana Flynn

EDUCATION:

2002 – 2006: University of Delaware
B.S. Wildlife Conservation

EMPLOYMENT HISTORY:

Senior Environmental Scientist – Louis Berger, U.S., Morristown, New Jersey (2007 - present)

Field Biologist – New Jersey Audubon, Cape May Court House, New Jersey (2007)

Wildlife Technician – New Jersey Division of Fish and Wildlife, Clinton, New Jersey (2006-2007)

Wildlife Technician – University of Delaware, Department of Entomology & Wildlife Ecology (2006)

PUBLICATIONS/ARTICLES:

N/A

PROFESSIONAL CERTIFICATIONS:

Certified Ecologist, Ecological Society of America

Certified Wildlife Biologist – The Wildlife Society

PROFESSIONAL AFFILIATIONS:

Ecological Society of America (2017 - present)

New Jersey Chapter of The Wildlife Society (2013-present)

The Wildlife Society (National) (2008-present)

Appendix C: Phase I Datasheets

Phase 1 Bog Turtle Habitat Survey Data Form For the Northern Population Range (Revised October 23, 2018)		Wetland ID: <u>C1-WE/C1-W1</u>
General Info	Property/Project Name: <u>Greenbrook Flood Risk Mgmt C12, H</u>	County: <u>Middlesex</u>
	Entity Requesting Phase 1 Survey (landowner, developer, agency): <u>ACOE</u>	
	Township/Municipality: <u>Middlesex Borough</u>	
	Lead Surveyor: <u>Tesaro</u>	Affiliation: <u>First Environment</u>
	Other Assistants Present: <u>D. Flynn, LBG</u>	
Date/Condition	Date of Survey: <u>10/18/18</u>	Time In: <u>1000h</u> Time Out: <u>1030h</u> Air Temp: <u>40</u> °F
	Last Precipitation: <u>< 24 hours</u> <input checked="" type="checkbox"/> 1-7 days <input type="checkbox"/> > 1 week <input type="checkbox"/> unknown Drought conditions? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Unknown	
	Drought Index* ¹ (Circle): D0 D1 D2 D3 D4 Notes (e.g., details about drought, flood, abnormally dry, seasonal conditions): <u>Wet fall + Summer</u>	
Wetland Info	Wetland ID: <u>C1-WE/C1-W1</u> Wetland Size: _____ acres, if known # Wetlands w/in Project Area ² : _____	
	If estimating wetland size: <input type="checkbox"/> < 0.1 acre <input type="checkbox"/> 0.1-0.5 acre <input checked="" type="checkbox"/> 1-2 acres <input type="checkbox"/> 2-4 acres <input type="checkbox"/> 5+ acres <input type="checkbox"/> 10+ acres	
	% Canopy Cover* ³ <input type="checkbox"/> 0% <input type="checkbox"/> ≤ 5 <input type="checkbox"/> 6-20 <input type="checkbox"/> 21-40 <input checked="" type="checkbox"/> 41-60 <input type="checkbox"/> > 60	
	Hydrology and Soils (check all that apply):	
	<input checked="" type="checkbox"/> Springs/Seeps <input type="checkbox"/> Springhouse <input type="checkbox"/> Trib/Stream <input type="checkbox"/> Pond <input checked="" type="checkbox"/> Stormwater <input type="checkbox"/> Iron Bacteria	
	<input type="checkbox"/> Rivulets (how many _____) (_____ inches deep) <input type="checkbox"/> Subsurface Tunnel/Rivulets <input type="checkbox"/> Tire Ruts (_____ inches deep)	
	<input checked="" type="checkbox"/> Saturated soils present? If yes, year-round? <input checked="" type="checkbox"/> Likely <input type="checkbox"/> Unlikely <input type="checkbox"/> Unknown	
	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No water visible on surface? <input checked="" type="checkbox"/> Small Puddles/Depressions (<u>2</u> inches deep)	
	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Are there any signs of disturbance to <u>hydrology</u> (e.g., drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver impoundment, evidence of flooding)? If yes, describe (if possible, include how recent disturbance is*): <u>Storm water flooding</u>	
	For ditches that may be present, is there bog turtle habitat? If yes, describe: _____	
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Are there any signs of disturbance to <u>vegetation</u> (e.g., mowing, pasturing, burning)? If yes, describe (if possible, include level of disturbance*): <u>P.O.W. veg mngmt.</u>		
Soil types present*: <u>Saturated mineral soils, Small area of 'muckiness'</u>		

¹ (*) Denotes reference to the Supplemental Information document that provides more details on this particular question.
² Each wetland must have a separate Phase 1 habitat assessment data form completed.
³ Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are

PEM Portion of Wetland: Approx. Acre(s) 0.2 ac Mucky soils depth (inches) 1-3"
 PSS Portion of Wetland: Approx. Acre(s) 1.8 ac Mucky soils depth (inches) 1-3"
 PFO Portion of Wetland: Approx. Acre(s) 1.8 ac Mucky soils depth (inches) 1-3"
 PO Portion of Wetland: Approx. Acre(s) _____

CIRCLE all vegetation* from list below that is dominant $\geq 20\%$ for each wetland type listed above. Also, CIRCLE calciphiles⁴ present even if not a dominant species.

Sphagnum Moss	Grass-of-Parnassus	Rice Cutgrass	<u>Tussock Sedge</u>	Shrubby Cinquefoil	Red Maple
Arrowhead	<u>Japanese Stiltgrass</u>	Rough-leaved Goldenrod	White Turtlehead	Spicebush	Viburnum Spp.
Carpetgrass	<u>Jewelweed</u>	<u>Sensitive Fern</u>	Woolly-fruited Sedge	Swamp Rose	
Cattail	Mile-A-Minute	Skunk Cabbage	Yellow Sedge	Alder Spp.	
Cinnamon Fern	Porcupine Sedge	Smooth Sawgrass	Alder-leaved Buckthorn	American Elm	
Common Boneset	Purple Loosestrife	Sweetflag	Dogwood Spp.	Eastern Red Cedar	
<u>Common Reed</u>	Reed Canary Grass	Tearthumb Spp.	Multiflora Rose	Poison Sumac	

Notes on additional plant species (Are there other sedges/rushes/other species dominant that are not on the list above?):
Carex, Soft rush, Woolgrass, marsh purslane

Describe surrounding landscape (e.g., wetlands, forest, subdivision, agricultural field, fallow field, etc.):
Active railroad, residential, industrial/commercial

How much of this wetland is located off-site (i.e., outside the property boundaries or right-of-way)?
☒ None of it – the entire wetland is within the property boundaries
☐ Some of it – _____ Acres or _____ % of the wetland appears to be located off-site
 If part of this wetland continues off-site, how much of the off-site portion was surveyed (on foot)?
☐ None of it ☐ All of it ☐ Part of it (_____ acres or _____ % of the off-site portion)
 Is there potential bog turtle habitat off-site? ☐ Yes ☐ No ☐ Unknown If yes, how did you conclude this?

Were any bog turtles observed? ☐ Yes ☒ No If yes, how many? _____
 Other herps observed? ☐ Yes ☒ No If yes, which ones? _____

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.
 *Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

☒ Yes ☐ No ☐ Unsure The hydrology criterion for bog turtle habitat is met.
☒ Yes ☐ No ☐ Unsure The soils criterion for bog turtle habitat is met.
☒ Yes ☐ No ☐ Unsure The vegetation criterion for bog turtle habitat is met.
☐ Yes ☐ No ☐ Unsure This wetland has potential bog turtle habitat (fair to good quality).
☒ Yes ☐ No ☐ Unsure This wetland has potential bog turtle habitat (low to very low quality).
☐ Yes ☒ No ☐ Unsure This wetland does NOT have potential bog turtle habitat.

Notes (How did you reach this opinion?):
Small area meets minimum criteria for suitability

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Signature [Signature] Date 10/13/18

most prominent in the wetland and have the highest percent of coverage compared to other species.
⁴ Pertinent to bog turtle sites found in Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania. See Supplemental Information – Suitable Vegetation section.

Phase 1 Bog Turtle Habitat Survey Data Form For the Northern Population Range (Revised October 23, 2018)		Wetland ID: <u>C1-WC</u>
General Info	Property/Project Name: <u>Green Brook Flood Risk Mgmt C1,2,N</u>	County: <u>Middlesex</u>
	Entity Requesting Phase 1 Survey (landowner, developer, agency): <u>ACOE</u>	
	Township/Municipality: <u>Middlesex Boro</u>	
	Lead Surveyor: <u>T. Saurro</u>	Affiliation: <u>First Environment</u>
	Other Assistants Present: <u>D. Flynn, LBG</u>	
Date/Condition	Date of Survey: <u>10/18/18</u> Time In: <u>1035h</u> Time Out: <u>1045h</u> Air Temp: <u>40</u> °C	
	Last Precipitation: <u>< 24 hours</u> <u>X</u> 7 days <u>> 1 week</u> <u>unknown</u> Drought conditions? <u>YES</u> <u>X</u> NO <u>Unknown</u>	
	Drought Index* ¹ (Circle): D0 D1 D2 D3 D4 Notes (e.g., details about drought, flood, abnormally dry, seasonal conditions): <u>Wet fall + summer</u>	
Wetland Info	Wetland ID: <u>C1-WC</u> Wetland Size: _____ acres, if known # Wetlands w/in Project Area ² : _____	
	If estimating wetland size: <u>< 0.1 acre</u> <u>X</u> 0.1-0.5 acre <u>1-2 acres</u> <u>2-4 acres</u> <u>5+ acres</u> <u>10+ acres</u>	
	% Canopy Cover* ³ <u>0%</u> <u>< 5</u> <u>6-20</u> <u>21-40</u> <u>41-60</u> <u>X</u> 60	
	Hydrology and Soils (check all that apply):	
	<u>Spring/Seeps</u> <u>Springhouse</u> <u>Trib/Stream</u> <u>X</u> Pond <u>X</u> Stormwater <u>Iron Bacteria</u>	
	<u>Rivulets</u> (how many _____) (_____ inches deep) <u>Subsurface Tunnel/Rivulets</u> <u>Tire Ruts</u> (_____ inches deep)	
	<u>X</u> Saturated soils present? If yes, year-round? <u>Likely</u> <u>X</u> Unlikely <u>Unknown</u>	
	<u>X</u> Yes <u>No</u> water visible on surface? <u>Small Puddles/Depressions</u> (<u>4</u> " inches deep)	
	<u>X</u> Yes <u>No</u> Are there any signs of disturbance to <u>hydrology</u> (e.g., drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver impoundment, evidence of flooding)? If yes, describe (if possible, include how recent disturbance is*): <u>Storm water flooding, overflow</u>	
	For ditches that may be present, is there bog turtle habitat? If yes, describe:	
<u>Yes</u> <u>X</u> No Are there any signs of disturbance to <u>vegetation</u> (e.g., mowing, pasturing, burning)? If yes, describe (if possible, include level of disturbance*):		
Soil types present*: <u>Saturated mineral soils</u>		

¹ (*) Denotes reference to the Supplemental Information document that provides more details on this particular question.
² Each wetland must have a separate Phase 1 habitat assessment data form completed.
³ Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are

PEM Portion of Wetland: Approx. Acre(s) _____ Mucky soils depth (inches) _____
 PSS Portion of Wetland: Approx. Acre(s) _____ Mucky soils depth (inches) _____
 PFO Portion of Wetland: Approx. Acre(s) .5 ac Mucky soils depth (inches) <1"
 PO Portion of Wetland: Approx. Acre(s) _____

CIRCLE all vegetation* from list below that is dominant $\geq 20\%$ for each wetland type listed above. Also, CIRCLE calciphiles⁴ present even if not a dominant species.

Sphagnum Moss	Grass-of-Parnassus	Rice Cutgrass	Tussock Sedge	Shrubby Cinquefoil	Red Maple
Arrowhead	Japanese Stiltgrass	Rough-leaved Goldenrod	White Turtlehead	Spicebush	Viburnum Spp.
Carpetgrass	Jewelweed	Sensitive Fern	Woolly-fruited Sedge	Swamp Rose	
Cattail	Mile-A-Minute	Skunk Cabbage	Yellow Sedge	Alder Spp.	
Cinnamon Fern	Porcupine Sedge	Smooth Sawgrass	Alder-leaved Buckthorn	American Elm	
Common Boneset	Purple Loosestrife	Sweetflag	Dogwood Spp.	Eastern Red Cedar	
Common Reed	Reed Canary Grass	Tearthumb Spp.	Multiflora Rose	Poison Sumac	

Notes on additional plant species (Are there other sedges/rushes/other species dominant that are not on the list above?):

Describe surrounding landscape (e.g., wetlands, forest, subdivision, agricultural field, fallow field, etc.):
Railroad, forest

How much of this wetland is located off-site (i.e., outside the property boundaries or right-of-way)?
☒ None of it – the entire wetland is within the property boundaries
☐ Some of it – _____ Acres or _____ % of the wetland appears to be located off-site
 If part of this wetland continues off-site, how much of the off-site portion was surveyed (on foot)?
☐ None of it ☐ All of it ☐ Part of it (_____ acres or _____ % of the off-site portion)
 Is there potential bog turtle habitat off-site? ☐ Yes ☐ No ☐ Unknown If yes, how did you conclude this?

Were any bog turtles observed? ☐ Yes ☒ No If yes, how many? _____
 Other herps observed? ☐ Yes ☒ No If yes, which ones? _____

☐ Yes ☒ No ☐ Unsure The hydrology criterion for bog turtle habitat is met.
☐ Yes ☒ No ☐ Unsure The soils criterion for bog turtle habitat is met.
☐ Yes ☒ No ☐ Unsure The vegetation criterion for bog turtle habitat is met.
☐ Yes ☒ No ☐ Unsure This wetland has potential bog turtle habitat (fair to good quality).
☐ Yes ☒ No ☐ Unsure This wetland has potential bog turtle habitat (low to very low quality).
☒ Yes ☐ No ☐ Unsure This wetland does NOT have potential bog turtle habitat.

Notes (How did you reach this opinion?):
Flooded basin

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Signature [Signature] Date 10/18/18

most prominent in the wetland and have the highest percent of coverage compared to other species.
⁴ Pertinent to bog turtle sites found in Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania. See Supplemental Information – Suitable Vegetation section.

Phase 1 Bog Turtle Habitat Survey Data Form For the Northern Population Range (Revised October 23, 2018)		Wetland ID: <u>C/A-W1</u>
General Info	Property/Project Name: <u>Green Brook Flood Risk Mgmt C1, 2, 4</u>	County: <u>Middlesex</u>
	Entity Requesting Phase 1 Survey (landowner, developer, agency): <u>ACOE</u>	
	Township/Municipality: <u>Middlesex Borough</u>	
	Lead Surveyor: <u>Tesavro</u>	Affiliation: <u>First Environment</u>
	Other Assistants Present: <u>D. Flynn, LBG</u>	
Date/Condition	Date of Survey: <u>10/18/18</u> Time In: <u>1050h</u> Time Out: <u>1120h</u> Air Temp: <u>43°F</u> °C	
	Last Precipitation: <input type="checkbox"/> < 24 hours <input type="checkbox"/> 1-7 days <input type="checkbox"/> > 1 week <input type="checkbox"/> unknown Drought conditions? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Unknown	
	Drought Index* ¹ (Circle): D0 D1 D2 D3 D4 Notes (e.g., details about drought, flood, abnormally dry, seasonal conditions): <u>Wet fall & summer</u>	
Wetland Info	Wetland ID: <u>C/A-W1</u> Wetland Size: _____ acres, if known # Wetlands w/in Project Area ² : _____	
	If estimating wetland size: <input type="checkbox"/> < 0.1 acre <input type="checkbox"/> 0.1-0.5 acre <input checked="" type="checkbox"/> 1-2 acres <input type="checkbox"/> 2-4 acres <input type="checkbox"/> 5+ acres <input type="checkbox"/> 10+ acres	
	% Canopy Cover* ³ <input type="checkbox"/> 0% <input type="checkbox"/> ≤ 5 <input type="checkbox"/> 6-20 <input type="checkbox"/> 21-40 <input checked="" type="checkbox"/> 41-60 <input type="checkbox"/> > 60	
	Hydrology and Soils (check all that apply):	
	<input type="checkbox"/> Springs/Seeps <input type="checkbox"/> Springhouse <input checked="" type="checkbox"/> Trib/Stream <input checked="" type="checkbox"/> Pond <input checked="" type="checkbox"/> Stormwater <input type="checkbox"/> Iron Bacteria	
	<input type="checkbox"/> Rivulets (how many _____) (_____ inches deep) <input type="checkbox"/> Subsurface Tunnel/Rivulets <input type="checkbox"/> Tire Ruts (_____ inches deep)	
	<input checked="" type="checkbox"/> Saturated soils present? If yes, year-round? <input checked="" type="checkbox"/> Likely <input type="checkbox"/> Unlikely <input type="checkbox"/> Unknown	
	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No water visible on surface? <input type="checkbox"/> Small Puddles/Depressions (_____ inches deep)	
	<input type="checkbox"/> Yes <input type="checkbox"/> No Are there any signs of disturbance to <u>hydrology</u> (e.g., drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver impoundment, evidence of flooding)? If yes, describe (if possible, include how recent disturbance is*): <u>Stormwater flooding</u>	
	For ditches that may be present, is there bog turtle habitat? If yes, describe:	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Are there any signs of disturbance to <u>vegetation</u> (e.g., mowing, pasturing, burning)? If yes, describe (if possible, include level of disturbance*):		
Soil types present*: <u>Saturated mineral soils</u>		

¹ (*) Denotes reference to the Supplemental Information document that provides more details on this particular question.
² Each wetland must have a separate Phase 1 habitat assessment data form completed.
³ Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are

PEM Portion of Wetland: Approx. Acre(s) 25 Mucky soils depth (inches) 21"
PSS Portion of Wetland: Approx. Acre(s) 25 Mucky soils depth (inches) 1-3"
PFO Portion of Wetland: Approx. Acre(s) 1.5 Mucky soils depth (inches) 1"
PO Portion of Wetland: Approx. Acre(s) _____

CIRCLE all vegetation* from list below that is dominant $\geq 20\%$ for each wetland type listed above. Also, CIRCLE calciphiles⁴ present even if not a dominant species.

Sphagnum Moss	Grass-of-Parnassus	Rice Cutgrass	<u>Tussock Sedge</u>	Shrubby Cinquefoil	<u>Red Maple</u>
<u>Arrowhead</u>	<u>Japanese Stiltgrass</u>	Rough-leaved Goldenrod	White Turtlehead	Spicebush	Viburnum Spp.
Carpetgrass	Jewelweed	Sensitive Fern	Woolly-fruited Sedge	Swamp Rose	
Cattail	Mile-A-Minute	Skunk Cabbage	Yellow Sedge	Alder Spp.	
Cinnamon Fern	Porcupine Sedge	Smooth Sawgrass	Alder-leaved Buckthorn	American Elm	
Common Boneset	Purple Loosestrife	Sweetflag	Dogwood Spp.	Eastern Red Cedar	
Common Reed	Reed Canary Grass	Tearthumb Spp.	Multiflora Rose	Poison Sumac	

Notes on additional plant species (Are there other sedges/rushes/other species dominant that are not on the list above?):
False nettle, Wood reed, white snakeroot, hardwood swamp canopy, butterbush, mallow

Describe surrounding landscape (e.g., wetlands, forest, subdivision, agricultural field, fallow field, etc.):
Active railroad, development

How much of this wetland is located off-site (i.e., outside the property boundaries or right-of-way)?
☒ None of it – the entire wetland is within the property boundaries
☐ Some of it – _____ Acres or _____ % of the wetland appears to be located off-site
If part of this wetland continues off-site, how much of the off-site portion was surveyed (on foot)?
☐ None of it ☐ All of it ☐ Part of it (_____ acres or _____ % of the off-site portion)

Is there potential bog turtle habitat off-site? ☐ Yes ☒ No ☐ Unknown If yes, how did you conclude this?

Were any bog turtles observed? ☐ Yes ☒ No If yes, how many? _____
Other herps observed? ☐ Yes ☒ No If yes, which ones? _____

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.
 *Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion
☐ Yes ☒ No ☐ Unsure The hydrology criterion for bog turtle habitat is met.
☒ Yes ☐ No ☐ Unsure The soils criterion for bog turtle habitat is met.
☒ Yes ☐ No ☐ Unsure The vegetation criterion for bog turtle habitat is met.
☐ Yes ☒ No ☐ Unsure This wetland has potential bog turtle habitat (fair to good quality).
☐ Yes ☐ No ☐ Unsure This wetland has potential bog turtle habitat (low to very low quality).
☒ Yes ☐ No ☐ Unsure This wetland does NOT have potential bog turtle habitat.
Notes (How did you reach this opinion?):
Flooded, wooded

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.
 Signature [Signature] Date 10/18/18

most prominent in the wetland and have the highest percent of coverage compared to other species.
⁴ Pertinent to bog turtle sites found in Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania. See Supplemental Information – Suitable Vegetation section.

Phase 1 Bog Turtle Habitat Survey Data Form For the Northern Population Range (Revised October 23, 2018)		Wetland ID: <u>C1-WF</u>
General Info	Property/Project Name: <u>Greenbrook Flood Risk Mgmt C1, 2, 1d</u>	County: <u>Middlesex</u>
	Entity Requesting Phase 1 Survey (landowner, developer, agency): <u>ACO</u>	
	Township/Municipality: <u>Middlesex Borough</u>	
	Lead Surveyor: <u>J. Esau</u>	Affiliation: <u>First Environment</u>
	Other Assistants Present: <u>D. Flynn, LBG</u>	
Date/Condition	Date of Survey: <u>10/15/18</u> Time In: <u>1130h</u> Time Out: <u>1200h</u> Air Temp: <u>45</u> °C	
	Last Precipitation: <u>< 24 hours</u> <u>1-7 days</u> <u>> 1 week</u> <u>unknown</u> Drought conditions? <u>YES</u> <u>X</u> NO <u>Unknown</u>	
	Drought Index ¹ (Circle): D0 D1 D2 D3 D4 Notes (e.g., details about drought, flood, abnormally dry, seasonal conditions): <u>Wet fall + summer</u>	
Wetland Info	Wetland ID: <u>C1-WF</u> Wetland Size: _____ acres, if known # Wetlands w/in Project Area ² : _____	
	If estimating wetland size: <u>< 0.1 acre</u> <u>0.1-0.5 acre</u> <u>X</u> 1-2 acres <u>2-4 acres</u> <u>5+ acres</u> <u>10+ acres</u>	
	% Canopy Cover ³ <u>0%</u> <u>< 5</u> <u>6-20</u> <u>21-40</u> <u>41-60</u> <u>X</u> > 60	
	Hydrology and Soils (check all that apply):	
	<u> </u> Springs/Seeps <u> </u> Springhouse <u> </u> Trib/Stream <u> </u> Pond <u> </u> Stormwater <u> </u> Iron Bacteria	
	<u> </u> Rivulets (how many _____) (_____ inches deep) <u> </u> Subsurface Tunnel/Rivulets <u> </u> Tire Ruts (_____ inches deep)	
	<u>NO</u> Saturated soils present? If yes, year-round? <u> </u> Likely <u> </u> Unlikely <u> </u> Unknown	
	<u> </u> Yes <u>X</u> No water visible on surface? <u> </u> Small Puddles/Depressions (_____ inches deep)	
	<u> </u> Yes <u>X</u> No Are there any signs of disturbance to <u>hydrology</u> (e.g., drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver impoundment, evidence of flooding)? If yes, describe (if possible, include how recent disturbance is*):	
	For ditches that may be present, is there bog turtle habitat? If yes, describe:	
<u> </u> Yes <u>X</u> No Are there any signs of disturbance to <u>vegetation</u> (e.g., mowing, pasturing, burning)? If yes, describe (if possible, include level of disturbance*):		
Soil types present*: <u>Dry mineral soils</u>		

¹ (*) Denotes reference to the Supplemental Information document that provides more details on this particular question.
² Each wetland must have a separate Phase 1 habitat assessment data form completed.
³ Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are

PEM Portion of Wetland: Approx. Acre(s) _____ Mucky soils depth (inches) _____
 PSS Portion of Wetland: Approx. Acre(s) _____ Mucky soils depth (inches) _____
 PFO Portion of Wetland: Approx. Acre(s) 2ac Mucky soils depth (inches) 0
 PO Portion of Wetland: Approx. Acre(s) _____

CIRCLE all vegetation* from list below that is dominant $\geq 20\%$ for each wetland type listed above. Also, CIRCLE calciphiles⁴ present even if not a dominant species.

Sphagnum Moss	Grass-of-Parnassus	Rice Cutgrass	Tussock Sedge	Shrubby Cinquefoil	Red Maple
Arrowhead	Japanese Stiltgrass	Rough-leaved Goldenrod	White Turtlehead	Spicebush	Viburnum Spp.
Carpentgrass	Jewelweed	Sensitive Fern	Woolly-fruited Sedge	Swamp Rose	
Cattail	Mile-A-Minute	Skunk Cabbage	Yellow Sedge	Alder Spp.	
Cinnamon Fern	Porcupine Sedge	Smooth Sawgrass	Alder-leaved Buckthorn	American Elm	
Common Boneset	Purple Loosestrife	Sweetflag	Dogwood Spp.	Eastern Red Cedar	
Common Reed	Reed Canary Grass	Tearthumb Spp.	Multiflora Rose	Poison Sumac	

Notes on additional plant species (Are there other sedges/rushes/other species dominant that are not on the list above?):
Hardwood swamp commonity

Describe surrounding landscape (e.g., wetlands, forest, subdivision, agricultural field, fallow field, etc.): _____

How much of this wetland is located off-site (i.e., outside the property boundaries or right-of-way)?
☒ None of it – the entire wetland is within the property boundaries
☐ Some of it – _____ Acres or _____ % of the wetland appears to be located off-site
 If part of this wetland continues off-site, how much of the off-site portion was surveyed (on foot)?
☐ None of it ☐ All of it ☐ Part of it (_____ acres or _____ % of the off-site portion)

Is there potential bog turtle habitat off-site? ☐ Yes ☒ No ☐ Unknown If yes, how did you conclude this? _____

Were any bog turtles observed? ☐ Yes ☒ No If yes, how many? _____
 Other herps observed? ☐ Yes ☒ No If yes, which ones? _____

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.
 *Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

The hydrology criterion for bog turtle habitat is met.
 The soils criterion for bog turtle habitat is met.
 The vegetation criterion for bog turtle habitat is met.
 This wetland has potential bog turtle habitat (fair to good quality).
 This wetland has potential bog turtle habitat (low to very low quality).
 This wetland does NOT have potential bog turtle habitat.

Notes (How did you reach this opinion?):
Dry forested habitat

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Signature _____ Date 10/18/18

most prominent in the wetland and have the highest percent of coverage compared to other species.
⁴ Pertinent to bog turtle sites found in Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania. See Supplemental Information – Suitable Vegetation section.

Phase 1 Bog Turtle Habitat Survey Data Form For the Northern Population Range (Revised October 23, 2018)		Wetland ID: <u>CH-WB</u>
General Info	Property/Project Name: <u>Green Brook Flood Risk Mgmt C1, 2, H</u>	County: <u>Middlesex</u>
	Entity Requesting Phase 1 Survey (landowner, developer, agency): <u>ACOE</u>	
	Township/Municipality: <u>Middlesex Borough</u>	
	Lead Surveyor: <u>Tesoro</u>	Affiliation: <u>First Environment</u>
	Other Assistants Present: <u>D. Flynn, CBG</u>	
Date/Condition	Date of Survey: <u>10/16/18</u> Time In: <u>1300 h</u> Time Out: <u>1320 h</u> Air Temp: <u>48</u> (F) °C	
	Last Precipitation: <u>< 24 hours</u> <input checked="" type="checkbox"/> 1-7 days <input type="checkbox"/> > 1 week <input type="checkbox"/> unknown Drought conditions? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Unknown	
	Drought Index* ¹ (Circle): D0 D1 D2 D3 D4 Notes (e.g., details about drought, flood, abnormally dry, seasonal conditions): <u>Wet summer + fall</u>	
Wetland Info	Wetland ID: <u>CH-WB</u> Wetland Size: _____ acres, if known # Wetlands w/in Project Area ² : _____	
	If estimating wetland size: <input type="checkbox"/> < 0.1 acre <input type="checkbox"/> 0.1-0.5 acre <input checked="" type="checkbox"/> 1-2 acres <input type="checkbox"/> 2-4 acres <input type="checkbox"/> 5+ acres <input type="checkbox"/> 10+ acres	
	% Canopy Cover* ³ <input type="checkbox"/> 0% <input type="checkbox"/> ≤ 5 <input type="checkbox"/> 6-20 <input type="checkbox"/> 21-40 <input type="checkbox"/> 41-60 <input checked="" type="checkbox"/> > 60	
	Hydrology and Soils (check all that apply):	
	<input type="checkbox"/> Springs/Seeps <input type="checkbox"/> Springhouse <input type="checkbox"/> Trib/Stream <input type="checkbox"/> Pond <input checked="" type="checkbox"/> Stormwater <input type="checkbox"/> Iron Bacteria	
	<input type="checkbox"/> Rivulets (how many _____) (_____ inches deep) <input type="checkbox"/> Subsurface Tunnel/Rivulets <input type="checkbox"/> Tire Ruts (_____ inches deep)	
	<input checked="" type="checkbox"/> Saturated soils present? If yes, year-round? <input type="checkbox"/> Likely <input checked="" type="checkbox"/> Unlikely <input type="checkbox"/> Unknown	
	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No water visible on surface? <input type="checkbox"/> Small Puddles/Depressions (_____ inches deep)	
	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Are there any signs of disturbance to <u>hydrology</u> (e.g., drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver impoundment, evidence of flooding)? If yes, describe (if possible, include how recent disturbance is*):	
	For ditches that may be present, is there bog turtle habitat? If yes, describe:	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Are there any signs of disturbance to <u>vegetation</u> (e.g., mowing, pasturing, burning)? If yes, describe (if possible, include level of disturbance*):		
Soil types present*: <u>Clayey, mineral</u>		

¹ (*) Denotes reference to the Supplemental Information document that provides more details on this particular question.
² Each wetland must have a separate Phase 1 habitat assessment data form completed.
³ Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are

PEM Portion of Wetland: Approx. Acre(s) .1 Mucky soils depth (inches) <1
 PSS Portion of Wetland: Approx. Acre(s) Mucky soils depth (inches)
 PFO Portion of Wetland: Approx. Acre(s) 2 Mucky soils depth (inches) 0
 PO Portion of Wetland: Approx. Acre(s)

CIRCLE all vegetation* from list below that is dominant $\geq 20\%$ for each wetland type listed above. Also, CIRCLE calciphiles⁴ present even if not a dominant species.

Sphagnum Moss	Grass-of-Parnassus	Rice Cutgrass	Tussock Sedge	Shrubby Cinquefoil	<u>Red Maple</u>
Arrowhead	<u>Japanese Stiltgrass</u>	Rough-leaved Goldenrod	White Turtlehead	Spicebush	Viburnum Spp.
Carpetgrass	Jewelweed	Sensitive Fern	Woolly-fruited Sedge	Swamp Rose	
Cattail	Mile-A-Minute	Skunk Cabbage	Yellow Sedge	Alder Spp.	
Cinnamon Fern	Porcupine Sedge	Smooth Sawgrass	Alder-leaved Buckthorn	American Elm	
Common Boneset	Purple Loosestrife	Sweetflag	Dogwood Spp.	Eastern Red Cedar	
Common Reed	<u>Reed Canary Grass</u>	Tearthumb Spp.	Multiflora Rose	Poison Sumac	

Notes on additional plant species (Are there other sedges/rushes/other species dominant that are not on the list above?):
Woodreed, whitesnakeroot, hardwoods

Describe surrounding landscape (e.g., wetlands, forest, subdivision, agricultural field, fallow field, etc.):
Forest, commercial devel.

How much of this wetland is located off-site (i.e., outside the property boundaries or right-of-way)?
☒ None of it – the entire wetland is within the property boundaries
☐ Some of it – Acres or % of the wetland appears to be located off-site
 If part of this wetland continues off-site, how much of the off-site portion was surveyed (on foot)?
☐ None of it ☐ All of it ☐ Part of it (acres or % of the off-site portion)
 Is there potential bog turtle habitat off-site? ☐ Yes ☒ No ☐ Unknown If yes, how did you conclude this?

Were any bog turtles observed? ☐ Yes ☒ No If yes, how many?
 Other herps observed? ☐ Yes ☒ No If yes, which ones?

☐ Yes ☒ No ☐ Unsure The hydrology criterion for bog turtle habitat is met.
☐ Yes ☒ No ☐ Unsure The soils criterion for bog turtle habitat is met.
☐ Yes ☒ No ☐ Unsure The vegetation criterion for bog turtle habitat is met.
☐ Yes ☒ No ☐ Unsure This wetland has potential bog turtle habitat (fair to good quality).
☐ Yes ☒ No ☐ Unsure This wetland has potential bog turtle habitat (low to very low quality).
☒ Yes ☐ No ☐ Unsure This wetland does NOT have potential bog turtle habitat.

Notes (How did you reach this opinion?):
Forested floodplain wetland

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.
 Signature [Signature] Date 10/18/18

most prominent in the wetland and have the highest percent of coverage compared to other species.
⁴ Pertinent to bog turtle sites found in Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania. See Supplemental Information – Suitable Vegetation section.

Phase 1 Bog Turtle Habitat Survey Data Form For the Northern Population Range (Revised October 23, 2018)		Wetland ID: <u>CH-WE</u>
General Info	Property/Project Name: <u>Greenbrook Flood Risk Mgmt C1,2,18</u> County: <u>Middlesex</u>	
	Entity Requesting Phase 1 Survey (landowner, developer, agency): <u>ACOE</u>	
	Township/Municipality: <u>Middlesex Borough</u>	
	Lead Surveyor: <u>Tesauru</u> Affiliation: <u>First Environment</u>	
	Other Assistants Present: <u>D. Flynn, LBG</u>	
Date/Condition	Date of Survey: <u>10/18/18</u> Time In: <u>1325h</u> Time Out: <u>1335h</u> Air Temp: <u>48</u> °C	
	Last Precipitation: <input type="checkbox"/> < 24 hours <input checked="" type="checkbox"/> 1-7 days <input type="checkbox"/> > 1 week <input type="checkbox"/> unknown Drought conditions? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Unknown	
	Drought Index* ¹ (Circle): D0 D1 D2 D3 D4 Notes (e.g., details about drought, flood, abnormally dry, seasonal conditions): <u>Wet summer + fall</u>	
Wetland Info	Wetland ID: <u>CH-WE</u> Wetland Size: _____ acres, if known # Wetlands w/in Project Area ² : _____	
	If estimating wetland size: <input type="checkbox"/> < 0.1 acre <input type="checkbox"/> 0.1-0.5 acre <input checked="" type="checkbox"/> 1-2 acres <input type="checkbox"/> 2-4 acres <input type="checkbox"/> 5+ acres <input type="checkbox"/> 10+ acres	
	% Canopy Cover* ³ <input type="checkbox"/> 0% <input type="checkbox"/> ≤ 5 <input type="checkbox"/> 6-20 <input type="checkbox"/> 21-40 <input type="checkbox"/> 41-60 <input checked="" type="checkbox"/> > 60	
	Hydrology and Soils (check all that apply):	
	<input type="checkbox"/> Springs/Seeps <input type="checkbox"/> Springhouse <input type="checkbox"/> Trib/Stream <input type="checkbox"/> Pond <input type="checkbox"/> Stormwater <input type="checkbox"/> Iron Bacteria	
	<input type="checkbox"/> Rivulets (how many _____) (_____ inches deep) <input type="checkbox"/> Subsurface Tunnel/Rivulets <input type="checkbox"/> Tire Ruts (_____ inches deep)	
	<input checked="" type="checkbox"/> Saturated soils present? If yes, year-round? <input type="checkbox"/> Likely <input checked="" type="checkbox"/> Unlikely <input type="checkbox"/> Unknown	
	<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No water visible on surface? <input type="checkbox"/> Small Puddles/Depressions (_____ inches deep)	
	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Are there any signs of disturbance to <u>hydrology</u> (e.g., drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver impoundment, evidence of flooding)? If yes, describe (if possible, include how recent disturbance is*):	
	For ditches that may be present, is there bog turtle habitat? If yes, describe:	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Are there any signs of disturbance to <u>vegetation</u> (e.g., mowing, pasturing, burning)? If yes, describe (if possible, include level of disturbance*):		
Soil types present*: <u>Saturated - dry mineral soils, pockets of moisture</u>		
¹ (*) Denotes reference to the Supplemental Information document that provides more details on this particular question. ² Each wetland must have a separate Phase 1 habitat assessment data form completed. ³ Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are		1

PEM Portion of Wetland: Approx. Acre(s) .1 Mucky soils depth (inches) <1PSS Portion of Wetland: Approx. Acre(s) Mucky soils depth (inches) PFO Portion of Wetland: Approx. Acre(s) .1 Mucky soils depth (inches) <1PO Portion of Wetland: Approx. Acre(s) CIRCLE all vegetation* from list below that is dominant $\geq 20\%$ for each wetland type listed above. Also, CIRCLE calciphiles⁴ present even if not a dominant species.

Wetland Type/Vegetation

Sphagnum Moss	Grass-of-Parnassus	Rice Cutgrass	Tussock Sedge	Shrubby Cinquefoil	Red Maple
Arrowhead	Japanese Stiltgrass	Rough-leaved Goldenrod	White Turtlehead	Spicebush	Viburnum Spp.
Carpetgrass	Jewelweed	Sensitive Fern	Woolly-fruited Sedge	Swamp Rose	
Cattail	Mile-A-Minute	Skunk Cabbage	Yellow Sedge	Alder Spp.	
Cinnamon Fern	Porcupine Sedge	Smooth Sawgrass	Alder-leaved Buckthorn	American Elm	
Common Boneset	Purple Loosestrife	Sweetflag	Dogwood Spp.	Eastern Red Cedar	
Common Reed	Reed Canary Grass	Tearthumb Spp.	Multiflora Rose	Poison Sumac	

Notes on additional plant species (Are there other sedges/rushes/other species dominant that are not on the list above?):

White snakeroot, mixed hardwoods

Describe surrounding landscape (e.g., wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Forest, commercial devel.

Landscape Info

How much of this wetland is located off-site (i.e., outside the property boundaries or right-of-way)?

☒ None of it – the entire wetland is within the property boundaries☐ Some of it – Acres or % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the off-site portion was surveyed (on foot)?

☐ None of it ☐ All of it ☐ Part of it (acres or % of the off-site portion)Is there potential bog turtle habitat off-site? ☐ Yes ☒ No ☐ Unknown If yes, how did you conclude this?

Species

Were any bog turtles observed? ☐ Yes ☒ No If yes, how many?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.

Other herps observed? ☐ Yes ☒ No If yes, which ones?

*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

Lead Surveyor Opinion

- ☐ Yes ☒ No ☐ Unsure The hydrology criterion for bog turtle habitat is met.
☐ Yes ☒ No ☐ Unsure The soils criterion for bog turtle habitat is met.
☐ Yes ☒ No ☐ Unsure The vegetation criterion for bog turtle habitat is met.
☐ Yes ☒ No ☐ Unsure This wetland has potential bog turtle habitat (fair to good quality).
☐ Yes ☒ No ☐ Unsure This wetland has potential bog turtle habitat (low to very low quality).
☒ Yes ☐ No ☐ Unsure This wetland does NOT have potential bog turtle habitat.

Notes (How did you reach this opinion?):

Mostly Dry & low plain forest

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Signature Date 10/12/18

most prominent in the wetland and have the highest percent of coverage compared to other species.

⁴ Pertinent to bog turtle sites found in Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania. See Supplemental Information – Suitable Vegetation section.

Phase 1 Bog Turtle Habitat Survey Data Form For the Northern Population Range (Revised October 23, 2018)		Wetland ID: <u>CH-WF</u>
General Info	Property/Project Name: <u>Green Brook Flood Risk Mgmt. C1,2,18</u>	County: <u>Middlesex</u>
	Entity Requesting Phase 1 Survey (landowner, developer, agency): <u>ACOE</u>	
	Township/Municipality: <u>Middlesex Borough</u>	
	Lead Surveyor: <u>Tesoro</u>	Affiliation: <u>First Environment</u>
	Other Assistants Present: <u>D. Flynn, LBG</u>	
Date/Condition	Date of Survey: <u>10/18/18</u> Time In: <u>1340 h</u> Time Out: <u>1350 h</u> Air Temp: <u>49</u> (F) °C	
	Last Precipitation: <u>< 24 hours</u> <u>1-7 days</u> <u>> 1 week</u> <u>unknown</u> Drought conditions? <u>YES</u> <u>NO</u> <u>Unknown</u>	
	Drought Index* ¹ (Circle): D0 D1 D2 D3 D4 Notes (e.g., details about drought, flood, abnormally dry, seasonal conditions): <u>Wet fall - summer</u>	
Wetland Info	Wetland ID: <u>CH-WF</u> Wetland Size: _____ acres, if known # Wetlands w/in Project Area ² : _____	
	If estimating wetland size: <u>< 0.1 acre</u> <u>0.1-0.5 acre</u> <u>1-2 acres</u> <u>2-4 acres</u> <u>5+ acres</u> <u>10+ acres</u>	
	% Canopy Cover* ³ <u>0%</u> <u>≤ 5</u> <u>6-20</u> <u>21-40</u> <u>41-60</u> <u>> 60</u>	
	Hydrology and Soils (check all that apply):	
	<u>Spring/Seeps</u> <u>Springhouse</u> <u>Trib/Stream</u> <u>Pond</u> <u>Stormwater</u> <u>Iron Bacteria</u>	
	<u>Rivulets</u> (how many _____) (_____ inches deep) <u>Subsurface Tunnel/Rivulets</u> <u>Tire Ruts</u> (_____ inches deep)	
	<u>Saturated soils present?</u> If yes, year-round? <u>Likely</u> <u>Unlikely</u> <u>Unknown</u>	
	<u>Yes</u> <u>No</u> water visible on surface? <u>Small Puddles/Depressions</u> (_____ inches deep)	
	<u>Yes</u> <u>No</u> Are there any signs of disturbance to <u>hydrology</u> (e.g., drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver impoundment, evidence of flooding)? If yes, describe (if possible, include how recent disturbance is*):	
	For ditches that may be present, is there bog turtle habitat? If yes, describe:	
<u>Yes</u> <u>No</u> Are there any signs of disturbance to <u>vegetation</u> (e.g., mowing, pasturing, burning)? If yes, describe (if possible, include level of disturbance*):		
Soil types present*: <u>Saturated mineral soils (mud)</u>		
¹ (*) Denotes reference to the Supplemental Information document that provides more details on this particular question. ² Each wetland must have a separate Phase 1 habitat assessment data form completed. ³ Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are		

PEM Portion of Wetland: Approx. Acre(s) .2 Mucky soils depth (inches) 6"
 PSS Portion of Wetland: Approx. Acre(s) _____ Mucky soils depth (inches) _____
 PFO Portion of Wetland: Approx. Acre(s) _____ Mucky soils depth (inches) _____
 PO Portion of Wetland: Approx. Acre(s) _____

CIRCLE all vegetation* from list below that is dominant $\geq 20\%$ for each wetland type listed above. Also, CIRCLE calciphiles⁴ present even if not a dominant species.

Sphagnum Moss	Grass-of-Parnassus	Rice Cutgrass	Tussock Sedge	Shrubby Cinquefoil	Red Maple
Arrowhead	Japanese Stiltgrass	Rough-leaved Goldenrod	White Turtlehead	Spicebush	Viburnum Spp.
Carpetgrass	Jewelweed	Sensitive Fern	Woolly-fruited Sedge	Swamp Rose	
Cattail	Mile-A-Minute	Skunk Cabbage	Yellow Sedge	Alder Spp.	
Cinnamon Fern	Porcupine Sedge	Smooth Sawgrass	Alder-leaved Buckthorn	American Elm	
Common Boneset	Purple Loosestrife	Sweetflag	Dogwood Spp.	Eastern Red Cedar	
Common Reed	Reed Canary Grass	Tearthumb Spp.	Multiflora Rose	Poison Sumac	

Notes on additional plant species (Are there other sedges/rushes/other species dominant that are not on the list above?):
marsh purslane, boxelder - very little veg

Describe surrounding landscape (e.g., wetlands, forest, subdivision, agricultural field, fallow field, etc.):

How much of this wetland is located off-site (i.e., outside the property boundaries or right-of-way)?
☒ None of it - the entire wetland is within the property boundaries
☐ Some of it - _____ Acres or _____ % of the wetland appears to be located off-site
 If part of this wetland continues off-site, how much of the off-site portion was surveyed (on foot)?
☐ None of it ☐ All of it ☐ Part of it (_____ acres or _____ % of the off-site portion)
 Is there potential bog turtle habitat off-site? ☐ Yes ☒ No ☐ Unknown If yes, how did you conclude this?

Were any bog turtles observed? ☐ Yes ☒ No If yes, how many? _____
 Other herps observed? ☐ Yes ☒ No If yes, which ones? _____

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.
 *Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

The hydrology criterion for bog turtle habitat is met.
 The soils criterion for bog turtle habitat is met.
 The vegetation criterion for bog turtle habitat is met.
 This wetland has potential bog turtle habitat (fair to good quality).
 This wetland has potential bog turtle habitat (low to very low quality).
☒ Yes ☐ No ☐ Unsure This wetland does NOT have potential bog turtle habitat.

Notes (How did you reach this opinion?):
muddy oxbow basin

Lead Surveyor - please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.
 Signature [Signature] Date 10/18/18

most prominent in the wetland and have the highest percent of coverage compared to other species.
⁴ Pertinent to bog turtle sites found in Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania. See Supplemental Information - Suitable Vegetation section.

Phase 1 Bog Turtle Habitat Survey Data Form For the Northern Population Range (Revised October 23, 2018)		Wetland ID: <u>CH-WA</u>
General Info	Property/Project Name: <u>Greenbrook Flood Risk Mgmt C1, 2, 14</u>	County: <u>Middlesex</u>
	Entity Requesting Phase 1 Survey (landowner, developer, agency): _____	
	Township/Municipality: <u>Middlesex Borough</u>	
	Lead Surveyor: <u>Tesauvo</u>	Affiliation: <u>First Environment</u>
Date/Condition	Other Assistants Present: <u>D. Flynn, LBL</u>	
	Date of Survey: <u>10/18/18</u> Time In: <u>1400 h</u> Time Out: <u>1420 h</u> Air Temp: <u>49</u> °F °C	
	Last Precipitation: <u>< 24 hours</u> <u>1-7 days</u> <u>> 1 week</u> <u>unknown</u> Drought conditions? <u>YES</u> <u>NO</u> <u>Unknown</u>	
	Drought Index* ¹ (Circle): D0 D1 D2 D3 D4 Notes (e.g., details about drought, flood, abnormally dry, seasonal conditions): <u>Wet fall-summer</u>	
Wetland Info	Wetland ID: <u>CH-WA</u> Wetland Size: _____ acres, if known # Wetlands w/in Project Area ² : _____	
	If estimating wetland size: <u>< 0.1 acre</u> <u>0.1-0.5 acre</u> <u>X 1-2 acres</u> <u>2-4 acres</u> <u>5+ acres</u> <u>10+ acres</u>	
	% Canopy Cover* ³ <u>0%</u> <u>≤ 5</u> <u>6-20</u> <u>21-40</u> <u>41-60</u> <u>X > 60</u>	
	Hydrology and Soils (check all that apply):	
	<u>Spring/Seeps</u> <u>Springhouse</u> <u>Trib/Stream</u> <u>Pond</u> <u>X Stormwater</u> <u>Iron Bacteria</u>	
	<u>Rivulets (how many _____) (_____ inches deep)</u> <u>Subsurface Tunnel/Rivulets</u> <u>Tire Ruts (_____ inches deep)</u>	
	<u>X Saturated soils present?</u> If yes, year-round? <u>X Likely</u> <u>Unlikely</u> <u>Unknown</u>	
	<u>X Yes</u> <u>No water visible on surface?</u> <u>X Small Puddles/Depressions</u> <u>≤ 1"</u> inches deep	
	<u>Yes</u> <u>No</u> Are there any signs of disturbance to <u>hydrology</u> (e.g., drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver impoundment, evidence of flooding)? If yes, describe (if possible, include how recent disturbance is*): <u>Storm water runoff, old ditches</u>	
	For ditches that may be present, is there bog turtle habitat? If yes, describe: <u>NO</u>	
<u>Yes</u> <u>X No</u> Are there any signs of disturbance to <u>vegetation</u> (e.g., mowing, pasturing, burning)? If yes, describe (if possible, include level of disturbance*):		
Soil types present*: <u>Mineral soils - saturated + dry - small areas of shallow 'muckiness' assoc. w/ runoff ditch</u>		

¹ (*) Denotes reference to the Supplemental Information document that provides more details on this particular question.
² Each wetland must have a separate Phase 1 habitat assessment data form completed.
³ Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are

PEM Portion of Wetland: Approx. Acre(s) _____ Mucky soils depth (inches) _____
 PSS Portion of Wetland: Approx. Acre(s) _____ Mucky soils depth (inches) _____
 PFO Portion of Wetland: Approx. Acre(s) 1-2 ac Mucky soils depth (inches) 1-2'
 PO Portion of Wetland: Approx. Acre(s) _____

CIRCLE all vegetation* from list below that is dominant $\geq 20\%$ for each wetland type listed above. Also, CIRCLE calciphiles⁴ present even if not a dominant species.

Sphagnum Moss	Grass-of-Parnassus	Rice Cutgrass	Tussock Sedge	Shrubby Cinquefoil	<u>Red Maple</u>
Arrowhead	<u>Japanese Stiltgrass</u>	Rough-leaved Goldenrod	White Turtlehead	Spicebush	Viburnum Spp.
Carpetgrass	Jewelweed	Sensitive Fern	Woolly-fruited Sedge	Swamp Rose	
Cattail	Mile-A-Minute	Skunk Cabbage	Yellow Sedge	Alder Spp.	
<u>Cinnamon Fern</u>	Porcupine Sedge	Smooth Sawgrass	Alder-leaved Buckthorn	<u>American Elm</u>	
Common Boneset	Purple Loosestrife	Sweetflag	Dogwood Spp.	Eastern Red Cedar	
Common Reed	Reed Canary Grass	Tearthumb Spp.	Multiflora Rose	Poison Sumac	

Notes on additional plant species (Are there other sedges/rushes/other species dominant that are not on the list above?):
Also: woodred, cinnamon fern, marsh purslane present

Describe surrounding landscape (e.g., wetlands, forest, subdivision, agricultural field, fallow field, etc.):

How much of this wetland is located off-site (i.e., outside the property boundaries or right-of-way)?
☒ None of it – the entire wetland is within the property boundaries
☐ Some of it – _____ Acres or _____ % of the wetland appears to be located off-site
 If part of this wetland continues off-site, how much of the off-site portion was surveyed (on foot)?
☐ None of it ☐ All of it ☐ Part of it (_____ acres or _____ % of the off-site portion)

Is there potential bog turtle habitat off-site? ☐ Yes ☒ No ☐ Unknown If yes, how did you conclude this?

Were any bog turtles observed? ☐ Yes ☒ No If yes, how many? _____
 Other herps observed? ☒ Yes ☐ No If yes, which ones? Green frog

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.
 *Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

The hydrology criterion for bog turtle habitat is met.
 The soils criterion for bog turtle habitat is met.
 The vegetation criterion for bog turtle habitat is met.
 This wetland has potential bog turtle habitat (fair to good quality).
 This wetland has potential bog turtle habitat (low to very low quality).
☒ Yes ☐ No ☐ Unsure This wetland does NOT have potential bog turtle habitat.

Notes (How did you reach this opinion?):
Hardwood swamp, no hydrology suitable for BT

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Signature _____ Date 10/15/18

most prominent in the wetland and have the highest percent of coverage compared to other species.
⁴ Pertinent to bog turtle sites found in Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania. See Supplemental Information – Suitable Vegetation section.

Phase 1 Bog Turtle Habitat Survey Data Form For the Northern Population Range (Revised October 23, 2018)		Wetland ID: <u>CH-W6</u>
General Info	Property/Project Name <u>Greenbrook Flood Risk Mitig. C1, 2, 4</u>	County <u>Middlesex</u>
	Entity Requesting Phase 1 Survey (landowner, developer, agency): <u>ACOE</u>	
	Township/Municipality: <u>Middlesex Borough</u>	
	Lead Surveyor: <u>Tesaro</u>	Affiliation: <u>First Environment</u>
	Other Assistants Present: <u>D. F. Lynn</u>	
Date/Condition	Date of Survey: <u>10/18/18</u>	Time In: <u>1440 h</u> Time Out: <u>1505 h</u> Air Temp. <u>50</u> °C
	Last Precipitation: <u>< 24 hours</u> <input checked="" type="checkbox"/> 1-7 days <input type="checkbox"/> > 1 week <input type="checkbox"/> unknown	Drought conditions? <u>YES</u> <input checked="" type="checkbox"/> NO <input type="checkbox"/> Unknown
	Drought Index* ¹ (Circle): D0 D1 D2 D3 D4	Notes (e.g., details about drought, flood, abnormally dry, seasonal conditions):
		<u>Wet fall - summer</u>
Wetland Info	Wetland ID: <u>CH-W6</u>	Wetland Size: _____ acres, if known # Wetlands w/in Project Area ² : _____
	If estimating wetland size: <u>< 0.1 acre</u> <input type="checkbox"/> 0.1-0.5 acre <input checked="" type="checkbox"/> 1-2 acres <input type="checkbox"/> 2-4 acres <input type="checkbox"/> 5+ acres <input type="checkbox"/> 10+ acres	
	% Canopy Cover* ³ <u>0%</u> <input type="checkbox"/> ≤ 5 <input type="checkbox"/> 6-20 <input type="checkbox"/> 21-40 <input checked="" type="checkbox"/> 41-60 <input type="checkbox"/> > 60	
	Hydrology and Soils (check all that apply):	
	<input type="checkbox"/> Springs/Seeps <input type="checkbox"/> Springhouse <input type="checkbox"/> Trib/Stream <input type="checkbox"/> Pond <input checked="" type="checkbox"/> Stormwater <input type="checkbox"/> Iron Bacteria	
	<input type="checkbox"/> Rivulets (how many _____) (_____ inches deep) <input type="checkbox"/> Subsurface Tunnel/Rivulets <input type="checkbox"/> Tire Ruts (_____ inches deep)	
	<input checked="" type="checkbox"/> Saturated soils present? If yes, year-round? <input checked="" type="checkbox"/> Likely <input type="checkbox"/> Unlikely <input type="checkbox"/> Unknown	
	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No water visible on surface? <input type="checkbox"/> Small Puddles/Depressions (_____ inches deep)	
	<input type="checkbox"/> Yes <input type="checkbox"/> No Are there any signs of disturbance to <u>hydrology</u> (e.g., drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver impoundment, evidence of flooding)? If yes, describe (if possible, include how recent disturbance is*):	<u>Deeply incised ditch along road from house; heavy fillings in past</u>
	For ditches that may be present, is there bog turtle habitat? If yes, describe:	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Are there any signs of disturbance to <u>vegetation</u> (e.g., mowing, pasturing, burning)? If yes, describe (if possible, include level of disturbance*):		
Soil types present*:	<u>Organic + mineral, drained by ditch</u>	

¹ (*) Denotes reference to the Supplemental Information document that provides more details on this particular question.
² Each wetland must have a separate Phase 1 habitat assessment data form completed.
³ Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are

PEM Portion of Wetland: Approx. Acre(s) .5 Mucky soils depth (inches) 21"
 PSS Portion of Wetland: Approx. Acre(s) .5 Mucky soils depth (inches) 21"
 PFO Portion of Wetland: Approx. Acre(s) .5 Mucky soils depth (inches) 21"
 PO Portion of Wetland: Approx. Acre(s)

CIRCLE all vegetation* from list below that is dominant $\geq 20\%$ for each wetland type listed above. Also, CIRCLE calciphiles⁴ present even if not a dominant species.

Sphagnum Moss	Grass-of-Parnassus	Rice Cutgrass	Tussock Sedge	Shrubby Cinquefoil	Red Maple
Arrowhead	Japanese Stiltgrass	Rough-leaved Goldenrod	White Turtlehead	Spicebush	Viburnum Spp.
Carpetgrass	Jewelweed	Sensitive Fern	Woolly-fruited Sedge	Swamp Rose	
Cattail	Mile-A-Minute	Skunk Cabbage	Yellow Sedge	Alder Spp.	
Cinnamon Fern	Porcupine Sedge	Smooth Sawgrass	Alder-leaved Buckthorn	American Elm	
Common Boneset	Purple Loosestrife	Sweetflag	Dogwood Spp.	Eastern Red Cedar	
Common Reed	Reed Canary Grass	Tearthumb Spp.	Multiflora Rose	Poison Sumac	

Notes on additional plant species (Are there other sedges/rushes/other species dominant that are not on the list above?):

Describe surrounding landscape (e.g., wetlands, forest, subdivision, agricultural field, fallow field, etc.):

How much of this wetland is located off-site (i.e., outside the property boundaries or right-of-way)?

☒ None of it – the entire wetland is within the property boundaries
☐ Some of it – Acres or % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the off-site portion was surveyed (on foot)?

☐ None of it ☐ All of it ☐ Part of it (acres or % of the off-site portion)

Is there potential bog turtle habitat off-site? ☐ Yes ☒ No ☐ Unknown If yes, how did you conclude this?

Were any bog turtles observed? ☐ Yes ☒ No If yes, how many?

Other herps observed? ☒ Yes ☐ No If yes, which ones? E. Garter Snake

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.
*Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 h^{rs}.

☐ Yes ☒ No ☐ Unsure The hydrology criterion for bog turtle habitat is met.
☒ Yes ☐ No ☐ Unsure The soils criterion for bog turtle habitat is met.
☐ Yes ☒ No ☐ Unsure The vegetation criterion for bog turtle habitat is met.
☐ Yes ☒ No ☐ Unsure This wetland has potential bog turtle habitat (fair to good quality).
☐ Yes ☒ No ☐ Unsure This wetland has potential bog turtle habitat (low to very low quality).
☒ Yes ☐ No ☐ Unsure This wetland does NOT have potential bog turtle habitat.

Notes (How did you reach this opinion?):

Degraded, altered wetland

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Signature [Signature] Date 10/18/18

most prominent in the wetland and have the highest percent of coverage compared to other species.

⁴ Pertinent to bog turtle sites found in Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania. See Supplemental Information – Suitable Vegetation section.

Phase 1 Bog Turtle Habitat Survey Data Form For the Northern Population Range (Revised October 23, 2018)		Wetland ID: <u>C2-we</u>
General Info	Property/Project Name: <u>Green Brook Flood Risk Mgmt C1, 2, 4</u>	County: <u>Middlesex</u>
	Entity Requesting Phase 1 Survey (landowner, developer, agency): <u>ACOE</u>	
	Township/Municipality: <u>Middlesex Borough</u>	
	Lead Surveyor: <u>Tesaro</u>	Affiliation: <u>First Environment</u>
Date/Condition	Other Assistants Present: <u>Jeffrey P. P. P.</u>	
	Date of Survey: <u>10/26/18</u> Time In: <u>0900</u> Time Out: <u>0910</u> Air Temp: <u>33</u> °F °C	
	Last Precipitation: <u>< 24 hours</u> <input checked="" type="checkbox"/> 1-7 days <input type="checkbox"/> > 1 week <input type="checkbox"/> unknown Drought conditions? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Unknown	
	Drought Index* ¹ (Circle): D0 D1 D2 D3 D4 Notes (e.g., details about drought, flood, abnormally dry, seasonal conditions): <u>Wet summer - fall</u>	
Wetland Info	Wetland ID: <u>C2-we</u> Wetland Size: _____ acres, if known # Wetlands w/in Project Area ² : _____	
	If estimating wetland size: <input type="checkbox"/> < 0.1 acre <input checked="" type="checkbox"/> 0.1-0.5 acre <input type="checkbox"/> 1-2 acres <input type="checkbox"/> 2-4 acres <input type="checkbox"/> 5+ acres <input type="checkbox"/> 10+ acres	
	% Canopy Cover* ³ <input type="checkbox"/> 0% <input type="checkbox"/> ≤ 5 <input checked="" type="checkbox"/> 6-20 <input type="checkbox"/> 21-40 <input type="checkbox"/> 41-60 <input type="checkbox"/> > 60	
	Hydrology and Soils (check all that apply):	
	<input type="checkbox"/> Springs/Seeps <input type="checkbox"/> Springhouse <input checked="" type="checkbox"/> Trib/Stream <input type="checkbox"/> Pond <input type="checkbox"/> Stormwater <input type="checkbox"/> Iron Bacteria	
	<input type="checkbox"/> Rivulets (how many _____) (_____ inches deep) <input type="checkbox"/> Subsurface Tunnel/Rivulets <input type="checkbox"/> Tire Ruts (_____ inches deep)	
	<input type="checkbox"/> Saturated soils present? If yes, year-round? <input type="checkbox"/> Likely <input type="checkbox"/> Unlikely <input type="checkbox"/> Unknown	
	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No water visible on surface? <input type="checkbox"/> Small Puddles/Depressions (_____ inches deep)	
	<input type="checkbox"/> Yes <input type="checkbox"/> No Are there any signs of disturbance to <u>hydrology</u> (e.g., drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver impoundment, evidence of flooding)? If yes, describe (if possible, include how recent disturbance is*):	
	For ditches that may be present, is there bog turtle habitat? If yes, describe:	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Are there any signs of disturbance to <u>vegetation</u> (e.g., mowing, pasturing, burning)? If yes, describe (if possible, include level of disturbance*):		
Soil types present*: <u>Mineral, alluvial</u>		

¹ (*) Denotes reference to the Supplemental Information document that provides more details on this particular question.
² Each wetland must have a separate Phase 1 habitat assessment data form completed.
³ Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are

PEM Portion of Wetland: Approx. Acre(s) 0.1 Mucky soils depth (inches) 0
PSS Portion of Wetland: Approx. Acre(s) _____ Mucky soils depth (inches) _____
PFO Portion of Wetland: Approx. Acre(s) _____ Mucky soils depth (inches) _____
PO Portion of Wetland: Approx. Acre(s) _____

CIRCLE all vegetation* from list below that is dominant $\geq 20\%$ for each wetland type listed above. Also, CIRCLE calciphiles⁴ present even if not a dominant species.

Sphagnum Moss	Grass-of-Parnassus	Rice Cutgrass	Tussock Sedge	Shrubby Cinquefoil	Red Maple
Arrowhead	Japanese Stiltgrass	Rough-leaved Goldenrod	White Turtlehead	Spicebush	Viburnum Spp.
Carpetgrass	Jewelweed	Sensitive Fern	Woolly-fruited Sedge	Swamp Rose	
Cattail	Mile-A-Minute	Skunk Cabbage	Yellow Sedge	Alder Spp.	
Cinnamon Fern	Porcupine Sedge	Smooth Sawgrass	Alder-leaved Buckthorn	American Elm	
Common Boneset	Purple Loosestrife	Sweetflag	Dogwood Spp.	Eastern Red Cedar	
Common Reed	Reed Canary Grass	Tearthumb Spp.	Multiflora Rose	Poison Sumac	

Notes on additional plant species (Are there other sedges/rushes/other species dominant that are not on the list above?):

Describe surrounding landscape (e.g., wetlands, forest, subdivision, agricultural field, fallow field, etc.):

Forest, res. Suburb

How much of this wetland is located off-site (i.e., outside the property boundaries or right-of-way)?

☒ None of it – the entire wetland is within the property boundaries
☐ Some of it – _____ Acres or _____ % of the wetland appears to be located off-site

If part of this wetland continues off-site, how much of the off-site portion was surveyed (on foot)?

☐ None of it ☐ All of it ☐ Part of it (_____ acres or _____ % of the off-site portion)

Is there potential bog turtle habitat off-site? ☐ Yes ☒ No ☐ Unknown If yes, how did you conclude this?

Were any bog turtles observed? ☐ Yes ☒ No If yes, how many? _____
 Other herps observed? ☐ Yes ☒ No If yes, which ones? _____

The hydrology criterion for bog turtle habitat is met.
 The soils criterion for bog turtle habitat is met.
 The vegetation criterion for bog turtle habitat is met.
 This wetland has potential bog turtle habitat (fair to good quality).
 This wetland has potential bog turtle habitat (low to very low quality).
 This wetland does NOT have potential bog turtle habitat.

Notes (How did you reach this opinion?):

Dry oxbow floodplain

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Signature [Signature] Date 10/26/18

most prominent in the wetland and have the highest percent of coverage compared to other species.

⁴ Pertinent to bog turtle sites found in Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania. See Supplemental Information – Suitable Vegetation section.

Phase 1 Bog Turtle Habitat Survey Data Form For the Northern Population Range (Revised October 23, 2018)		Wetland ID: <u>CH-WD</u>
General Info	Property/Project Name: <u>Green Brook Flood Risk Mgmt C12, H</u>	County: <u>Middlesex</u>
	Entity Requesting Phase 1 Survey (landowner, developer, agency): <u>ACOE</u>	
	Township/Municipality: <u>Middlesex Borough</u>	
	Lead Surveyor: <u>T. Savore</u>	Affiliation: <u>First Environment</u>
	Other Assistants Present: <u>C. Hanlon, LBG</u>	
Date/Condition	Date of Survey: <u>10/20/18</u>	Time In: <u>0930h</u> Time Out: <u>1000h</u> Air Temp: <u>35</u> (F) °C
	Last Precipitation: <input type="checkbox"/> < 24 hours <input checked="" type="checkbox"/> 1-7 days <input type="checkbox"/> > 1 week <input type="checkbox"/> unknown	Drought conditions? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Unknown
	Drought Index* ¹ (Circle): D0 D1 D2 D3 D4	Notes (e.g., details about drought, flood, abnormally dry, seasonal conditions):
	<u>wet fall + summer</u>	
Wetland Info	Wetland ID: <u>CH-WD</u>	Wetland Size: _____ acres, if known # Wetlands w/in Project Area ² : _____
	If estimating wetland size: <input type="checkbox"/> < 0.1 acre <input type="checkbox"/> 0.1-0.5 acre <input checked="" type="checkbox"/> 1-2 acres <input type="checkbox"/> 2-4 acres <input type="checkbox"/> 5+ acres <input type="checkbox"/> 10+ acres	
	% Canopy Cover* ³ <input type="checkbox"/> 0% <input type="checkbox"/> ≤ 5 <input type="checkbox"/> 6-20 <input type="checkbox"/> 21-40 <input type="checkbox"/> 41-60 <input checked="" type="checkbox"/> 60	
	Hydrology and Soils (check all that apply):	
	<input type="checkbox"/> Springs/Seeps <input type="checkbox"/> Springhouse <input checked="" type="checkbox"/> Trib/Stream <input type="checkbox"/> Pond <input checked="" type="checkbox"/> Stormwater <input type="checkbox"/> Iron Bacteria	
	<input type="checkbox"/> Rivulets (how many _____) (_____ inches deep) <input type="checkbox"/> Subsurface Tunnel/Rivulets <input type="checkbox"/> Tire Ruts (_____ inches deep)	
	<input checked="" type="checkbox"/> Saturated soils present? If yes, year-round? <input type="checkbox"/> Likely <input checked="" type="checkbox"/> Unlikely <input type="checkbox"/> Unknown	
	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No water visible on surface? <input type="checkbox"/> Small Puddles/Depressions (_____ inches deep)	
	<input type="checkbox"/> Yes <input type="checkbox"/> No Are there any signs of disturbance to <u>hydrology</u> (e.g., drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver impoundment, evidence of flooding)? If yes, describe (if possible, include how recent disturbance is*):	
	For ditches that may be present, is there bog turtle habitat? If yes, describe:	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Are there any signs of disturbance to <u>vegetation</u> (e.g., mowing, pasturing, burning)? If yes, describe (if possible, include level of disturbance*):		
Soil types present*: <u>Mostly Dry floodplain soils, a fluvial - mineral, some clay</u>		

¹ (*) Denotes reference to the Supplemental Information document that provides more details on this particular question.

² Each wetland must have a separate Phase 1 habitat assessment data form completed.

³ Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are

PEM Portion of Wetland: Approx. Acre(s) _____ Mucky soils depth (inches) _____
 PSS Portion of Wetland: Approx. Acre(s) _____ Mucky soils depth (inches) _____
 PFO Portion of Wetland: Approx. Acre(s) 2 Mucky soils depth (inches) 0-1" (puddles)
 PO Portion of Wetland: Approx. Acre(s) _____

CIRCLE all vegetation* from list below that is dominant $\geq 20\%$ for each wetland type listed above. Also, CIRCLE calciphiles⁴ present even if not a dominant species.

Sphagnum Moss	Grass-of-Parnassus	Rice Cutgrass	Tussock Sedge	Shrubby Cinquefoil	Red Maple
Arrowhead	Japanese Stiltgrass	Rough-leaved Goldenrod	White Turtlehead	Spicebush	Viburnum Spp.
Carpetgrass	Jewelweed	Sensitive Fern	Woolly-fruited Sedge	Swamp Rose	
Cattail	Mile-A-Minute	Skunk Cabbage	Yellow Sedge	Alder Spp.	
Cinnamon Fern	Porcupine Sedge	Smooth Sawgrass	Alder-leaved Buckthorn	American Elm	
Common Boneset	Purple Loosestrife	Sweetflag	Dogwood Spp.	Eastern Red Cedar	
Common Reed	Reed Canary Grass	Tearthumb Spp.	Multiflora Rose	Poison Sumac	

Notes on additional plant species (Are there other sedges/rushes/other species dominant that are not on the list above?):
Hardwood swamp, white snakeroot

Describe surrounding landscape (e.g., wetlands, forest, subdivision, agricultural field, fallow field, etc.):
Forest, residential, old landfill

How much of this wetland is located off-site (i.e., outside the property boundaries or right-of-way)?
~~None~~ None of it – the entire wetland is within the property boundaries
~~Some~~ Some of it – _____ Acres or _____ % of the wetland appears to be located off-site
 If part of this wetland continues off-site, how much of the off-site portion was surveyed (on foot)?
 _____ None of it ~~All~~ All of it _____ Part of it (_____ acres or _____ % of the off-site portion)

Is there potential bog turtle habitat off-site? _____ Yes ~~No~~ No _____ Unknown If yes, how did you conclude this?

Were any bog turtles observed? _____ Yes ~~No~~ No If yes, how many? _____
 Other herps observed? _____ Yes ~~No~~ No If yes, which ones? _____

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.
 *Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

The hydrology criterion for bog turtle habitat is met.
 The soils criterion for bog turtle habitat is met.
 The vegetation criterion for bog turtle habitat is met.
 This wetland has potential bog turtle habitat (fair to good quality).
 This wetland has potential bog turtle habitat (low to very low quality).
~~Yes~~ Yes _____ No _____ Unsure _____ This wetland does NOT have potential bog turtle habitat.

Notes (How did you reach this opinion?):
Dryish, disturbed floodplain forest

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Signature _____ Date 10/20/18

most prominent in the wetland and have the highest percent of coverage compared to other species.
⁴ Pertinent to bog turtle sites found in Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania. See Supplemental Information – Suitable Vegetation section.

Phase 1 Bog Turtle Habitat Survey Data Form For the Northern Population Range (Revised October 23, 2018)		Wetland ID: <u>C2-WE</u>
General Info	Property/Project Name: <u>Green Brook Flood Risk Mgmt C1,2,18</u>	County: <u>Middlesex</u>
	Entity Requesting Phase 1 Survey (landowner, developer, agency): <u>ACOE</u>	
	Township/Municipality: <u>Middlesex Borough</u>	
	Lead Surveyor: <u>Tesaro</u>	Affiliation: <u>First Environment</u>
Other Assistants Present: <u>C. Hanlon, CBG</u>		
Date/Condition	Date of Survey: <u>10/26/18</u> Time In: <u>11254</u> Time Out: <u>11304</u> Air Temp: <u>38</u> °F	
	Last Precipitation: <input type="checkbox"/> < 24 hours <input checked="" type="checkbox"/> 1-7 days <input type="checkbox"/> > 1 week <input type="checkbox"/> unknown Drought conditions? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO <input type="checkbox"/> Unknown	
	Drought Index* ¹ (Circle): D0 D1 D2 D3 D4 Notes (e.g., details about drought, flood, abnormally dry, seasonal conditions): <u>Wet fall + summer</u>	
Wetland Info	Wetland ID: <u>C2-WE</u> Wetland Size: _____ acres, if known # Wetlands w/in Project Area ² : _____	
	If estimating wetland size: <input type="checkbox"/> < 0.1 acre <input checked="" type="checkbox"/> 0.1-0.5 acre <input type="checkbox"/> 1-2 acres <input type="checkbox"/> 2-4 acres <input type="checkbox"/> 5+ acres <input type="checkbox"/> 10+ acres	
	% Canopy Cover* ³ <input type="checkbox"/> 0% <input checked="" type="checkbox"/> ≤ 5 <input type="checkbox"/> 6-20 <input type="checkbox"/> 21-40 <input type="checkbox"/> 41-60 <input type="checkbox"/> > 60	
	Hydrology and Soils (check all that apply):	
	<input type="checkbox"/> Springs/Seeps <input type="checkbox"/> Springhouse <input type="checkbox"/> Trib/Stream <input type="checkbox"/> Pond <input checked="" type="checkbox"/> Stormwater <input type="checkbox"/> Iron Bacteria	
	<input type="checkbox"/> Rivulets (how many _____) (_____ inches deep) <input type="checkbox"/> Subsurface Tunnel/Rivulets <input type="checkbox"/> Tire Ruts (_____ inches deep)	
	<input checked="" type="checkbox"/> Saturated soils present? If yes, year-round? <input type="checkbox"/> Likely <input checked="" type="checkbox"/> Unlikely <input type="checkbox"/> Unknown	
	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No water visible on surface? <input type="checkbox"/> Small Puddles/Depressions (_____ inches deep)	
	<input type="checkbox"/> Yes <input type="checkbox"/> No Are there any signs of disturbance to <u>hydrology</u> (e.g., drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver impoundment, evidence of flooding)? If yes, describe (if possible, include how recent disturbance is*): <u>Ditch</u>	
	For ditches that may be present, is there bog turtle habitat? If yes, describe: <u>NO</u>	
<input checked="" type="checkbox"/> Yes <input type="checkbox"/> No Are there any signs of disturbance to <u>vegetation</u> (e.g., mowing, pasturing, burning)? If yes, describe (if possible, include level of disturbance*): <u>Mowed</u>		
Soil types present*: <u>Mineral</u>		

¹ (*) Denotes reference to the Supplemental Information document that provides more details on this particular question.
² Each wetland must have a separate Phase 1 habitat assessment data form completed.
³ Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are

PEM Portion of Wetland: Approx. Acre(s) .1 Mucky soils depth (inches) 0
 PSS Portion of Wetland: Approx. Acre(s) _____ Mucky soils depth (inches) _____
 PFO Portion of Wetland: Approx. Acre(s) _____ Mucky soils depth (inches) _____
 PO Portion of Wetland: Approx. Acre(s) _____

CIRCLE all vegetation* from list below that is dominant $\geq 20\%$ for each wetland type listed above. Also, CIRCLE calciphiles⁴ present even if not a dominant species.

Sphagnum Moss	Grass-of-Parnassus	Rice Cutgrass	Tussock Sedge	Shrubby Cinquefoil	Red Maple
Arrowhead	<u>Japanese Stiltgrass</u>	Rough-leaved Goldenrod	White Turtlehead	Spicebush	Viburnum Spp.
Carpetgrass	Jewelweed	Sensitive Fern	Woolly-fruited Sedge	Swamp Rose	
Cattail	Mile-A-Minute	Skunk Cabbage	Yellow Sedge	Alder Spp.	
Cinnamon Fern	Porcupine Sedge	Smooth Sawgrass	Alder-leaved Buckthorn	American Elm	
Common Boneset	Purple Loosestrife	Sweetflag	Dogwood Spp.	Eastern Red Cedar	
Common Reed	Reed Canary Grass	Tearthumb Spp.	Multiflora Rose	Poison Sumac	

Notes on additional plant species (Are there other sedges/rushes/other species dominant that are not on the list above?):
Mowed herbaceous veg.

Describe surrounding landscape (e.g., wetlands, forest, subdivision, agricultural field, fallow field, etc.):
Residential, floodplain

How much of this wetland is located off-site (i.e., outside the property boundaries or right-of-way)?
☒ None of it – the entire wetland is within the property boundaries
☐ Some of it – _____ Acres or _____ % of the wetland appears to be located off-site
 If part of this wetland continues off-site, how much of the off-site portion was surveyed (on foot)?
☐ None of it ☐ All of it ☐ Part of it (_____ acres or _____ % of the off-site portion)
 Is there potential bog turtle habitat off-site? ☐ Yes ☒ No ☐ Unknown If yes, how did you conclude this?

Were any bog turtles observed? ☐ Yes ☒ No If yes, how many? _____
 Other herps observed? ☐ Yes ☒ No If yes, which ones? _____

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.
 *Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

The hydrology criterion for bog turtle habitat is met.
 The soils criterion for bog turtle habitat is met.
 The vegetation criterion for bog turtle habitat is met.
 This wetland has potential bog turtle habitat (fair to good quality).
 This wetland has potential bog turtle habitat (low to very low quality).
☒ Yes ☐ No ☐ Unsure This wetland does NOT have potential bog turtle habitat.

Notes (How did you reach this opinion?):
Altered wetland

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Signature [Signature] Date 10/20/18

most prominent in the wetland and have the highest percent of coverage compared to other species.
⁴ Pertinent to bog turtle sites found in Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania. See Supplemental Information – Suitable Vegetation section.

Phase 1 Bog Turtle Habitat Survey Data Form For the Northern Population Range (Revised October 23, 2018)		Wetland ID: <u>C2-WA</u>
General Info	Property/Project Name: <u>Green Brook Flood Risk Mgmt C1,2,14</u>	County: <u>Middlesex</u>
	Entity Requesting Phase 1 Survey (landowner, developer, agency): <u>ACOE</u>	
	Township/Municipality: <u>Middlesex Borough</u>	
	Lead Surveyor: <u>Tesuro</u>	Affiliation: <u>First Environment</u>
Other Assistants Present: <u>C. Nathan, LBG</u>		
Date/Condition	Date of Survey: <u>10/26/18</u> Time In: <u>1115h</u> Time Out: <u>1120h</u> Air Temp. <u>37°F</u> °C	
	Last Precipitation: <u>< 24 hours</u> <u>1-7 days</u> <u>> 1 week</u> <u>unknown</u> Drought conditions? <u>YES</u> <u>NO</u> <u>Unknown</u>	
	Drought Index* ¹ (Circle): D0 D1 D2 D3 D4 Notes (e.g., details about drought, flood, abnormally dry, seasonal conditions): <u>Wet summer + fall</u>	
Wetland Info	Wetland ID: <u>C2-WA</u> Wetland Size: _____ acres, if known # Wetlands w/in Project Area ² : _____	
	If estimating wetland size: <u>< 0.1 acre</u> <u>0.1-0.5 acre</u> <u>1-2 acres</u> <u>2-4 acres</u> <u>5+ acres</u> <u>10+ acres</u>	
	% Canopy Cover* ³ <u>0%</u> <u>≤ 5</u> <u>6-20</u> <u>21-40</u> <u>41-60</u> <u>> 60</u>	
	Hydrology and Soils (check all that apply):	
	<u>Spring/Seeps</u> <u>Springhouse</u> <u>Trib/Stream</u> <u>Pond</u> <u>Stormwater</u> <u>Iron Bacteria</u>	
	<u>Rivulets</u> (how many _____) (_____ inches deep) <u>Subsurface Tunnel/Rivulets</u> <u>Tire Ruts</u> (_____ inches deep)	
	<u>Saturated soils present?</u> If yes, year-round? <u>Likely</u> <u>Unlikely</u> <u>Unknown</u>	
	<u>Yes</u> <u>No</u> water visible on surface? <u>Small Puddles/Depressions</u> (_____ inches deep)	
	<u>Yes</u> <u>No</u> Are there any signs of disturbance to <u>hydrology</u> (e.g., drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver impoundment, evidence of flooding)? If yes, describe (if possible, include how recent disturbance is*): <u>Storm water run off ditch</u>	
	For ditches that may be present, is there bog turtle habitat? If yes, describe: <u>NO</u>	
<u>Yes</u> <u>No</u> Are there any signs of disturbance to <u>vegetation</u> (e.g., mowing, pasturing, burning)? If yes, describe (if possible, include level of disturbance*):		
Soil types present*: <u>Sat. mineral soils, mud</u>		

¹ (*) Denotes reference to the Supplemental Information document that provides more details on this particular question.
² Each wetland must have a separate Phase 1 habitat assessment data form completed.
³ Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are

PEM Portion of Wetland: Approx. Acre(s) .05 Mucky soils depth (inches) 0-1"
 PSS Portion of Wetland: Approx. Acre(s) _____ Mucky soils depth (inches) _____
 PFO Portion of Wetland: Approx. Acre(s) _____ Mucky soils depth (inches) 0
 PO Portion of Wetland: Approx. Acre(s) .05

CIRCLE all vegetation* from list below that is dominant $\geq 20\%$ for each wetland type listed above. Also, CIRCLE calciphiles⁴ present even if not a dominant species.

Sphagnum Moss	Grass-of-Parnassus	Rice Cutgrass	Tussock Sedge	Shrubby Cinquefoil	Red Maple
Arrowhead	<u>Japanese Stiltgrass</u>	Rough-leaved Goldenrod	White Turtlehead	Spicebush	Viburnum Spp.
Carpentergrass	Jewelweed	Sensitive Fern	Woolly-fruited Sedge	Swamp Rose	
Cattail	Mile-A-Minute	Skunk Cabbage	Yellow Sedge	Alder Spp.	
Cinnamon Fern	Porcupine Sedge	Smooth Sawgrass	Alder-leaved Buckthorn	American Elm	
Common Boneset	Purple Loosestrife	Sweetflag	Dogwood Spp.	Eastern Red Cedar	
Common Reed	Reed Canary Grass	Tearthumb Spp.	Multiflora Rose	Poison Sumac	

Notes on additional plant species (Are there other sedges/rushes/other species dominant that are not on the list above?):
White snakeroot, adj. hardwood canopy

Describe surrounding landscape (e.g., wetlands, forest, subdivision, agricultural field, fallow field, etc.):
Residential, floodplain forest

How much of this wetland is located off-site (i.e., outside the property boundaries or right-of-way)?
☒ None of it – the entire wetland is within the property boundaries
☐ Some of it – _____ Acres or _____ % of the wetland appears to be located off-site
 If part of this wetland continues off-site, how much of the off-site portion was surveyed (on foot)?
☐ None of it ☐ All of it ☐ Part of it (_____ acres or _____ % of the off-site portion)

Is there potential bog turtle habitat off-site? ☐ Yes ☐ No ☐ Unknown If yes, how did you conclude this?

Were any bog turtles observed? ☐ Yes ☒ No If yes, how many? _____
 Other herps observed? ☐ Yes ☒ No If yes, which ones? _____

The hydrology criterion for bog turtle habitat is met.
 The soils criterion for bog turtle habitat is met.
 The vegetation criterion for bog turtle habitat is met.
 This wetland has potential bog turtle habitat (fair to good quality).
 This wetland has potential bog turtle habitat (low to very low quality).
☒ Yes ☐ No ☐ Unsure This wetland does NOT have potential bog turtle habitat.

Notes (How did you reach this opinion?):
Floodplain stormwater basin

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.
 Signature [Signature] Date 10/22/18

most prominent in the wetland and have the highest percent of coverage compared to other species.
⁴ Pertinent to bog turtle sites found in Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania. See Supplemental Information – Suitable Vegetation section.

Phase 1 Bog Turtle Habitat Survey Data Form For the Northern Population Range (Revised October 23, 2018)		Wetland ID: <u>C2-WD</u>
General Info	Property/Project Name: <u>Green Brook Flood Risk Mgmt C1, 2, H</u>	County: <u>Middlesex</u>
	Entity Requesting Phase 1 Survey (landowner, developer, agency): <u>ACOE</u>	
	Township/Municipality: <u>Middlesex Borough</u>	
	Lead Surveyor: <u>Tesaro</u>	Affiliation: <u>First Environment</u>
	Other Assistants Present: <u>C. Henlon, LBG</u>	
Date/Condition	Date of Survey: <u>10/26/18</u>	Time In: <u>1105h</u> Time Out: <u>1110h</u> Air Temp: <u>35</u> °F °C
	Last Precipitation: <input type="checkbox"/> < 24 hours <input checked="" type="checkbox"/> 1-7 days <input type="checkbox"/> > 1 week <input type="checkbox"/> unknown	Drought conditions? <input type="checkbox"/> YES <input type="checkbox"/> NO <input type="checkbox"/> Unknown
	Drought Index* ¹ (Circle): D0 D1 D2 D3 D4	Notes (e.g., details about drought, flood, abnormally dry, seasonal conditions): <u>Wet fall + summer</u>
Wetland Info	Wetland ID: <u>C2-WD</u>	Wetland Size: _____ acres, if known # Wetlands w/in Project Area ² : _____
	If estimating wetland size: <input type="checkbox"/> < 0.1 acre <input checked="" type="checkbox"/> 0.1-0.5 acre <input type="checkbox"/> 1-2 acres <input type="checkbox"/> 2-4 acres <input type="checkbox"/> 5+ acres <input type="checkbox"/> 10+ acres	
	% Canopy Cover* ³ <input type="checkbox"/> 0% <input type="checkbox"/> ≤ 5 <input type="checkbox"/> 6-20 <input type="checkbox"/> 21-40 <input checked="" type="checkbox"/> 41-60 <input type="checkbox"/> > 60	
	Hydrology and Soils (check all that apply):	
	<input type="checkbox"/> Springs/Seeps <input type="checkbox"/> Springhouse <input type="checkbox"/> Trib/Stream <input type="checkbox"/> Pond <input type="checkbox"/> Stormwater <input type="checkbox"/> Iron Bacteria	
	<input type="checkbox"/> Rivulets (how many _____) (_____ inches deep) <input type="checkbox"/> Subsurface Tunnel/Rivulets <input type="checkbox"/> Tire Ruts (_____ inches deep)	
	<input type="checkbox"/> Saturated soils present? If yes, year-round? <input type="checkbox"/> Likely <input type="checkbox"/> Unlikely <input type="checkbox"/> Unknown	
	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No water visible on surface? <input type="checkbox"/> Small Puddles/Depressions (_____ inches deep)	
	<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Are there any signs of disturbance to <u>hydrology</u> (e.g., drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver impoundment, evidence of flooding)? If yes, describe (if possible, include how recent disturbance is*):	
	For ditches that may be present, is there bog turtle habitat? If yes, describe:	
<input type="checkbox"/> Yes <input checked="" type="checkbox"/> No Are there any signs of disturbance to <u>vegetation</u> (e.g., mowing, pasturing, burning)? If yes, describe (if possible, include level of disturbance*):		
Soil types present*: <u>Mineral soils, no water but hydric</u>		

¹ (*) Denotes reference to the Supplemental Information document that provides more details on this particular question.
² Each wetland must have a separate Phase 1 habitat assessment data form completed.
³ Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are

PEM Portion of Wetland: Approx. Acre(s) 2.01 Mucky soils depth (inches) 0
 PSS Portion of Wetland: Approx. Acre(s) Mucky soils depth (inches)
 PFO Portion of Wetland: Approx. Acre(s) .1 Mucky soils depth (inches) 0
 PO Portion of Wetland: Approx. Acre(s)

CIRCLE all vegetation* from list below that is dominant $\geq 20\%$ for each wetland type listed above. Also, CIRCLE calciphiles⁴ present even if not a dominant species.

Sphagnum Moss	Grass-of-Parnassus	Rice Cutgrass	Tussock Sedge	Shrubby Cinquefoil	Red Maple
Arrowhead	Japanese Stiltgrass	Rough-leaved Goldenrod	White Turtlehead	Spicebush	Viburnum Spp.
Carpetgrass	Jewelweed	Sensitive Fern	Woolly-fruited Sedge	Swamp Rose	
Cattail	Mile-A-Minute	Skunk Cabbage	Yellow Sedge	Alder Spp.	
Cinnamon Fern	Porcupine Sedge	Smooth Sawgrass	Alder-leaved Buckthorn	American Elm	
Common Boneset	Purple Loosestrife	Sweetflag	Dogwood Spp.	Eastern Red Cedar	
Common Reed	Reed Canary Grass	Tearthumb Spp.	Multiflora Rose	Poison Sumac	

Notes on additional plant species (Are there other sedges/rushes/other species dominant that are not on the list above?):
Woodseed, bladder sedge, white snakeroot

Describe surrounding landscape (e.g., wetlands, forest, subdivision, agricultural field, fallow field, etc.):
Residential, floodplain forest

How much of this wetland is located off-site (i.e., outside the property boundaries or right-of-way)?
☒ None of it – the entire wetland is within the property boundaries
☐ Some of it – Acres or % of the wetland appears to be located off-site
 If part of this wetland continues off-site, how much of the off-site portion was surveyed (on foot)?
☐ None of it ☐ All of it ☐ Part of it (acres or % of the off-site portion)
 Is there potential bog turtle habitat off-site? ☐ Yes ☒ No ☐ Unknown If yes, how did you conclude this?

Were any bog turtles observed? ☐ Yes ☒ No If yes, how many?
 Other herps observed? ☐ Yes ☒ No If yes, which ones?

*Note that you must be permitted by the state you are conducting the survey in to handle bog turtles.
 *Report bog turtle observations to your local FWS Field Office and state wildlife office within 48 hrs.

The hydrology criterion for bog turtle habitat is met.
 The soils criterion for bog turtle habitat is met.
 The vegetation criterion for bog turtle habitat is met.
 This wetland has potential bog turtle habitat (fair to good quality).
 This wetland has potential bog turtle habitat (low to very low quality).
☒ Yes ☐ No ☐ Unsure This wetland does NOT have potential bog turtle habitat.

Notes (How did you reach this opinion?):
Dry, forested depression

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Signature [Signature] Date 10/26/18

most prominent in the wetland and have the highest percent of coverage compared to other species.
⁴ Pertinent to bog turtle sites found in Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania. See Supplemental Information – Suitable Vegetation section.

Phase 1 Bog Turtle Habitat Survey Data Form For the Northern Population Range (Revised October 23, 2018)		Wetland ID: <u>C2-WB</u>
General Info	Property/Project Name: <u>Green Brook Flood Risk Mgmt C1, 2, H</u>	County: <u>Middlesex</u>
	Entity Requesting Phase 1 Survey (landowner, developer, agency): <u>DCOE</u>	
	Township/Municipality: <u>Middlesex Borough</u>	
	Lead Surveyor: <u>Tesaro</u>	Affiliation: <u>First Environment</u>
	Other Assistants Present: <u>C. Hanlon, LBG</u>	
Date/Condition	Date of Survey: <u>10/26/18</u> Time In: <u>1015h</u> Time Out: <u>1100h</u> Air Temp: <u>35</u> °F	
	Last Precipitation: <u>< 24 hours</u> <u>X</u> 7 days <u> </u> > 1 week <u> </u> unknown Drought conditions? <u> </u> YES <u>X</u> NO <u> </u> Unknown	
	Drought Index* ¹ (Circle): D0 D1 D2 D3 D4 Notes (e.g., details about drought, flood, abnormally dry, seasonal conditions): <u>Wet fall + summer</u>	
Wetland Info	Wetland ID: <u>C2-WB</u> Wetland Size: <u> </u> acres, if known # Wetlands w/in Project Area ² : <u> </u>	
	If estimating wetland size: <u> </u> < 0.1 acre <u> </u> 0.1-0.5 acre <u> </u> 1-2 acres <u> </u> 2-4 acres <u> </u> 5+ acres <u>X</u> 10+ acres	
	% Canopy Cover* ³ <u> </u> 0% <u> </u> ≤ 5 <u> </u> 6-20 <u> </u> 21-40 <u>X</u> 41-60 <u> </u> > 60	
	Hydrology and Soils (check all that apply):	
	<u> </u> Springs/Seeps <u> </u> Springhouse <u>X</u> Trib/Stream <u> </u> Pond <u>X</u> Stormwater <u> </u> Iron Bacteria	
	<u> </u> Rivulets (how many <u> </u>) (<u> </u> inches deep) <u> </u> Subsurface Tunnel/Rivulets <u> </u> Tire Ruts (<u> </u> inches deep)	
	<u>X</u> Saturated soils present? If yes, year-round? <u> </u> Likely <u> </u> Unlikely <u> </u> Unknown	
	<u>X</u> Yes <u> </u> No water visible on surface? <u>X</u> Small Puddles/Depressions (<u>1</u> " inches deep)	
	<u>X</u> Yes <u> </u> No Are there any signs of disturbance to <u>hydrology</u> (e.g., drainage ditches, tile drainages, berms, culverts, fill material, ponds, roads, beaver impoundment, evidence of flooding)? If yes, describe (if possible, include how recent disturbance is*): <u>Flooding, stormwater</u>	
	For ditches that may be present, is there bog turtle habitat? If yes, describe: <u>No</u>	
<u> </u> Yes <u>X</u> No Are there any signs of disturbance to <u>vegetation</u> (e.g., mowing, pasturing, burning)? If yes, describe (if possible, include level of disturbance*):		
Soil types present*: <u>mineral soils, alluvium</u>		

¹ (*) Denotes reference to the Supplemental Information document that provides more details on this particular question.
² Each wetland must have a separate Phase 1 habitat assessment data form completed.
³ Determine percent cover of abundant species for the wetland, not by wetland type. Abundant species are those that are

PEM Portion of Wetland: Approx. Acre(s) 1.2 Mucky soils depth (inches) <1"
 PSS Portion of Wetland: Approx. Acre(s) Mucky soils depth (inches)
 PFO Portion of Wetland: Approx. Acre(s) 11 Mucky soils depth (inches) <1"
 PO Portion of Wetland: Approx. Acre(s)

CIRCLE all vegetation* from list below that is dominant $\geq 20\%$ for each wetland type listed above. Also, CIRCLE calciphiles⁴ present even if not a dominant species.

Sphagnum Moss	Grass-of-Parnassus	Rice Cutgrass	Tussock Sedge	Shrubby Cinquefoil	Red Maple
Arrowhead	Japanese Stiltgrass	Rough-leaved Goldenrod	White Turtlehead	Spicebush	Viburnum Spp.
Carpetgrass	Jewelweed	Sensitive Fern	Woolly-fruited Sedge	Swamp Rose	
Cattail	Mile-A-Minute	Skunk Cabbage	Yellow Sedge	Alder Spp.	
Cinnamon Fern	Porcupine Sedge	Smooth Sawgrass	Alder-leaved Buckthorn	American Elm	
Common Boneset	Purple Loosestrife	Sweetflag	Dogwood Spp.	Eastern Red Cedar	
Common Reed	Reed Canary Grass	Tearthumb Spp.	Multiflora Rose	Poison Sumac	

Notes on additional plant species (Are there other sedges/rushes/other species dominant that are not on the list above?):
Hardwoods, Carex, Lizard's tail, yellow flag, climbing hempweed, polygonum

Describe surrounding landscape (e.g., wetlands, forest, subdivision, agricultural field, fallow field, etc.):
Aster, Bidens, Common Ragwort, Barnyard Grass, White Snakeroot

How much of this wetland is located off-site (i.e., outside the property boundaries or right-of-way)?
☒ None of it – the entire wetland is within the property boundaries
☐ Some of it – Acres or % of the wetland appears to be located off-site
 If part of this wetland continues off-site, how much of the off-site portion was surveyed (on foot)?
☐ None of it ☐ All of it ☐ Part of it (acres or % of the off-site portion)
 Is there potential bog turtle habitat off-site? ☐ Yes ☒ No ☐ Unknown If yes, how did you conclude this?

Were any bog turtles observed? ☐ Yes ☒ No If yes, how many?
 Other herps observed? ☐ Yes ☒ No If yes, which ones?

The hydrology criterion for bog turtle habitat is met.
 The soils criterion for bog turtle habitat is met.
 The vegetation criterion for bog turtle habitat is met.
 This wetland has potential bog turtle habitat (fair to good quality).
 This wetland has potential bog turtle habitat (low to very low quality).
☒ Yes ☐ No ☐ Unsure This wetland does NOT have potential bog turtle habitat.

Notes (How did you reach this opinion?):

Lead Surveyor – please sign below certifying to the best of your knowledge that all of the information provided herein is accurate and complete.

Signature [Signature] Date 10/24/18

most prominent in the wetland and have the highest percent of coverage compared to other species.
⁴ Pertinent to bog turtle sites found in Connecticut, Massachusetts, New Jersey, New York, and Pennsylvania. See Supplemental Information – Suitable Vegetation section.

December 19, 2018

Prepared by:
First Environment, Inc.



**US Army Corps
of Engineers®**

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