HA File # PA23.29 PNDI # 774474

USFWS Review Requested

# Bog Turtle (*Glyptemys muhlenbergii*) Phase II Presence/Probable Absence Survey

# 301 Reservoir Road Project, East Goshen Township, Chester County, Pennsylvania



Submitted July 10, 2023

t•

Wolf BioServices, Inc. 8 Red Maple Drive Downingtown, PA 19335

by

# Michael E. Torocco, Quillyn Bickley and Robert T. Zappalorti

Herpetological Associates, Inc. Plant and Wildlife Consultants 1745 Westwood Road Wyomissing, PA 19610

## TABLE OF CONTENTS

Introduction
Materials and Methods
Project and Site Information
Wetland Information    5
Results
Summary and Conclusions
Bog Turtle Life History
Literature Cited
Appendix A: PNDI Receipt
Appendix B: Existing Conditions Plan with Photograph Locations
Appendix C. Wetland Photographs 23

## LIST OF TABLES

Table 1.	Wetland Size and Location	5
Table 2.	Summary of Phase II Survey Results	8
Table 3.	List of Reptiles and Amphibians Observed	8

# LIST OF FIGURES

Figure 1.	USGS topographic map showing the approximate location of the project area	2
Figure 2.	Satellite imagery showing the approximate location of the project area	3
Figure 3.	Aerial orthophoto map showing the Designated Survey Area	6
Figure 4.	An adult bog turtle from Chester County, Pennsylvania	10
Figure 5.	A yearling bog turtle from Monroe County, Pennsylvania	11

# INTRODUCTION

Herpetological Associates, Inc. (HA) was contracted by Wolf BioServices, Inc. to conduct a Bog Turtle (*Glyptemys muhlenbergii*) Phase II Presence/Probable Absence Survey for the 301 Reservoir Road Project. A search of the Pennsylvania Natural Diversity Inventory (PNDI) database resulted in a finding of "Potential Impact" to federally-protected species under the jurisdiction of the U.S. Fish and Wildlife Service (USFWS) for this project (PNDI# 774474; **Appendix A**). In response, a Phase I habitat assessment was performed by Wes Wolf of Wolf BioServices, which revealed the presence of potential bog turtle habitat within the project area. In order to obtain a PNDI clearance, HA was contracted to perform the Phase II survey. This report presents the findings of the Phase II survey, which is required to be submitted to USFWS for review and concurrence.

# MATERIALS AND METHODS

# LOCATION OF THE STUDY SITE

The approximately 7.2-acre project area (as represented on the PNDI) is located in East Goshen Township, Chester County, Pennsylvania (39.974883, -75.548696). The project area can be found on the West Chester U.S. Geological Survey (USGS) 7.5 minute quadrangle (Figures 1 and 2).

## SURVEYORS

Phase II surveys were performed by Michael Torocco and Quillyn Bickley (both Pennsylvania Qualified Bog Turtle Surveyors [QBTS]).

## PHASE II PRESENCE/PROBABLE ABSENCE SURVEY METHODS

Systematic searches for bog turtles were performed by a team of experienced herpetologists, qualified to conduct bog turtle surveys. This consisted of walking through a wetland and carefully looking for basking turtles. Searches were also conducted in shallow, muddy water; atop or amid sedge and grass hummocks; and in or on dead/decaying plant debris. Probing sticks were used to move vegetation aside and to probe into soft mud in search of hidden turtles. Additionally, shallow water and the muddy substrate was searched by muddling, or feeling around in the mud by hand (USFWS, 2020a).

Phase II survey methods follow the USFWS *Guidelines for Bog Turtle Surveys for the Northern Population Range: Phase 1 and 2 Surveys* (USFWS, 2020a). The specific methods are as follow:

- 1. Phase II surveys must be performed during the period from April 15 to June15. This coincides with the period of greatest annual turtle activity (spring emergence and breeding), and is before the period when vegetation gets too dense to accurately survey. While turtles may be found outside of these dates, a result of no turtles would be considered inconclusive. Surveys beyond June also have a higher likelihood of disruption/destruction of nests or newly hatched young.
- 2. Ambient air temperature, at the surface and in the shade, must be at least 55° F.
- 3. Surveys must be performed during the day, at least one hour after sunrise and no later than one hour before sunset.





- 4. Surveys may be performed when it is sunny or cloudy. In addition, surveys may be conducted during and after light to moderate rain, provided air temperature is greater than 65° F.
- 5. Surveys are generally performed by two four people. Michael Torocco and Quillyn Bickley are USFWS recognized qualified bog turtle surveyors; at least one of these individuals must be present during all surveys. All HA staff have previous experience with and have participated in surveys for bog turtles. The same surveyors must be used for each wetland to maintain a consistent survey effort and increase survey efficiency.
- 6. A *minimum* of four (4) surveys per wetland site must be performed to adequately assess the site for presence of bog turtles. <u>At least two of these surveys must be performed in May.</u> From mid-April to April 30, surveys must be separated by six or more days. From May 1 to mid-June, surveys must be separated by three or more days. The shorter period between surveys during May and June ensures that surveys are carried out during the optimum window of time (i.e., before wetland vegetation becomes too thick and while temperatures are optimal). It should be noted that bog turtles are more likely to be encountered by spreading the surveys out over a longer period. For example, erroneous survey results could be obtained if surveys were conducted on three successive days in late April due to possible late spring emergence, or during periods of extreme weather because turtles may be buried in mud and difficult to find. If turtles are found, the site does not need to be revisited.
- 7. Survey time must be 4-6 person-hours per acre of wetland per site visit unless a bog turtle is found before this time has elapsed.

## DESIGNATED SURVEY AREA

The Designated Survey Area (DSA) for the Phase II survey is produced by delineating wetland areas that contain the most suitable, potential bog turtle habitat. The primary site characteristics that are considered include the presence/depth of mucky soil, and presence of spring-fed hydrology. These areas are defined by a Recognized Qualified Bog Turtle Surveyor.

# PROJECT AND SITE INFORMATION

PROJECT / PROPERTY NAME: 301 Reservoir Road Project

**PROJECT DESCRIPTION**: The site is proposed for a 5-lot subdivision, with the existing house to remain (**Appendix B1**).

**CURRENT LAND USE AND SETTING:** The site is located within the Piedmont Upland Section of the Piedmont Physiographic Province, which is characterized by broad, rounded to flat-topped hills and shallow valleys. Local relief is low to moderate, ranging from 101 to 600 feet, while elevation of the Section ranges from 100 to 1,220 feet. Elevation of the site is approximately 400 to 540 feet.

- The site is currently developed with an unoccupied single-family residence, barn, and a smaller detached residence. The remainder of the property includes undeveloped land that includes meadow, scrub and forested areas. Off site and to the north bordering the property are houses on small lots that line Cooper Circle. Undeveloped land owned by East Goshen Township borders the property to the east and south. The surrounding landscape is characterized as residential, with single-family housing dominating.
- **WATERSHED**: The investigated wetlands are associated with an unnamed tributary to East Branch Chester Creek, which is within the East Branch Chester Creek HUC 12 subwatershed (HUC Code: 020402020603) and the Lower Delaware HUC 8 subbasin.

STREAM/WETLAND IMPACTS: There will be no direct impacts to streams or wetlands.

**AREA INVESTIGATED**: Since the Phase I survey was not performed by HA, two delineated wetland areas (identified as Wetlands A and B) were examined to determine the extent of potential habitat. Two areas, corresponding to Wetlands A and B, were found to contain marginal quality bog turtle habitat. The Phase II survey focused on these area of potential habitat, which are identified as the Designated Survey Areas (DSA A = 0.10 acre; DSA B = 0.16 acre) in Figure 3.

# WETLAND INFORMATION

The on-site wetland delineation was performed on February 20, 2023 by Wolf BioServices, Inc. Determination of the presence of wetlands was based on procedures prescribed in the U.S. Army Corps of Engineers (USACE) *Corps of Engineers Wetlands Delineation Manual* (Environmental Laboratory 1987) and *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region, Version 2.0* (USACE 2012).

Wetland Area ID	Wetland Size* (acres)	Latitude (°N)	Longitude (°W)	Entire Wetland within Project Area?
A	0.08	39.974288	75.548260	'No
В	0.4	39.974616	75.547763	No

Table 1. Wetland Size and Loca	ation
--------------------------------	-------

\*Delineated, on-site area only

5



#### RESULTS

#### WETLAND DESCRIPTIONS

Wetland A: Wetland A is a 0.08-acre (within project area) Palustrine Emergent (PEM) wetland, which is located along the southern property boundary. The wetland extends off site, to the southeast. The wetland is bordered to the east by forested and shrub upland, and to the west by a meadow.

The source of hydrology to Wetland A is a spring house, positioned just within the property boundary. Flow is to the southeast via a linear ditch, which drains to an unnamed tributary to East Branch Chester Creek. Shallow, standing water is present throughout the ditched portion of the wetland, though flow was generally slow and intermittent. A prolonged period of low rainfall in the spring likely contributed to the low flow. The wetland corridor is narrow, with the wetted channel base approximately two feet wide, though a wider area is present at the northern end of the wetland (15 feet wide). The substrate is mucky within the northern portion of the linear ditched area, up to 12 inches deep, but the majority of the wetland can be probed to three inches or less. Dominant vegetation includes cattail (*Typha latifolia*), sensitive fern (*Onoclea sensibilis*), watercress (*Nasturtium* sp.) and jewelweed (*Impatiens capensis*).

Wetland B: Wetland B is a 0.40-acre (within project area) PEM wetland, located in the southern portion of the property. The wetland extends offsite to the east. The wetland is bordered to the south by an unnamed tributary, to the west by a dilapidated reinforcement wall, to the north by undeveloped scrub upland; and to the east by another large section of impoundment wall.

Several spring seepage areas are present along the northwestern wetland boundary at the toe of a shallow slope. Overall hydrology drains south through the wetland via shallow rivulets (1 inch), but puddles (<0.5 inches) are also scattered in the wetland. Substrate is organic, saturated and can be probed beyond three inches; primarily in the northern portion of the wetland, where maximum substrate depth reaches six inches. Dominant plants in the wetland include common reed (*Pharagmites australis*), skunk cabbage (*Symplocarpus foetidus*), rice cutgrass (*Leersia oryzoides*) and other grasses.

#### PHASE II PRESENCE/PROBABLE ABSENCE SURVEY RESULTS

The Phase II bog turtle surveys were conducted on April 19, May 12, May 18, and May 28, 2023. A Designated Survey Area of 0.10 acre and 0.16 acre for was used for the search effort calculations, which equates to a combined minimum requirement of 4.16 person-hours of search effort for the study (1.04 person-hours per day) at a rate of 4 person-hours per acre. However, due to the secondary USFWS requirement of a minimum of 1 hour search time per day for small wetlands (4 hours total) regardless of the number of surveyors, a total of 4 hours was planned for this project. Actual search time was 5 hours spread over 4 days, or a total of 10 person-hours of search effort. No bog turtles or evidence of their presence (e.g. shells, tracks) were observed. A summary of the Phase II site visits is presented in Tables 2 and 3.

Date	to Time Surveyore Time Barrow		Time Commence	Total	We	ather		# Bog	
		Surveyors	(Hrs)	Hours	Variable*	In	Out	Found	
4-19-23	1				AmbT (°F)	60	66		
	1430-	M. Torocco	1.25	25	RH (%)	39	29	0	
	1545	Q. Bickley	1.25	2.5	Cloud (%)	0	0	0	
					Wind (mph)	0-15	5-15		
5-12-23			1		AmbT (°F)	83	82		
	1230- M. Toroco 1345 Q. Bickle	230- M. Torocco 1345 Q. Bickley	Corocco Bickley 1.25	1.25 2.5	RH (%)	33	30	0	
					Cloud (%)	0	0		
					Wind (mph)	0-3	0-3		
5-18-23	1450- M. Torocco 1610 Q. Bickley 1.	1450- M. Torocco	1.25	1.25	AmbT (°F)	66	66	0	
					RH (%)	34	32		
		1,25	25 2.5	Cloud (%)	0	0	0		
							Wind (mph)	0-5	0-5
				AmbT (°F)	68	70			
5 28 22	1050-	1050- M. Torocco	)- M. Torocco	A. Torocco	2.5	RH (%)	36	34	0
5-20-25	1205	Q. Bickley	1.23	25 2.5	Cloud (%)	80	90	0	
					Wind (mph)	0-3	0-10		

1 abic 2. Summary of thase at Dog Turthe Survey Nesu	Table	e 2.	Summary	y of Phase	II Bo	g Turtle	Survey	' Results
--	-------	------	---------	------------	-------	----------	--------	-----------

\*Amb T = Ambient Temperature, RH = Relative Humidity, Cloud = Cloud Cover, Wind = Wind Speed

## **REPTILES AND AMPHIBIANS OBSERVED**

No bog turtles were observed, but a few common species of reptiles and amphibians were found in low abundance within Wetland 1 and are presented in Table 3.

Common Name	Scientific Name	<u>N</u>	unber Observe	<u>d</u>
Reptiles			100 M 100	
N. Water Snake	Nerodia sipedon		1	
E. Garter Snake	Thamnophis sirtalis		1	
Snapping Turtle	Chelydra serpentina		5	
Painted Turtle	Chrysemys picta		1	
Amphibians				
N. Spring Peeper	Pseudacris crucifer		1 calling	
Pickerel Frog	Lithobates palustris		1	
Green Frog	Lithobates clamitans	25+		

Table 5. List of Keptnes and Amphibians Observed	Table 3.	List of R	eptiles	and Am	phibians	Observed
--	----------	-----------	---------	--------	----------	----------

#### SUMMARY AND CONCLUSIONS

HA was contracted by Wolf BioServices, Inc. to conduct a Bog Turtle (*Glyptemys muhlenbergii*) Phase II Presence/Probable Absence Survey for the 301 Reservoir Road Project, located in East Goshen Township, Chester County, Pennsylvania. The project PNDI indicated a potential impact to federally protected species under the jurisdiction of the USFWS (PNDI# 774474).

A Phase I habitat assessment was performed by Wes Wolf of Wolf BioServices at two delineated wetlands within the project property. Potential bog turtle habitat was identified, and HA was contacted to perform the Phase II survey. HA observed marginal quality habitat in both Wetland A and B, and delineated two separate Designated Survey Areas for Phase II surveys. DSA A is 0.01 acre and corresponds to Wetland A, and DSA B is 0.16 acre and corresponds to Wetland B. Phase II surveys were conducted on April 19, May 12, May 18, and May 28, 2023. Surveys were conducted within the guidelines specified by USFWS. No bog turtles or evidence of their presence were found within the investigated areas. Based on the results of the surveys, bog turtles are not expected to be impacted as a result of this project.

#### **BOG TURTLE LIFE HISTORY**

#### Description

The bog turtle is classified taxonomically into the class Reptilia, order Testudines, suborder

Thecophora, family Emydidae, genus Glyptemys [Clemmys], and species muhlenbergii (Schoepff 1792; Figures 4-5). Conant and  $\cdot$  Collins (1991) describe this turtle as small, attaining an average carapace length of 7.5-9 centimeters (3-3.5 inches), with a maximum recorded length of 11.4 centimeters (4.5 inches). The carapace is moderately domed, rather long, and slightly keeled. The scutes are often fairly deeply incised by the concentric rings of the laminae, although in older animals the shell is often worn smooth through years of burrowing in mud. In Figure 4. A bog turtle from Chester County, PA. specimens which do not have



iron oxide or other deposits on the shell, a light "sun-burst" pattern can be seen on each scute of an otherwise brown shell. The plastron is large, and dark brown or black in color with light markings either irregularly or symmetrically arranged. The limbs are typically brown with orange or reddish beneath, and there is a conspicuous orange head blotch behind the tympanum.

#### Status

Pennsylvania Status - Endangered Federal Status - Threatened

#### Range

Disjunct populations exist throughout the range of the bog turtle, occurring in 4 distinct areas (Conant and Collins, 1991). These separate populations occur in central New York; western Pennsylvania; eastern New York south to southern New Jersey and west to central Pennsylvania; and southern Virginia, south through western North Carolina, into extreme northern Georgia.

#### Habitat and Life History

Although rarely found far from water, the bog turtle is not a strong swimmer and may drown quickly if forced to stay in deep water; generally bog turtles are found wallowing in soft mud or swimming in shallow (several inches) streams and puddles. This turtle is omnivorous, and may feed on a variety of insects, earthworms, slugs, or berries. Loss of habitat through the direct destruction of wetlands, fragmentation of range as a result of long-term geologic factors (Carr, 1952), and

vegetative succession by wetland trees and invasive plants have all greatly impacted b o g t u r t l e populations.

Bog turtles generally do not move large distances and have relatively small home ranges. Not unlike other turtle species, males appear to have a larger home range than females (Lovich et al., 1992). In Pennsylvania, Ernst (1977) reports mean home range for males as 1.33 ha, and 1.26



home range for males Figure 5. A yearling bog turtle from Monroe County, PA.

ha for females. Chase, et al. (1989) is in agreement, but differences in mean home range between both sexes are larger and statistically significant for thread trailed specimens in Maryland:  $\bar{x} = 0.176$ ha for males,  $\bar{x} = 0.066$  ha for females. Distance traveled between locations of radiotracked bog turtles in North Carolina ranged 0-87 m ( $\bar{x} = 24.3$  m) for males and 0-62 m ( $\bar{x} = 15.8$  m) for females (Lovich, et al.,1992); rates of movements (distance/day) were also significantly larger for males. Movements and home range dimensions of bog turtles may be governed by the size of suitable habitat available to them.

Unlike most other chelonians, *G. muhlenbergii* do not travel to dry upland areas or the shore or beach of a pond to deposit their eggs. Instead, they select suitable slightly elevated nesting sites within their semi-aquatic marshy habitat (Zappalorti et al., 2015). Probably because of the constant saturated soil conditions in such environments, eggs are not buried in deep nest chambers. Instead, they are deposited in a shallow depression on the surface of raised grassy tussocks and are slightly covered with available humus and vegetation (Ernst et al., 1994). The elevated base of tussockforming grasses and sedges is the preferred nesting site, but nests have also been found on moss covered stumps and *Sphagnum* clumps. Nesting areas typically have limited canopy closure, support low vegetation and provide ample solar exposure. The possibly unique nesting habits of *G. muhlenbergii* is believed to reduce high predation usually associated with upland egg-laying (Kiviat, 1978). In most chelonians and generally other K-selected vertebrates, the period of greatest vulnerability is during the early stages of life.

#### LITERATURE CITED

Carr, A. 1952. Handbook of Turtles. Cornell University Press, Ithaca, New York.

- Chase, J.D., K.R. Dixon, J.E. Gates, D. Jacobs and G.J. Taylor. 1989. Habitat characteristics, population size, and home range of the bog turtle, *Clemmys muhlenbergii*, in Maryland. J. Herpetol. 23(4):356-362.
- Conant, R. And J.T. Collins. 1991 A Field Guide to Reptiles and Amphibians of Eastern and Central North America. Third Edition, Expanded.
- Environmental Laboratory. 1987. Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1. U.S. Army Engineer Waterways Experiment Station, Vicksburg, MS.
- Ernst, C.H. and R.B. Bury. 1977. Clemmys muhlenbergii. Catalog of American Amphibians and Reptiles. SSAR, 204:1-2.
- Ernst, C.H., J.E. Lovich and R.W. Barbour. 1994. Turtles of the United States and Canada. Smithsonian Institution Press, Washington and London. 578 pp.
- Federal Geographic Data Committee. 2013. Classification of wetlands and deepwater habitats of the United States. FGDC-STD-004-2013. Second Edition. Wetlands Subcommittee, Federal Geographic Data Committee and U.S. Fish and Wildlife Service, Washington, DC.
- Herman, D.W. 1994. The bog turtle, *Clemmys muhlenbergii*, in North Carolina: An action plan for its conservation and management. Zoo Atlanta, Department of Herpetology, Atlanta, Georgia. 144 pp. Submitted to The North Carolina Wildlife Resources Commission, Contract No. 93 SG 06.
- Kiviat, E. 1978. Bog turtle habitat ecology. Bull. Chicago Herpetological. Society 13:29-42.
- Lovich, J.E., D.W. Herman and K.M. Fahey. 1992. Seasonal activity and movements of bog turtles (*Clemmys muhlenbergii*) in North Carolina. Copeia 1992:1107-1111.
- Schoepff, Johann David. 1792. Historia testvdinvm iconibvs illvstrata (Illustrated History of the Turtles). In Latin.
- U.S. Army Corps of Engineers (USACE). 2011. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region Version 2.0, ed. J. S. Wakeley, R. W. Lichvar, C. V. Noble, and J. F. Berkowitz. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
- U.S. Army Corps of Engineers (USACE): 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region Version 2.0, ed. J.
  F. Berkowitz, J. S. Wakeley, R. W. Lichvar, C. V. Noble. ERDC/EL TR-12-9. Vicksburg, MS: U.S. Army Engineer Research and Development Center.
- U.S. Fish and Wildlife Service (USFWS). 2001. Bog Turtle (*Clemmys muhlenbergii*), Northern Population, Recovery Plan. Hadley, Massachusetts. 103 pp.
- U.S. Fish and Wildlife Service (USFWS). 2018a. Guidelines for Bog Turtle Surveys for the Northern Population Range: Phase I and 2 Surveys. Technical document, revised October 26, 2018. 20 pp.
- U.S. Fish and Wildlife Service (USFWS). 2018b. Phase 1 Bog Turtle Habitat Survey Data Form for the Northern Population Range: Supplemental Information. Technical document, revised October 26, 2018. 4 pp.
- Zappalorti, R.T., J.E. Lovich, R. Farrell, and M.E. Torocco. 2015. Nest-Site Characteristics of *Glyptemys muhlenbergii* (Bog Turtle) in New Jersey and Pennsylvania. Northeastern Naturalist 22(3):573-584.

# APPENDIX A

# PNDI

i.

ù,

,





Appendix C1. Wetland A, view looking southeast. This is the widest point of an otherwise narrow, linear, ditched wetland.



Appendix C2. Wetland A, showing the linear, ditched portion of the wetland

.

.



Appendix C3. Unnamed tributary to East Branch Chester Creek, as it flows through Wetland B.



Appendix C4. Wetland B, which is dominated in large part by common reed.

# PLOT PLAN

120

2 <sup>18</sup> 8

n a ka

ه پ و

3





1 8 8 9 10	THE SHEET S IS NOT 1
	SITE
	LOCATION MAP (SOME 1' - 2000)
	CENERAL NOTES: 1. ALCOR ONER/AFLOW: STE BUDGAL LE ELECTRONIE DO
배명화(남)에 관위 관위 1111년 111년 111년 111년 111년 111년 111년 11	P BY the BY OUTLY A HORE IN SECURING A HORE BY OUTLY A
HART TRANSPORT	Andre and Contraction of the American Contrea Contrelation of the American Contraction of the American Contra
1.1 MAN AND ADDRESS AND ADD	LIVER SING
SOLS DOMENTATION	A THAT INTO A THAT A TH
	L DOCT BRACK POR A NA ' ' SALE CATO SCE DOCT RI NA SCALE BRACK POR A NA ' ' SALE R COT SCE DOCT RI L M SCALE BRACK POR A RA CATO SCE DOCT RI L M SCALE BRACK POR A RA CATO SCE DOCTARE
A NORTH AND A THE AND A TH	
NOTICE OF REQUIRED CONDITIONAL USE:	dal Porto Francis and Provide Annual Porto Contract of Manual Porto Contract Port
DEVELOPER'S ACREEMENT NOTCE	COLORON AND AND AND AND AND AND AND AND AND AN
ENANCHAL SECURITY NOTICE	COUNTY OF CREETER
Scher Stadiots Extra 8 we have based accounted to the intervention of the second second second second second accounter of the second second second second second accounter of the second sec	(all 247711)
PRAATE STREET WANTENANCE ACREEMENT:	
NUIKE OF PROPOSED PRIVALE SINCE :	
PRIVATE STREET RIGHTS AND RESPONSEDUTES:	
NORCE OF EDSTING & PROPOSED SAVEARY SEVER- tion of the second sec	
NOTICE OF PROPOSED SEMER WAN DEDICATION:	(42807)
OFFER OF BLANKET EASEMENT:	CLAY, FORD AN IN OF F THE DAY OF THE
HOWE OWNERS ASSOCIATION NOTICE: A REMARK REAL & LEARNING AND A REAL AND A REMARK REAL REAL REAL A REMARK REAL REAL REAL REAL REAL REAL REAL REAL	HARDI & TE DAGA DOCH Y DO ESO DOGA, OCH ALAY, Reflam, TG W Y
STORMMATER FACILITY MAINTENANCE:	In the PLECKER & PLECKER TIME AND A DATES
	מדיר חנו אאונא
POIENTIAL WARE RECOVERTS:	
MARTIN & DUPON OF THE TAXABLE VIA THE BOT OF A DUPON OF THE STATE AND THE STATE IN THE STATE OF THE STATE AND THE STATE AND THE STATE IN THE STATE OF THE STATE AND THE ST	(בנה ט נגאבא היינו)
	STATEMENT OF COMPLIANCE (ENGINEER);
	STATEMENT OF COMPLIANCE (STORIWATER):
	I were store of the set of the se
PROFILE ALL B PROFILE ALL B PROFIL	(ACCH ACUL & A) (200)
ENAL PLAN RECORDENCE NOTICE	NOT AN EAST DEAL OF AN APPENDING A DE DATAS DE LA LA COMPANY DESTANT DEEL DE ANTANA DE LA LA CARDO DE
	(HEZ LETTERLY BAZZBALL HL) (SAT)
	PLAN
TIMBERM	R ILL, LLC
EAST COSIEN TOWNSHIP	CHESTER COUNTY, PA
COMMONWEALTH ENGINEER	S, NC. SKE as show
111 TAST LANCASTIR ADUE - SECON FLO COMPACTORY, FA 19335 TELLIPHONE: (\$10) 518-503 - FAX: (\$10) 518 COMPACTORI-LANC (\$10) 518	-9304 DED/2022 KC
	DRIMME AG. 202040-1 07: 33



	17 State	
1		A State A
/		3 13 12 12 212
	1000	The second for
5	S -X	A Contraction
í,	Section 4	SITE
3		
1	10,20	
1	0	1 - 12
1	1242	THE COLORED
	[[予太祝]]	ALL
-		
ŝ	12-2-12 22	AS BE AND AND AND
	and the second second	DEATION MAP
r i	SOLS IDENTIFICATION: IN CALCULATION AND AND AND AND AND AND AND AND AND AN	TOPSOIL APPLICATION NOTE:
È.	INTER A PARTY AND	PERMANENT SEED MIXTURE:
	M REPEARING THE R. R. H. I	AND BY ADDAY REDAY AND ADDAY
	A REPUBLICAN R. R. C.	TENPORARY SEED WOTURE:
5	THEE PROTECTION MEASURES AND NOTES:	SCHOOL STREET, S
	A MELLEN MELLE MELLEN AND AND AND AND AND AND AND AND AND AN	STOCK STOCK IN TANCING LIEACON
	NO & R POINTS IN ALL W. K UT PO & ALL WE WART THE O WHILL SHIT & WILLIAM & DOTE NOT A VIEW OF AND A 1200 YEAR NOT AN A DATA OF A DATA OF A DATA OF A 1200 YEAR NOT AND AN A DATA OF A DATA OF A DATA OF A 1200 YEAR NOT AND A DATA OF A DATA OF A DATA OF A 1200 YEAR NOT AND A DATA OF A DATA OF A DATA OF A 1200 YEAR OF A DATA OF A	S THE POT H CH C
	LA EAST OF CALL WARK SHI, & HAD TO THIS AND CONTROL OF THIS SHI, & ANTO OF COMES WHICH WE PRAY DIALS AND CAN CONTROL PRAY HAD AND DATE WIT THIS AND A WITH SHI, NO K OF CARD THAT HATCHING ON AND THE RANK.	IN LAST STORE & SAMO SERVE DAY IN A RAN ID
	THE AND BE AND	
	TO REAL PROPERTY FOR THE STREAM AND SALES AND ADDRESS OF AN ADDRESS AND ADDRES	STATE OF EVERATEL WERE BUS
~	DEMOLITION NOTES:	MUCH, UNE, FERTILIZER, SOO & SEED NOTES:
	SAUT ADJANCE. LEMAY MY ALLONG BUTT AN ESSLEDN IF ENGINEER ADORTS MAKE AREE THE WE WE SEATTHE FR.	AND PARTY OF A REAL PARTY AND A REAL PAR
	1 NOVE PROTECTOR FOR RECORD AND PROTECT. LINEWS AND PROF AND AND RECORD.	NO I NOT DUE MILLS & FI OLISTE PART DINNE DELETE DE DUE MILLE DE FI ANT DE MAR UN MEDICI MILLE EL MILLE DE DUE MILLE MEDICI MILLE EL MILLE DE DUE MILLE MILL
	ANTERN VING A TRANS PERS OF THE ANTAL ATTAS 193	INC. AND THE REPORT OF THE PARTY AND A THE PAR
	NOT ALL THE WE REALT TO BE AND AND ALL	THE REAL PROPERTY AND AND A PROPERTY
1	LONG AN LONG TO ADDRESS OF AN AND AN A TO ADDRESS AND A DRESS OF ADDRESS AND A	NE PODECO O SE A DESELLO O ADULA A DELLO DI ANI ALEMI O E COMODIO O AUTALI E COMO DI 2010 ALENDO ALENDO A DELLO DELLO ALENDO 2010 ALENDO ALENDO ALENDO ADULA ALENDO
2	Cardon Rolla Tarre for Month Te FE at Rolls. (RE /REC/COX	AND AN ADDA AND AN ANALY AND AN AND AND AND AND AN ALL AND AN A MANON AND AND AND AND AND A MONTANY AND AND AND AND AND AND AND AND AND AND AND AND AND AND AND AND AND AND
-	LEOC CONSTRUCTS	E ANT IN DARLEY MAN COMMANN IN LAW IN
	LEWISE Under Getre Dorthe Mer 1 Daelber DR. KLEN LLOPE S.L.E. 5 Dael Dr. Loter J.M. S. R. M. M. T.M.	STILL STUDY AND A REAL STATE OF A STATE AND A REAL AND
	THERE CORP. INVESTIGATION WARMAN AND AND A CONSULT OF STATEMENT AND AND A CONSULT OF STATEMENT OF SECONDARY	And schemen of the set
÷	Uncled acked and acted to rectar state provid at rectar from power. L rectar rectarion from Educity for and first set at 197822 at ordered	A AGED PALE OF BOX WELL BE & BERLIND VON DE AVAIL & DREED & ADDREAD WILL BE CONNECT MELLIND POLITIONS IN INC. PALE & GOMODO DI MA ACCES PALE PREDITIVE HOLT F INT A MALE OPEN DIA RECENT CONTRACT ON CONTRACT.
	Lange and the for the of the second to the second to the of the second to the second t	NOT WE ARE AN A REAL OWNERS AND A REAL AND AN AND AND AND AND AND AND AND AND
	LINET INCOME A LEVEL OF BRANCH OF BRANCH AND A LEVEL TO BE AND THE BRANCH AND BRANCH AND AND A REALT.	TEMPORARY SITE STABILIZATION REQUIREMENTS:
	And not writers used where be at the part, relative task of Alarth Black man writers.	WE IN DEPUTS FACE YOU FOR 14 CARENCE IS OFFICE FACE SOUL STATES IN MARKET SECTOR FACE OF THE W MARKET WORK FOR THE PROOF IS OF DEPUTS WAR I MARKET, WORK FOR MICH WILL BE AND ALL DEPUTS OF
	LINE A BAS HERE'S Y THE DAT	FINAL SITE STABILIZATION REQUIREMENTS:
	SXAL OF WITHIN A ROBALI AND REDA, USE PROVA NO PORE A REDAR MONTHING REGISTER, USE PROVA NO PORE	STALLES DATES LINE TO THE SEARCH AND LODG
	LVAGE FREMAN, SEE AS OF AN ACARDE ANALACE. 147 DOR AL HITMLE AN ADAMASE AN IOLUL	The weat of the period with the second state of the second state o
	ALL OUTS SALL & LEDWING AND ALL NO. OWNER DOWNER DO TO GATHER SHE	A A THE S AND AN A REAL OF A SEAR PARTY AND A REAL AND
	Lange of AL WORKS NOW TO THE DAY OF A DAY HAR TO USURDA BETWARD BY THE CONNECTS & N. REPORT OF D THE DAY.	LISTANT ALL OF ANY
6	LOS PERSON OF ALL SCHILL MERK HOLD BUTCH & ROUTH & N BERKORN ME ROUTH EAST HOLD BUT LOS IN ONLY BUTCH IN MEDIA OF AN AVENA EVEN COMPOSE BUTCH WERK HOLD AND HOLD AND HOLD IN AND IN A ROUTH OF HE	REFERENCE WAS NOT IN THE AND A MARKET MADRIE TO THE REFERENCE AND
	AND SERVICE AND	La contra la contra de la contra la contra de la contra d
1	MUNISINUCITOR WASTE DISPOSAL NOTE:	The way in the process of the party way in a single of which the single of the single
	INFORESTEN FROSNE CONDITIONS	GEOTEXTILE STABILIZATION REQUIREMENTS:
1	Is all an unrear part and a loss save and an in the period and by the cost of the same period and the most save to period. For all of the same save and	A AND AND A REAL PROOF DATE OF THE AND AND A AND AND A AND AND A AND AND A
1	THE WAY I AND THE REAL PROPERTY AND AN ANALY AND A REAL	SCAT STURIZOTON
/	The second state and a second at a second state of a	
	Decision of Policity of the state of the second sec	1'er 1'er
	A DET OF NEW PERCENCE STANDARD PROVIDENT AND	S - CONSULAR SALE BY S - CONSULAR SALE BY
1	SPRINGS & SEEPS NOTICE:	BAR REALT BAR REALTERS
	SEDMENT TRACKING NOTICE:	WEVERATING BEAMINET INSTALLATION DETAIL
	NAME AND ADDRESS AND ADDRESS A	THE REAL PROPERTY AND A RE
	ARCHAEOLOGICAL RESOURCE NOTICE:	The set of
	PERSON WITH THE PROPERTY AND ADDR AND, T WE ADDRESS AND ADDRESS AN	Search and the search of the
+		ON DIAN
1	DEMOLITI	
	PRELIMINARY SUBDIVISION AN	D LAND DEVELOPMENT PLANS
	TIMBERM	ILL, LLC OFFIR CONTY PA
ť		STE SOTDIO 13, 7231 SHEET:
	COMMONWEALTH ENGINEER	S, INC.
1	THE EAST LANCASTER ADALE ~ SECOND R.C.	208 2004 2008 KC 2
	COMENCOCE-1.00M	DEDUID: 10
1		protes in instant with





A second contraction of the	A PART
	MESTER SP
State State	SITE
	ALCON ACC
	A SA ARE REAL
20-20-20 L	LOCATION MAP (NOME 1" - 2000)
ZONING: R2 LOW DENSITY RESIDENTIAL DISTRICT POINT CONTRACT RESIDENTIAL DISTRICT POINT CONTRACT RESIDENTIAL DISTRICT POINT CONTRACT RESIDENTIAL DISTRICT	CONTRAL MOTES:
	LE DELLA A RUE LE DELLA A RUE LE DELLA A RUE LE DELLA A RUE RUELA OF ADDRESS AND A RUE RUELA OF ADDRESS AND A RUE RUELA OF ADDRESS AND A RUELAND
HALL ALSO CONCE THE PART OF TH	
THE REPORT OF A DECK OF A	
SOLS DENDERATION: NO CUT III NO UNI ACCOMPANY AND ON NO ST ME FILSE NO CUT III NO UNI ACCOMPANY AND ON NO ST ME FILSE NO CUT III NO CUT III NO CUT III NO ST ME CUT III NO CUT III CUT III NO CUT IIII NO CUT III NO CUT II NO CUT II NO CUT II NO CUT III NO CUT III NO CUT II NO CUT III NO CUT II NO	
Matrix         District (10)         District (10) </td <td></td>	
OFFER OF BLAKKET EASEMENT:	
HAND COULD A BANK A HAND A HAND AND AND AND AND AND AND AND AND AND	ALL AND A DESCRIPTION AND A DE
TA A WE IN THE HE POCKET AND AND AND A REAL	COMMONWEALTH OF PENNSILVANA
NOTICE OF PROPOSED PRIVATE STREET:	COUNTY OF CHESTER
PRIVATE STREET ROATS AND RESPONSIBILITIES:	No W L CERE BAR S L NO WE WE HO ENGLER H
STORMATER FACILITY WANTERWICE	FEED IN HAD BO SC HE DE HAD DE
A COLOR MANAGE AN A STANDAY MANAGE AND A COLOR MAY A MARTINE DECLARS INCOME IN MARCH AND AND A COLOR MAY A STANDAY AND AND AND AND AND AND A CALL AND AND AND A CALL AND	
I taken with heat of the status a manager at a manager a status and the case i heat, so that a status and a factor of the near model. He based with not i the or an another school near and the status is the with and the status into a status. Not status based and the status and status into a status. Not status based and the status and status into a status into status based and the status and status into a status into status based and the status and status into status and status and status into a status into status and status and status into a status into status and status and status into a status into status and status and status and status and status and status and status and status and status and status and status and status and status and status and status a	(000 ALL OF 00 (000)
WYENGEND FOWER UNE NOTICE: OWICH WE ARE UNE BUILT RICH & DEAL ALMA, THE ALL PRACE PORT UND & RECEIPT DE RECEIPT DEREAL CONSCIPTION & AND THE DE RECEIPT DE RECEIPT DE RECEIPT DESCRIPTION OF THE DE RECEIPT DE RECEIPT DE RECEIPT DESCRIPTIONS OF THE DEREMENT DE RECEIPT DE RECEIPT DE RECEIPT DE RECEIPT DE RECEIPT DE RECEIPT DE RECE	NOOD & 14 KINT & MANUAL & LIG END LINKIN PLAT
STREET SIGN MOTES: Uncer proto income works are income unterest a measure but will be manager of and the sign of the income income and the sign and the sign of the sign of the sign income and the sign of the sign of the sign of the sign income and the sign of the sign of the sign of the sign income and the sign of the sign	(42 0000)
POST PLAN NOTCE	(4000) ATTOOL & TIC AMING GAMERIC & CAT EN-CA DINOVI, DOTA GUAR, ROBELING, THE IN B IN B IN B IN D
SENSITIVE RESOURCE WAP NOTICE:	(5464)
PROPOSED MPERVOUS CONTRACE SUMMARY:	
LIT I TRE MONOS ANT COUP	Tig Au of Karal # Is been Darn Anne Darna Corts
	Ausse marries and
Let and a local and a local way that a local way that a local and a local way that a local	CORD & N. PTC & S. CERCU & S.C. & M. S. OGEN SKY, Nature, N. Tablad A. B. B. S.
Internet and a series of the s	STATEMENT OF COMPLIANCE (ENGINEER):
LIT I THE WINGS AND A LINE S AN	STATEMENT OF COMPLIANCE (STORMMATER):
HORE CIERCE : CELL	NOTE ALL & AN IL DOT
NOTE PROPOSED CONFINE CALDULATONS FER CALD TO THE ROAT-OF-WAY LINE OF THE APARTE ROAD RECURRED RECURATORY APPROVALS:	TATA DESIGNAL DE LA DE LEGIS DE LA TATA DE LA DESIGNA DE MENALES TATA DE LA LA DEL LA DE MENALE DE LA DECEMBRA DE LA LA DESIGNA TATA DE LA DECEMBRA DE MENALES DE LA DESIGNALES TATA DE LA DECEMBRA DE LA DEL LA DECEMBRA DE LA DESIGNALES TATA DE LA DECEMBRA DE LA DEL LA DEL LA DEL LA DEL LA DEL TATA DE LA DELLA DEL LA DELLA D
TRUE BELLAN FREE AND REAL AND REAL DESIGNED REAL TODAL FREE AND REAL AND REAL AND REAL AND REAL AND REAL AND REAL REAL AND REAL A	pari nanos sei ner, usi (neri)
PAVING & LA	YOUT PLAN
FRELININART SUBJITISION AND FOR TIMPERMI	LAND DEVELOPMENT PLANS
CAST GOSHEN TOKISHP	CHESTER COUNTY, PA
COMMONWEALTH ENGINEERS	R SHARES CO
TELEPHONE: (810) 518-5001 FOC: (810) 518- COMENCACE: 1.00W	04040 040002 VC



_	
2	
1	TO SAMPLE
	A THE FEATRE
i	SITE ST
1	
11	
-	
~	
r	LOCATION MAP
4	(SOLE 1' = 2007) ZONING: R2 LOW DENSTLY RESIDENTIAL DISTRICT GENERAL NOTES:
3	
1	HARE RECEIVE TO COME A CONTRACT OF A CONTRAC
	The second secon
	L DA RECU DA RECU DATA DA LA RETARDA DA LA REFERENCIA DA LA RECENTARIA NOTA (CON 2010) DE RECU DA RECU DATA DA RECU DA RECU RECU (CON 2010) DE RECU DA RECU DA RECU DA RECU La la la ser da recurranza de recultar de Recul Alta da Recu
	<ul> <li>The second second</li></ul>
0	PARTICLE STATE AND ALL TO A STATE AND A ST
	Notice of the second se
	AMARYCE KOCKETE.
)	
~	
_	
2	
- A	
1	
1	
1	
/	
11	
/	
_	CT
-	DOCH ODIDING DI IN
F	PERIMINARY SUBDIVISION AND LAND DEVELOPMENT DI LUS
-	FOR TIMBERMILL LLC
-	EAST COSHEN TOMINSHIP TATLED DAVID TUDE, DUC OLESTOR COUNTY, PA
	COMMONWEALTH ENGINEERS, INC.
T	THE DECEMPTION OF A LAUGH (10) S18-8004 (0-EDTE)
	DALLAR NO 20149-1 07 13