Gannett Fleming

Excellence Delivered As Promised

March 27, 2017

Mr. Steven Kepler
Pennsylvania Fish and Boat Commission
Division of Environmental Services
450 Robinson Lane
Bellefonte, PA 16823

Subject: **Drawdown Permit and Eastern Redbelly Turtle Capture & Relocation Work Plan**
Hazard Classification Reduction of Milltown Dam (DEP ID No. D15-146)
East Goshen Township, Chester County, Pennsylvania

Dear Mr. Kepler,

East Goshen Township (Township) owns and operates Milltown Dam (DEP ID No. D15-146) as a recreational facility. The dam is currently classified as a High Hazard (C-1) structure and the Spillway Design Flood (SDF) is currently established as the 1/2 Probable Maximum Flood (PMF). Constructed in 1923-1924, the structure no longer complies with current dam safety regulations, the most significant of which is inadequate spillway capacity. In order to address dam safety concerns, the Township is proposing to reduce the hazard classification of Milltown Dam which will reduce the SDF from the ½ PMF to the 100-year storm. This will be accomplished by lowering the existing spillway and right embankment which in turn will eliminate the permanent pool and reduce the storage volume impounded by this structure, reducing the potential for downstream consequences in the unlikely event of a dam failure and uncontrolled release of water. In preparation for the embankment lowering project which is anticipated to occur in 2018, the Township is proposing to permanently dewater the reservoir in 2017 in order to establish a vegetative ground cover throughout the reservoir. The dewatering activities will require approval from both the Pennsylvania Fish and Boat Commission through a "Permit to Draw Off Water from Impoundments" and from the Department of Environmental Protection (DEP), Division of Dam Safety, for modifications to the existing dam in support of the drawdown activities.

The Township currently holds a Permit to Draw Off Water From Impoundments (Permit #31-15) which is effective from May 1, 2015 through August 31, 2017 (refer to Attachment A) and is herein requesting that this permit be extended for two years.

The following information is provided in support of the Township's request to permanently dewater the reservoir formed by Milltown Dam.

Gannett Fleming, Inc.

P.O. Box 67100 • Harrisburg, PA 17106-7100 | 207 Senate Avenue • Camp Hill, PA 17011-2316
t: 717.763.7211 • f: 717.763.8150
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Background Information

Milltown Dam (39° 58' 2.97" N; 75°32'39.45" W) and reservoir are situated on and discharge to East Branch of Chester Creek and are bounded by East Strasburg Road to the north, Reservoir Road to the west and West Chester Pike (Route 3) is located approximately 600-feet to the south of the dam. The 6.3 square mile drainage area extends to the north into West Goshen Township and primarily consists of residential type development. The location of the dam and the contributing watershed are shown on the Watershed Map provided within Attachment B. Photographs of Milltown Dam and the surrounding area are provided in Attachment C.

Permitted in 1921 by the Water Supply Commission of Pennsylvania, Milltown Dam and Reservoir were originally constructed as an extension of the water supply system for the Borough of West Chester as a water storage reservoir with a storage capacity of 21,835,000 gallons. Constructed between 1923 and 1924, Milltown Dam is an earthen embankment dam with a concrete core wall, a concrete ogee spillway and valve house. The dam has a maximum height of approximately 20 feet and is 350 feet long. The 69-foot long concrete ogee spillway was constructed at the former location of the East Branch Chester Creek stream channel. The valve house is located on the crest of the dam adjacent to the spillway and is situated directly over the value chamber. The valve house contains the controls for the low level dewatering system which consists of two intake conduits (16-inch and a 24-inch) and a 24-inch discharge pipe that releases to East Branch Chester Creek.

By 1961, heavy sedimentation had reduced functionality of Milltown Reservoir as a water supply reservoir and in 1984, the West Chester Area Municipal Authority (WCAMA) transferred ownership of Milltown Dam to Mr. Robert Wiggins. In 1985, Mr. Wiggins grants the tract of land containing Milltown Dam and Reservoir to East Goshen Township who immediately made improvements to the dam including armoring the upstream and downstream embankment slopes with riprap, reconstructing the upper portions of the spillway training walls, reconstructing portions of the spillway, and replacing dislodged riprap below the spillway. Since the 1985 rehabilitation project, maintenance and repair activities have included the addition of trash racks to the low level intake conduits, raising the left embankment by 18-inches by adding riprap, slush grouting of riprap on the downstream right embankment, surface concrete repairs on the spillway, and valve stem and guide replacements on the 24-inch sluice gate within the valve chamber.

The improvements associated with the proposed hazard classification reduction project will ultimately lower the concrete spillway crest by approximately 5.7-feet which will place the lowered crest at or near the top of sediment elevation within the reservoir. This will eliminate the permanent pool of the reservoir. The right embankment of the dam will also be lowered to a point approximately 3.5-feet above the lowered spillway crest. This configuration will maintain daily flows within the spillway channel and will nearly eliminate the entire storage volume of the reservoir, resulting in a reduced hazard classification for this structure.

Redbelly Turtle Capture and Relocation Work Plan

Based on the results of the PNDI Search for this project (Project Search ID PNDI-614355) performed on November 13, 2016, it is our understanding that Milltown Reservoir is known to support redbelly turtles (*Pseudemys rubriventris*) which are a PA State-listed Threatened species. In support of the drawdown permit, the Township is proposing to capture and relocate redbelly turtles from the reservoir prior to the start of the drawdown activities. The services of DuBois Environmental Consultants LLC (DuBois), who as a listed, qualified surveyor for redbelly turtles, have been secured to perform this task. The capture and relocation plan as prepared by DuBois is provided within Attachment D.

Drawdown Approach and Schedule

In anticipation of Milltown Dam Hazard Reduction Project, the Township wishes to permanently dewater the reservoir in a phased approach beginning in the spring of 2017. It is anticipated that the phased drawdown will be accomplished by notching the existing concrete spillway to predetermined elevations. Each subsequent phase will be initiated by the Township once the previously exposed portions of the reservoir bed have been vegetated. The first phase (Phase 1) will lower the spillway crest by approximately 14-inches. Phase 2 and 3 will subsequently lower the spillway crest in 18-inch increments. Refer to Attachment E for plan drawings showing the proposed modifications to the spillway crest and a plan view showing the anticipated area of the reservoir to be exposed with each phase of the drawdown. It is anticipated that the Township will follow with the Hazard Classification Reduction Project in 2018 that will complete the lowering of the principal spillway and right embankment.

The following schedule is anticipated:

April 2017:	Obtain approval from PFBC and DEP Dam Safety to proceed with Redbelly Turtle Capture and Relocation Program, secure drawdown permit & obtain approval of spillway notching approach.
April-May 2017:	Implement Redbelly Turtle Capture and Relocation Program (20 days).
May 2017:	Phase 1 reservoir drawdown (lower spillway crest to El. 341.0). See Note.
July 2017:	Phase 2 reservoir drawdown (lower spillway crest to El. 339.5). See Note.
September 2017:	Phase 3 reservoir drawdown (lower spillway crest to El. 338.0). See Note.
2018:	Set spillway crest to final elevation as part of the Hazard Reduction Project.

Note: Phase 1 spillway lowering will immediately follow the 20-day redbelly turtle capture and relocation program. The Phase 2 and Phase 3 spillway lowerings will be dependent upon establishment of vegetation within those portions of the reservoir exposed by the Phase 1 and Phase 2 lowerings, respectively.

On behalf of the Township, we herein request 1) authorization from the PFBC to proceed with the Redbelly Turtle Capture and Relocation Plan (a copy of this letter has been sent to Ms. Kathy Gipe for her review), and 2) a two year extension of the Township's current Permit #31-15, Permit to Draw Off Water From Impoundments. This information is being sent concurrently to DEP, Division of Dam Safety for approval of the spillway modifications associated with the drawdown activities.

If you have any questions about the proposed work activities, please do not hesitate to call me or Mr. David Graff of our office at 717-763-7212, extensions 2828 and 2073, respectively. We thank you for your attention to this request.

Sincerely,

GANNETT FLEMING, INC.
Environmental Resources Division

Eric C. Neast

ERIC C. NEAST, P.E.
Project Manager
Dams and Hydraulics Section

Enclosures

xc: Rick Smith, East Goshen Township
Kathy Gipe, PFBC
Desmond Reynolds, DEP Dam Safety
Dave Graff, Gannett Fleming

ATTACHMENT A
Township's Existing Permit to Draw Off Water From Impoundments

Permit Number

31 - 15

PFBC DD-02
Rev. 2/05

Commonwealth of Pennsylvania
Fish and Boat Commission - Department of Environmental Protection

PERMIT TO DRAW OFF WATER FROM IMPOUNDMENTS

Information submitted by the applicant has been reviewed by the Pennsylvania Fish and Boat Commission (PFBC) and Department of Environmental Protection - Division of Dam Safety (DEP), and upon approval, becomes a permit under Section 3506 of the Fish and Boat Code, Title 30 Pa. C. S. and Section 51.81 of the Fishing and Boating Regulations, Title 58, Pa. Code. The permit is valid only for the effective permit dates specified. Any changes from the permit application shown below have been made by reviewing agencies to improve safety, address site-specific issues, coordinate with other regulated

Permittee: *East Goshen Township*

Street: *1580 Paoli Pike*

City: *West Chester* **State:** *PA* **Zip Code:** *19380-6199*

County: *Chester* **Municipality:** *East Goshen Township*

Impoundment name *Milltown Reservoir* **DEP ID #** *15-146*

Impoundment area: *12 acres* **Maximum depth:** *16 feet*

Receiving stream: *Chester Creek*

Approved depth of drawdown: *16 feet below normal pool level*

Effective permit dates: *5/1/2015 to 8/31/2017*

This permit is subject to the specifications listed above and the conditions and requirements indicated below. Failure of the permittee or agents acting on behalf of the permittee to follow approved specifications, conditions and requirements immediately renders this permit null and void.

Standard Permit Conditions A through G are found on the attached page and apply to this permit unless specifically modified.

Agency	Reviewer	Title	Date
Department of Environmental Protection	Roger Adams	Chief, Division of Dam Safety	4/20/2015

Permit conditions and requirements:

The permittee must follow DEP's best management practices for "Minimizing Sediment Pollution to Downstream Channels During Impoundment Dewatering."
During the refilling of the reservoir, the permittee shall allow a sufficient flow of water into the stream below the dam to support fish and other aquatic life and to preserve the water quality in the stream. Proposed breach plan must also be submitted to the Division of Dam Safety for review and approval. State and federal approvals and/or permits may be required. Applicant should submit breach plan, including spoil area information, and photos of the dam, the impoundment area and any spoil area. Call Jack Kraeuter at 717-772-5959 with questions.

				Approve	Disapprove
Pennsylvania Fish and Boat Commission	Steven Kepler	Fisheries Biologist	4/23/2015	X	

Permit conditions and requirements:

PERMIT TO DRAW OFF WATER FROM IMPOUNDMENTS - STANDARD CONDITIONS

A. During the permit period, the permittee is authorized to take, catch, kill or possess fish from the waters drawn down, regardless of seasons, sizes, limits or manner of taking. Any disposal of fish must be done in conformance with appropriate state and local laws and regulations. Restocking of fish to another water requires owner permission. This condition may be modified at the discretion of the Fish and Boat Commission to accommodate concerns regarding fish, reptiles, amphibians or aquatic life specific to the water body affected by the drawdown.

B. This permit does not authorize withdrawal of water in any manner inconsistent with or in violation of existing laws governing downstream flooding.

C. Should this drawdown involve the disturbance of earth within or outside the impoundment, the disturbed sediments must be stabilized and placed in an area outside the floodway of any stream channel or any body of water, including lakes, ponds and reservoirs and wetlands. The floodway is marked on flood insurance maps; or is 50 feet from the top of the stream bank if there is no map. Additionally, this earth disturbance may require a plan or permit pursuant to the Clean Streams Law, Chapter 102 – Erosion Control Regulations. It is the permittee's responsibility to contact the local County Conservation District for any additional requirements.

D. If structural repairs or extensions of any kind are to be made to the dam, a separate permit may be required for this work from DEP-Division of Dam Safety, P. O. Box 8554, Harrisburg, PA 17105, before a draw down permit will be issued.

E. Except when the purpose of the permitted drawdown is to remove or eliminate the impoundment, the permittee shall refill the impoundment when the permit expires or the work is completed, whichever occurs first.

F. If work cannot be completed in the period approved, application for permit extension or a new permit must be made *at least 30 days prior to the permit expiration date.*

G. The impoundment owner or person in charge must, at all times, permit sufficient water to flow into the stream below so that fish and aquatic life will be protected.

MINIMIZING SEDIMENT POLLUTION TO DOWNSTREAM CHANNELS DURING IMPOUNDMENT DEWATERING

I. BREACHING DAMS

A. Impoundment Area

1. Wherever possible, the impounded water should be lowered in **stages**.

   a. The initial discharge should be relatively free of sediment and, therefore, should not require filtering prior to entering the stream channel below.

   b. As the water level approaches the level of accumulated sediment, the potential for re-suspending sediment increases. If possible, the rate of discharge should decrease as the water level decreases. IF DOWNSTREAM CONTROL MEASURES ARE USED, THEY SHOULD BE IN PLACE BEFORE THIS PHASE OF DEWATERING BEGINS.

2. Where feasible and practical, consideration should be given to excavating existing sediment deposition before drawdown begins or as drawdown progresses.

3. Areas exposed by the falling water levels should be **stabilized** as soon as possible following their exposure.

4. The stream through the impoundment area should be evaluated for stability. Consideration should be given to stabilizing the stream, if necessary, using natural stream design or other concepts.

5. Materials removed from the impoundment area should be taken to a waste disposal area having suitable control facilities in place (see Section D below). The erosion and sediment pollution control plan for the waste disposal area should be approved by the local **County Conservation District** prior to its implementation.

B. Breaching Area

1. During the final stages of dewatering, the breaching area should be isolated from the upstream impoundment area by means of a **cofferdam** until the breaching is completed and stabilized. Upstream flow should be diverted around the work area by means of a **temporary bypass** channel or pipe during this stage.

2. Once the breaching area has been stabilized, the temporary bypass and cofferdam should be removed.

C. Downstream Control Measures

1. If a secondary outlet channel exists (e.g. from the riser outlet to the main channel of an impoundment with a sluice type principal spillway) breaching should take place at a

location (or locations) that will allow temporary discharge into the secondary outlet channel and permanent discharge into the main channel.

a. **Rock Filters** may be installed in the outlet channel at locations above the point where it enters the main channel.

b. Since these filters must be constantly maintained throughout the project, they should be located where they will be **easily accessible**.

2. **Outlet Basins** may be used to collect sediment.

a. Rock filters may be installed across the outlet of the basin to filter water prior to discharge.

b. It is important to keep the outlet basin cleaned out and to maintain the rock filter since failure to do so could result in backing up of water into the breaching area.

D. Waste Disposal Areas

1. Materials removed from the impoundment area or breaching area, as well as sediment removed from control facilities should be taken to a disposal area with an E&S plan approved by the local Conservation District.

2. Waste material and control facilities should be kept outside of the floodplain and floodway. Waste material and control facilities should not be placed in wetlands.

3. Waste material that is at or near saturation should be placed behind an **earthen berm**. One or more rock filter outlets are recommended to allow dewatering of the material.

4. Upslope runoff should be diverted away from the waste disposal area wherever possible.

5. Wherever it is necessary to cross an existing stream channel (defined bed and bank) to access the waste or borrow area, a **temporary culvert pipe** should be provided. Only clean rock fill should be used to cover the pipe (not earthen materials). The approaches to the stream crossing should be stabilized with AASHTO #1 stone for at least 25' on both sides.

6. As portions of the waste reach final grade, they should be seeded and mulched. If this occurs during a non-germinating season, a mulch cover should be provided until the beginning of the next germinating season.

II. TEMPORARY DRAWDOWN

A. Impoundment Area

1. Wherever possible, the impounded water should be lowered in **stages**.

a. The initial discharge should be relatively free of sediment and, therefore, should not require filtering prior to entering the stream channel below.

b. As the water level approaches the level of accumulated sediment, the potential for re-suspending sediment increases. If possible, the rate of discharge should decrease as the water level decreases. IF DOWNSTREAM CONTROL MEASURES ARE USED, THEY SHOULD BE IN PLACE BEFORE THIS PHASE OF DEWATERING BEGINS.

2. Where feasible and practical, consideration should be given to excavating existing sediment deposition before drawdown begins or as drawdown progresses.

3. Areas exposed by the falling water level need not be stabilized.

4. Materials removed from the impoundment area should be taken to a waste disposal area having suitable control facilities in place (see Section D below). The erosion and sediment pollution control plan for the waste disposal area should be approved by the local **County Conservation District** prior to its implementation.

B. Work Area

1. During the final stages of dewatering, the work area should be isolated from the upstream impoundment area by means of a **cofferdam** until the work is completed and stabilized. Upstream flow should be diverted around the work area by means of a **temporary bypass** channel or pipe during this stage.

2. Water accumulating in the work area should either be pumped from a **filtering device** similar to the "Sediment Storage Dewatering Device" (see Figure 1) or to a filter bag (see Figure 2) located outside the impoundment.

3. Once the repairs, etc. have been completed and the disturbed areas stabilized, the temporary bypass and cofferdam should be removed.

C. Downstream Control Measures

1. If a secondary outlet channel exists (e.g. from the riser outlet to the main channel of an impoundment with a sluice type principal spillway) breaching should take place at a location (or locations) that will allow temporary discharge into the secondary outlet channel and permanent discharge into the main channel.

   a. **Rock filters** may be installed in the outlet channel at locations above the point where it enters the main channel.

   b. Since these filters must be constantly maintained throughout the project, they should be located where they will be easily **accessible**.

2. **Outlet Basins** may be used to collect sediment.

   a. Rock filters may be installed across the outlet of the basin to filter water prior to discharge.

b. It is important to keep the outlet basin cleaned out and to maintain the rock filter since failure to do so could result in backing up of water into the breaching area.

D. Waste Disposal Areas

1. Materials removed from the impoundment area or breaching area, as well as sediment removed from control facilities should be taken to an approved (by the local Conservation District) disposal area.

2. Waste material and control facilities should be kept outside of the floodplain and floodway. Waste material and control facilities should not be placed in wetlands.

3. Waste material that is at or near saturation should be placed behind an **earthen berm.** One or more rock filter outlets are recommended to allow dewatering of the material.

4. Upslope runoff should be diverted away from the waste disposal area wherever possible.

5. Wherever it is necessary to cross an existing stream channel (defined bed and bank) to access the waste or borrow area, a **temporary culvert pipe** should be provided. Only clean rock fill should be used to cover the pipe (not earthen materials). The approaches to the stream crossing should be stabilized with AASHTO #1 stone for at least 25' on both sides.

6. As portions of the waste reach final grade, they should be seeded and mulched. If this occurs during a non-germinating season, a mulch cover should be provided until the beginning of the next germinating season.

FIGURE 1

Sediment Storage Dewatering Device

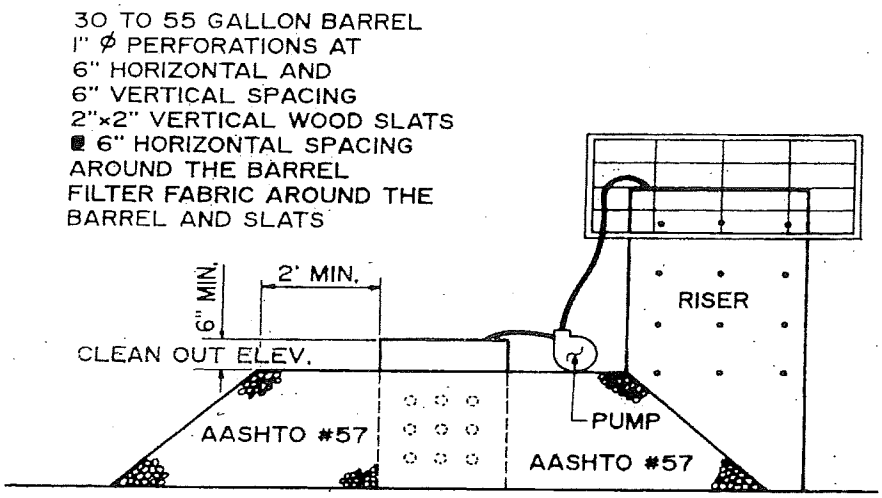
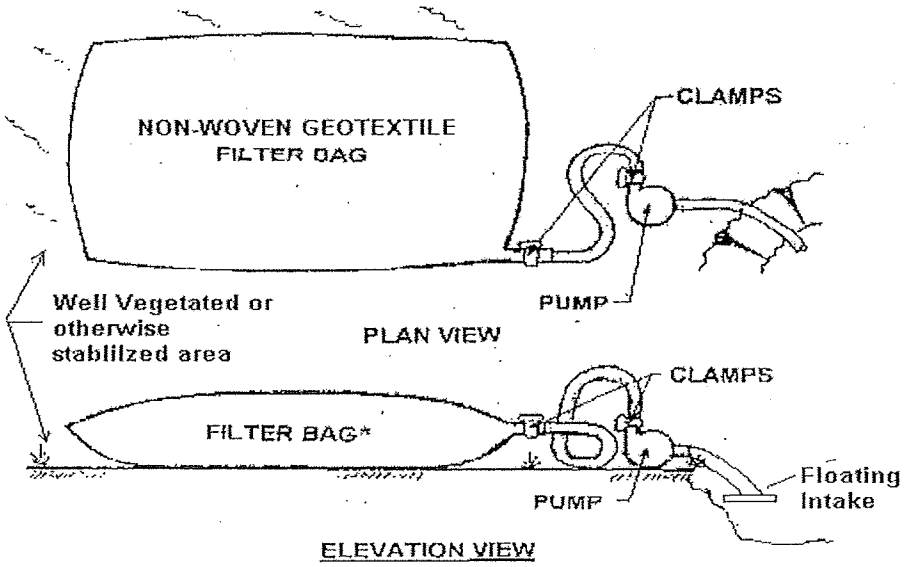
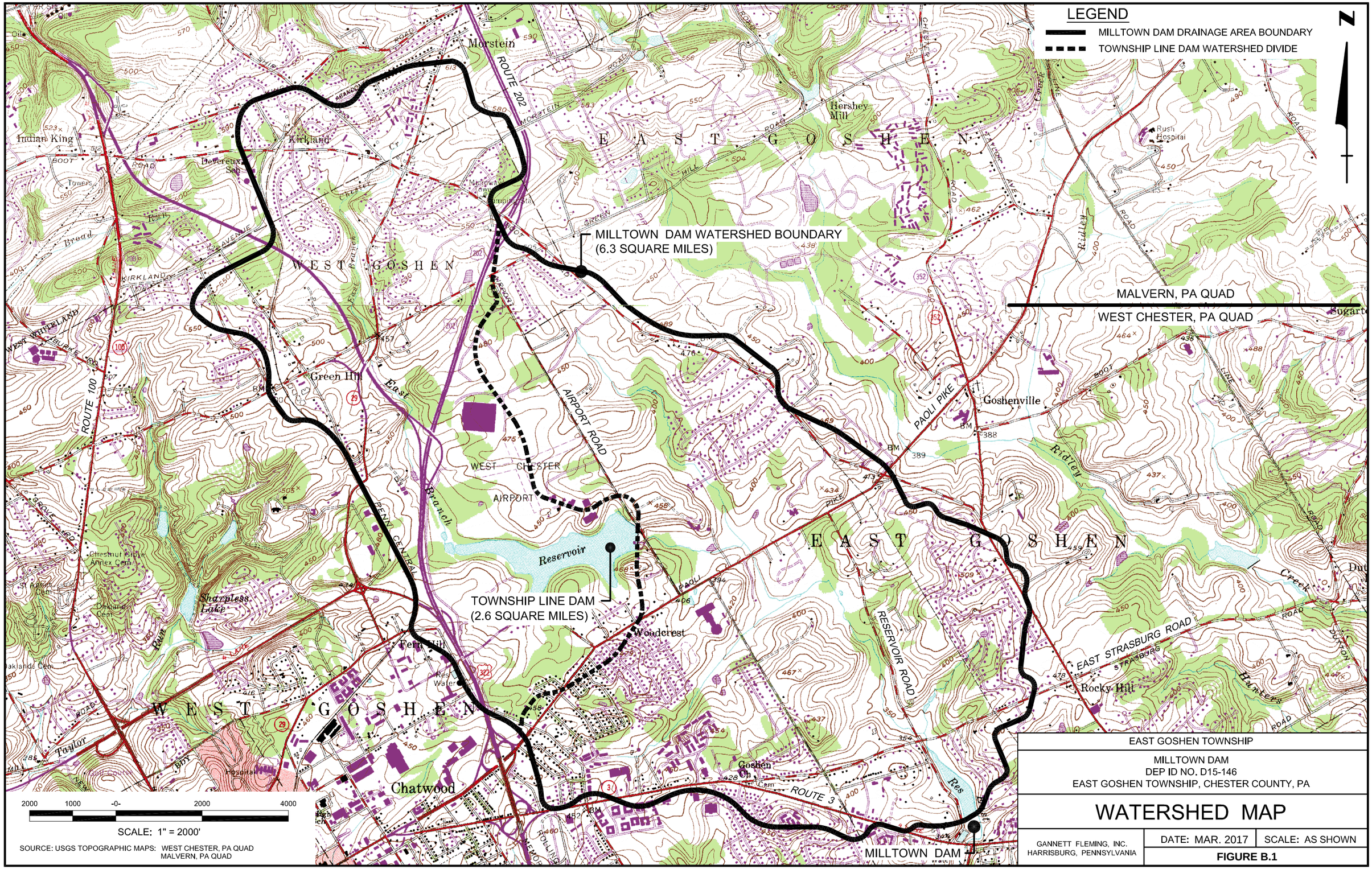


FIGURE 2

Pumped Water Filter Bag Details



ATTACHMENT B
Milltown Dam Location and Watershed Map



EAST GOSHEN TOWNSHIP

MILLTOWN DAM
DEP ID NO. D15-146
EAST GOSHEN TOWNSHIP, CHESTER COUNTY, PA

WATERSHED MAP

GANNETT FLEMING, INC.
HARRISBURG, PENNSYLVANIA

DATE: MAR. 2017 | SCALE: AS SHOWN

FIGURE B.1

ATTACHMENT C
Photographs of Milltown Dam

Photo 1
Standing at the principal spillway looking upstream at Milltown Reservoir.
(Reservoir Road located along left side of photo)

Photo 2
View of upstream slope of Milltown Dam right embankment.

Photographs taken on July 21, 2016

Photo 3
View of downstream slope of Milltown Dam right embankment.

Photo 4
View of ogee spillway crest with low flow notch.
(Standing with back to valve house looking towards left abutment)

Photographs taken on July 21, 2016

Photo 5
View from left embankment looking at Valve House and downstream face of concrete spillway.

Photo 6
Standing below right embankment looking at downstream face of concrete spillway.

Photographs taken on July 21, 2016

Photo 7
Standing below spillway looking downstream at receiving channel.
(East Branch Chester Creek)

ATTACHMENT D
Redbelly Turtle Capture and Relocation Work Plan

DuBois Environmental Consultants, LLC

D1389.001
March 13, 2017

Ms. Kathy Gipe
Natural Diversity Section
Pennsylvania Fish and Boat Commission
450 Robinson Lane
Bellefonte, PA 16823

Re: Proposed Eastern Redbelly Turtle
Capture & Relocation Work Plan
Milltown Reservoir
East Goshen Township, Chester County, PA

Dear Ms. Gipe:

DuBois Environmental Consultants (DEC) was contracted by Gannet Fleming, Inc. to conduct an eastern redbelly turtle (*Pseudemys rubriventris*) Phase III survey/salvage throughout the Milltown Reservoir. The proposed drawdown of the reservoir will coincide with the termination of the dam structure due to age and safety concerns. Redbelly turtles are known to be present at this reservoir and are protected by the Pennsylvania Fish and Boat Commission (PAFBC). The goal of the trapping and relocation project is capture as many redbelly turtles as possible within a 20-day period and relocate to other known ponds and lakes in the vicinity of Chester Creek. Gannet Fleming proposes to dewater the entire reservoir, after which it will remain drained and half the dam removed. The drawdown plan is to begin lowering the pool elevation in 1 foot increments. This work plan has been prepared to develop pre-survey coordination with the Fish and Boat Commission and receive concurrence on our proposed methodologies.

Site Location

The project is located at the Milltown Reservoir, situated within East Goshen Township, Chester County, Pennsylvania. The lake has frontage on Reservoir Road to the west, and West Chester Pike to the south. E. Strasburg Road is located along the northern boundary but does not grant access to the lake itself (refer to *Figure 1: Pennsylvania Road Map*). The reservoir is located on the West Chester U.S.G.S. Quadrangle with NAD83 coordinates of - 75.545309 W, 39.968863 N located at the approximate center of the site (refer to *Figure 2: West Chester USGS Quadrangle Map*). Adjacent land-coverage consists predominantly of residential communities (refer to *Figure 3: Milltown Reservoir Aerial Map*). The parcel is located in the Lower Delaware (HUC 8) and East Branch Chester Creek (HUC 12) watersheds.

249 South Main Street · Suite 6 · Barnegat · New Jersey · 08005
Phone: 609-488-2857 or 609-488-2859
www.denviro.com

Proposed Project

The dam at the Milltown Reservoir is to be removed due to age and safety concerns by reducing the height of the structure and thereby reducing the storage volume retained by the structure. The removal of the dam and de-watering of the reservoir will re-establish the stream, therefore habitat for the redbelly turtle at the Milltown Reservoir will become non-existent. In an effort to relocate the target species, relocation areas were evaluated to verify that the habitat meets suitable criteria to support the redbelly turtle population, including size, potential available food sources, water quality, vicinity to the Milltown Reservoir, and any other potential limiting factors. These habitats include Westtown Lake, Penn Woods Pond, Marydell Pond and Bow Tree 1 Pond (refer to *Figure 4: Redbelly Turtle Relocation Pond Map*). The aforementioned ponds/lakes are all located within the same watershed, with the exception of Bow Tree 1 Pond, which is located within the Ridley Creek watershed. Below is a brief description of each potential relocation area.

Westtown Lake

The Westtown Lake is situated on the property of The Westtown School in Westtown Township. Adjacent land-coverage consists predominantly of wooded upland and wetland communities. This lake is known to inhabit redbelly turtles and was part of a trapping and relocation project conducted by DEC. The entire open water area is considered as a suitable relocation habitat and is approximately 13.46 acres.

Penn Woods Pond

Penn Woods Pond is ecologically connected to the Westtown Lake through a natural wooded wetland corridor between the two (2) habitat areas. This pond is known to contain redbelly turtles and was used in the past to serve as a relocation pond for the Westtown School redbelly turtle project by DEC. Overall, the entire open water area considered as suitable relocation habitat is approximately 1.4 acres.

Marydell Pond

This pond is ecologically connected to the Milltown Reservoir through a natural wooded wetland corridor between the two (2) habitat areas. The pond is associated with one larger aquatic area to the west. Overall, the entire open water area considered as suitable relocation habitat is approximately 3.0 acres.

Bow Tree 1 Pond

This pond is not ecologically connected to the Milltown Reservoir, however is associated with a larger aquatic area to the east and west along the Ridley Creek. Overall, the entire open water area considered as suitable relocation habitat is approximately 2.0 acres.

Methodologies

DEC shall obtain a valid scientific collecting permit from the PAFBC which will authorize the collection and release of any captured redbelly turtles to the aforementioned relocation ponds. The Phase III survey will incorporate the following:

- The surveys will commence between April 1st to April 30th and will encompass a twenty (20) day trapping period. The start of the survey is weather dependent.
- Trapping will commence when the ambient air temperature is a minimum of 55°F
- A minimum of twenty (20) survey dates will be performed and a minimum of eight (8) man hours will be expended per day.
- At the time of the drawdown, DEC will conduct three (3) more days of opportunistic and random surveys to move additional turtles that do not go into the traps.
- All types of terrestrial turtle activities will be recorded (nest construction, completed nests, predated nests, semi-completed nests, egg laying) of all turtle species.
- Each redbelly turtle encountered will be photo-documented by taking pictures of the carapace, plastron and face/neck markings. For each turtle encountered, information including the sex, carapace length (straight line and maximum length), carapace width, weight and details (i.e. scars/injuries) will be collected. Each redbelly turtle will be marked in a manner consistent with the appropriate State agency and the PAFBC.
- The PAFBC will be sent a copy of the survey results for review.

Our office will be on-site for no more than three (3) days during the last stage of the drawdown process in an effort to capture and relocate any turtle species that are present. Our office will set up approximately twelve (12) traps in order to capture turtles and relocate them. All captured red-eared sliders will be disposed of or euthanized unless an alternative method is provided by the East Goshen Township. All non-targeted turtles will be recorded, held and moved if necessary.

Based on professional experience monitoring redbelly turtle populations associated with drawdowns of water features, it has been documented that redbelly turtles will vacate the area once the water level is lowered. In an effort to accommodate this movement of turtles, trapping will be conducted in addition to standard removal from the lake itself during the drawdown process. Two (2) types of traps will be used to capture turtles before and during the complete drawdown of the lake. Please refer to *Figure 5: Redbelly Turtle Trap Location Map* for a depiction of trap types and locations.

Six (6) basking traps approved by the PAFBC will be used in areas of the lake with suitable sun exposure that served as good basking areas. Turtles are attracted to the floating substrate, and when they climb atop to bask, the weight of the turtle triggers hinges that cause the turtle to fall within a confined aquatic cage, and turtles have access to open air.

Six (6) floating hoop traps will be placed within the water, which based on experience has been successful in capturing a wide variety of species and a high number of individual turtles. The hoop traps contain multiple mesh compartments, and once entered, a turtle may not escape

however as a floatable feature there is access to open air. The hoop trap will be baited daily with a mixture of cornmeal and captured sun fish from the lake. This will maximize trapping efforts since turtles would be looking for a food source after hibernation.

We request a review of this work plan for USFWS approval. Attached please find figures depicting the survey site and designated survey areas. If you have any questions, comments or require additional information, please do not hesitate to contact this office. Thank you.

Sincerely,

Bryon DuBois, PWS
Senior Biologist

Enclosures:

Figure 1: *Pennsylvania Road Map*
Figure 2: *West Chester USGS Quadrangle*
Figure 3: *Milltown Reservoir Aerial Map*
Figure 4: *Redbelly Turtle Relocation Pond Map*
Figure 5: *Redbelly Turtle Trap Location Map*

cc: Autumn Thomas (Gannet Fleming, Inc.) via email: athomas@gfnet.com

Doc: 03D389RBTWKPL001

Sources: Esri, HERE, DeLorme, USGS, Intermap, increment P Corp., NRCAN, Esri Japan, METI, Esri China (Hong Kong), Esri (Thailand), MapmyIndia, © OpenStreetMap contributors, and the GIS User Community

DuBois Environmental Consultants

Pennsylvania Road Map

Milltown Reservoir
East Goshen Township, Chester County, PA

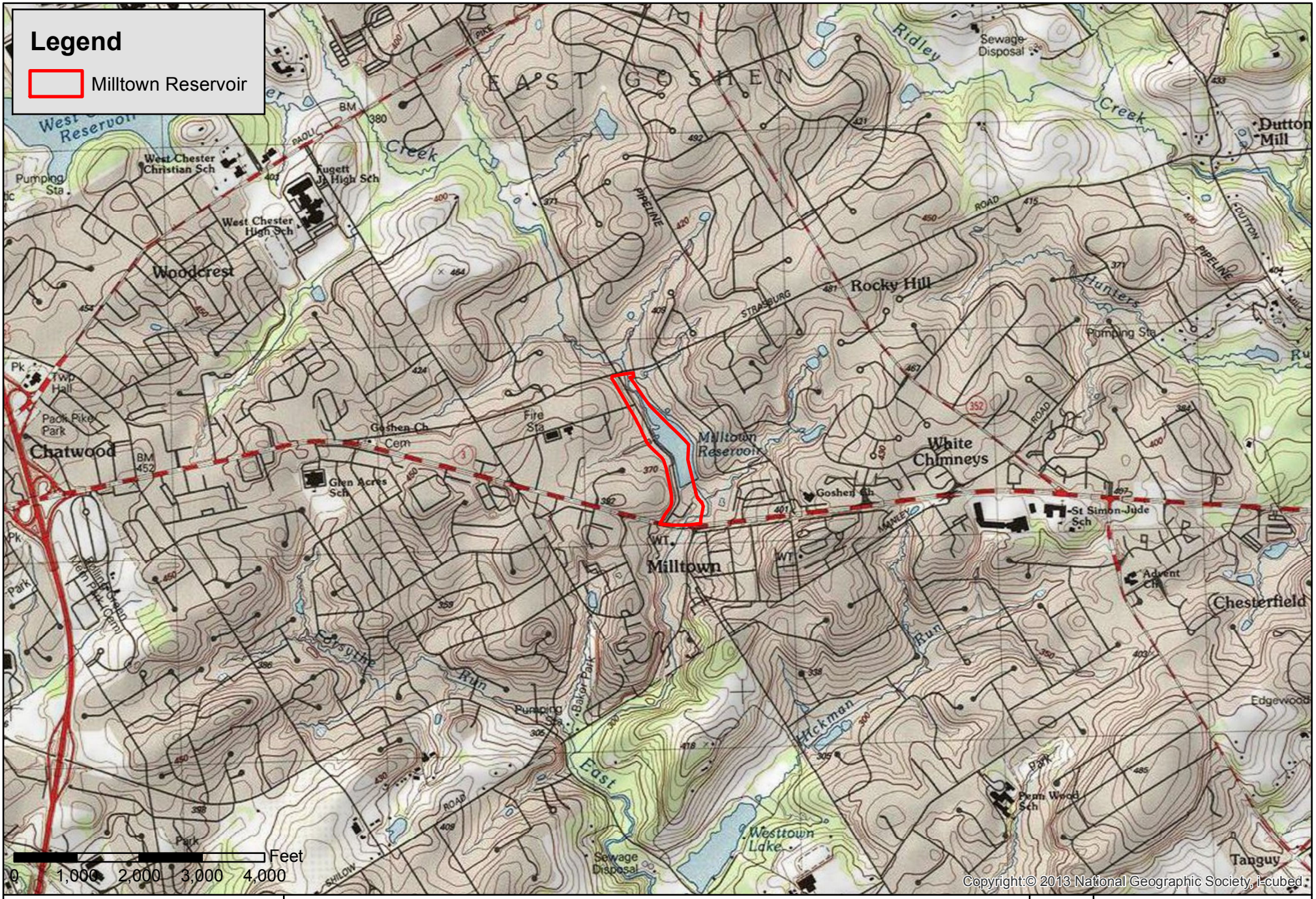
NORTH

Figure 1

Job No.: D1389.001	
Scale: 1 in = 1,000 ft	
Date: 3/15/2017	
Drawn By:	

Document Path: S:\JOBS NUMBERS\D1389.001\roads.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.



DuBois Environmental Consultants

West Chester USGS Quadrangle Map

Milltown Reservoir
East Goshen Township, Chester County, PA

NORTH

Figure 2

Job No.:	
Scale: 1 in = 2,000 ft	
Date: 3/15/2017	
Drawn By:	

Document Path: S:\JOBS NUMBERS\D1389.001\quad.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.

DuBois Environmental Consultants

Milltown Reservoir Aerial Map

Milltown Reservoir
East Goshen Township, Chester County, PA

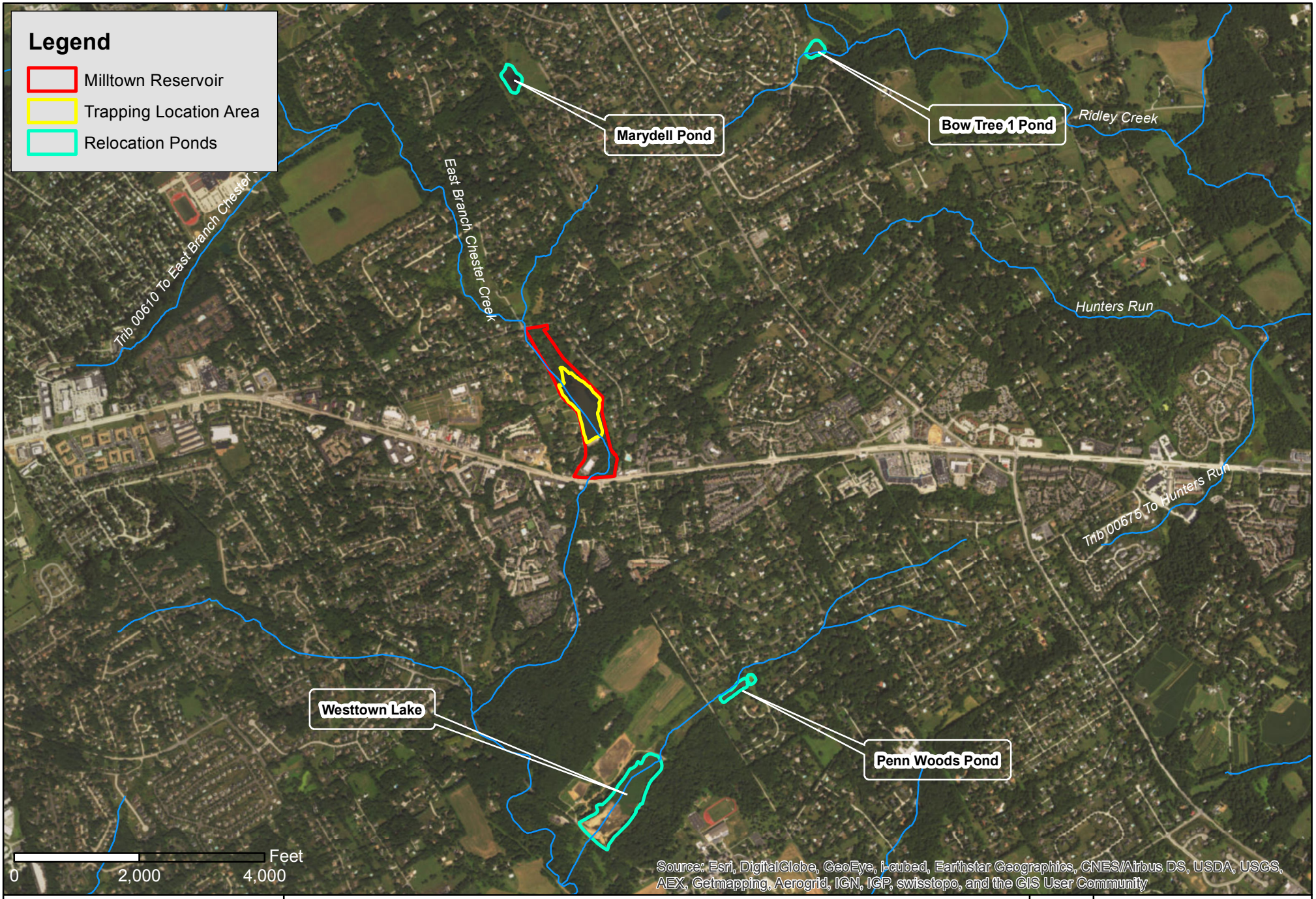
NORTH

Figure 3

Job No.:	
Scale: 1 in = 400 ft	
Date: 3/15/2017	
Drawn By:	

Document Path: S:\JOBS NUMBERS\D1389.001\aerial.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.



DuBois Environmental Consultants

Redbelly Turtle Relocation Pond Map

Milltown Reservoir
East Goshen Township, Chester County, PA

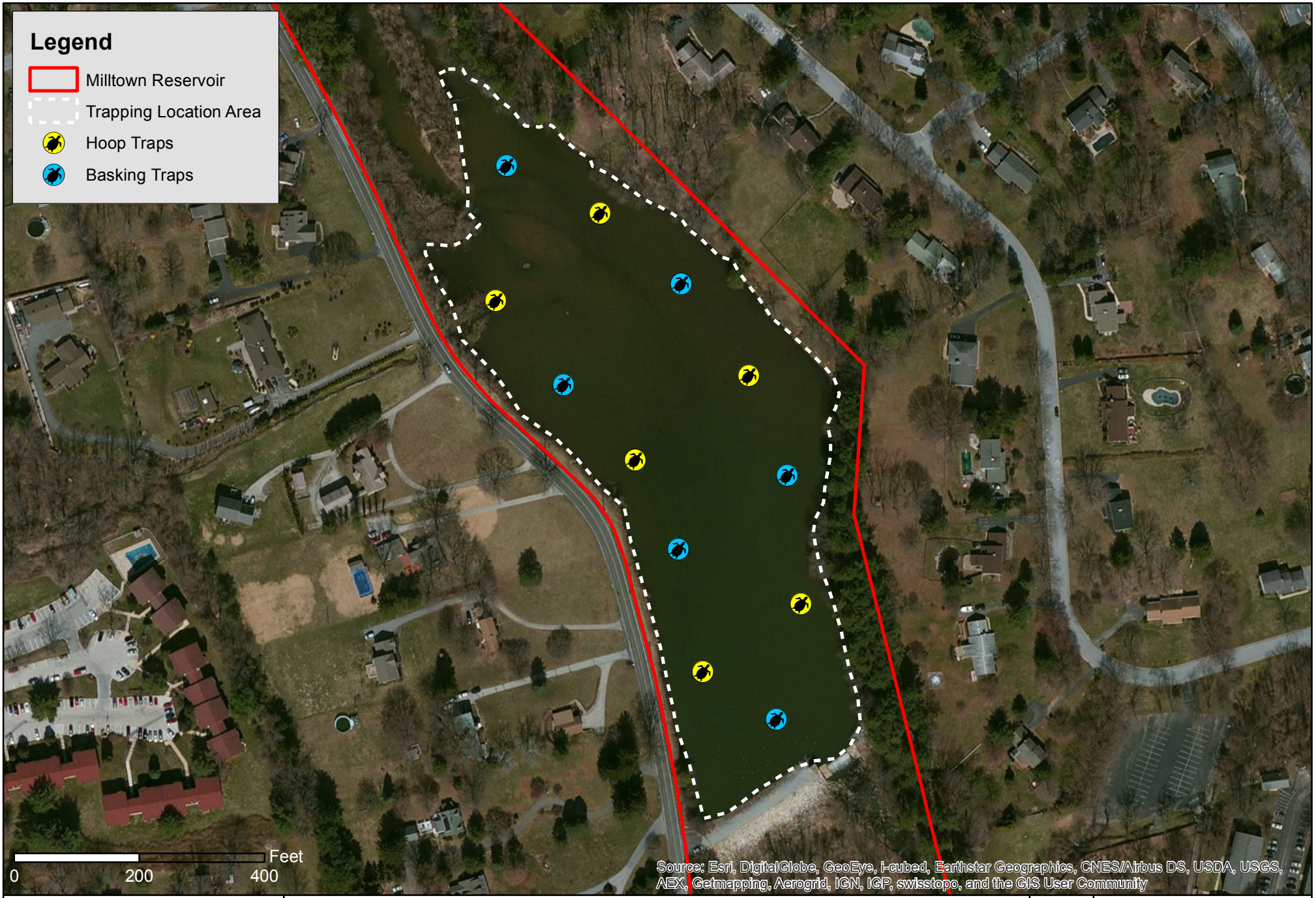
NORTH

Figure 4

Job No.: D1389.001	
Scale: 1 in = 2,000 ft	
Date: 3/15/2017	
Drawn By:	

Document Path: S:\JOBS NUMBERS\D1389.001\relocation pond.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.



DuBois Environmental Consultants

Redbelly Turtle Trap Location Map

Milltown Reservoir
East Goshen Township, Chester County, PA

NORTH

Figure 5

Job No.: D1389.001	
Scale: 1 in = 200 ft	
Date: 3/15/2017	
Drawn By:	

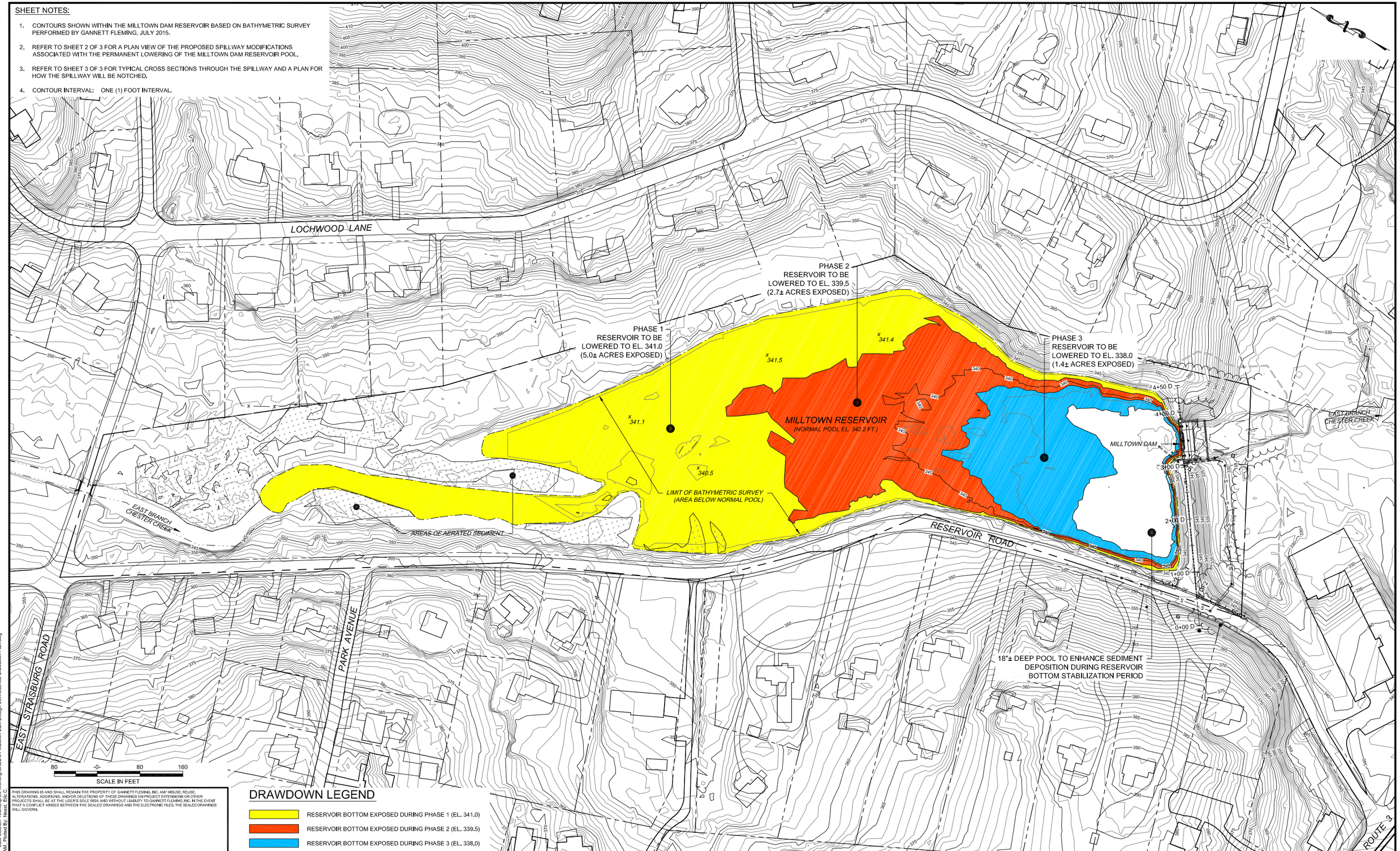
Document Path: S:\JOBS NUMBERS\D1389.001\rbt survey.mxd

This map was developed using Geographic Information Systems Digital Data. This map is for visual display purposes only and all locations are approximate.

ATTACHMENT E
Reservoir Drawdown Plan

SHEET NOTES:

1. CONTOURS SHOWN WITHIN THE MILLTOWN DAM RESERVOIR BASED ON BATHYMETRIC SURVEY PERFORMED BY GANNETT FLEMING, JULY 2015.
2. REFER TO SHEET 2 OF 3 FOR A PLAN VIEW OF THE PROPOSED SPILLWAY MODIFICATIONS ASSOCIATED WITH THE PERMANENT LOWERING OF THE MILLTOWN DAM RESERVOIR POOL.
3. REFER TO SHEET 3 OF 3 FOR TYPICAL CROSS SECTIONS THROUGH THE SPILLWAY AND A PLAN FOR HOW THE SPILLWAY WILL BE NOTCHED.
4. CONTOUR INTERVAL: ONE (1) FOOT INTERVAL.



DRAWDOWN LEGEND

- RESERVOIR BOTTOM EXPOSED DURING PHASE 1 (EL. 341.0)
- RESERVOIR BOTTOM EXPOSED DURING PHASE 2 (EL. 339.5)
- RESERVOIR BOTTOM EXPOSED DURING PHASE 3 (EL. 338.0)

NO.	DESCRIPTION	DATE	BY

REVISIONS

DESIGNED	CADD	SCALE
WCH	WCH	AS SHOWN
DRAWN	CHECKED	APPROVED
TDT	ECN	ECN

Gannett Fleming

EAST GOSHEN TOWNSHIP
CHESTER COUNTY, PENNSYLVANIA

MILLTOWN DAM
DEP ID NO. D15-146

RESERVOIR DRAWDOWN PLAN
RESERVOIR PLAN

JOB NO.	SHEET NO.
60466	1 OF 3
DATE	DRAWING NO.
MAR. 2017	

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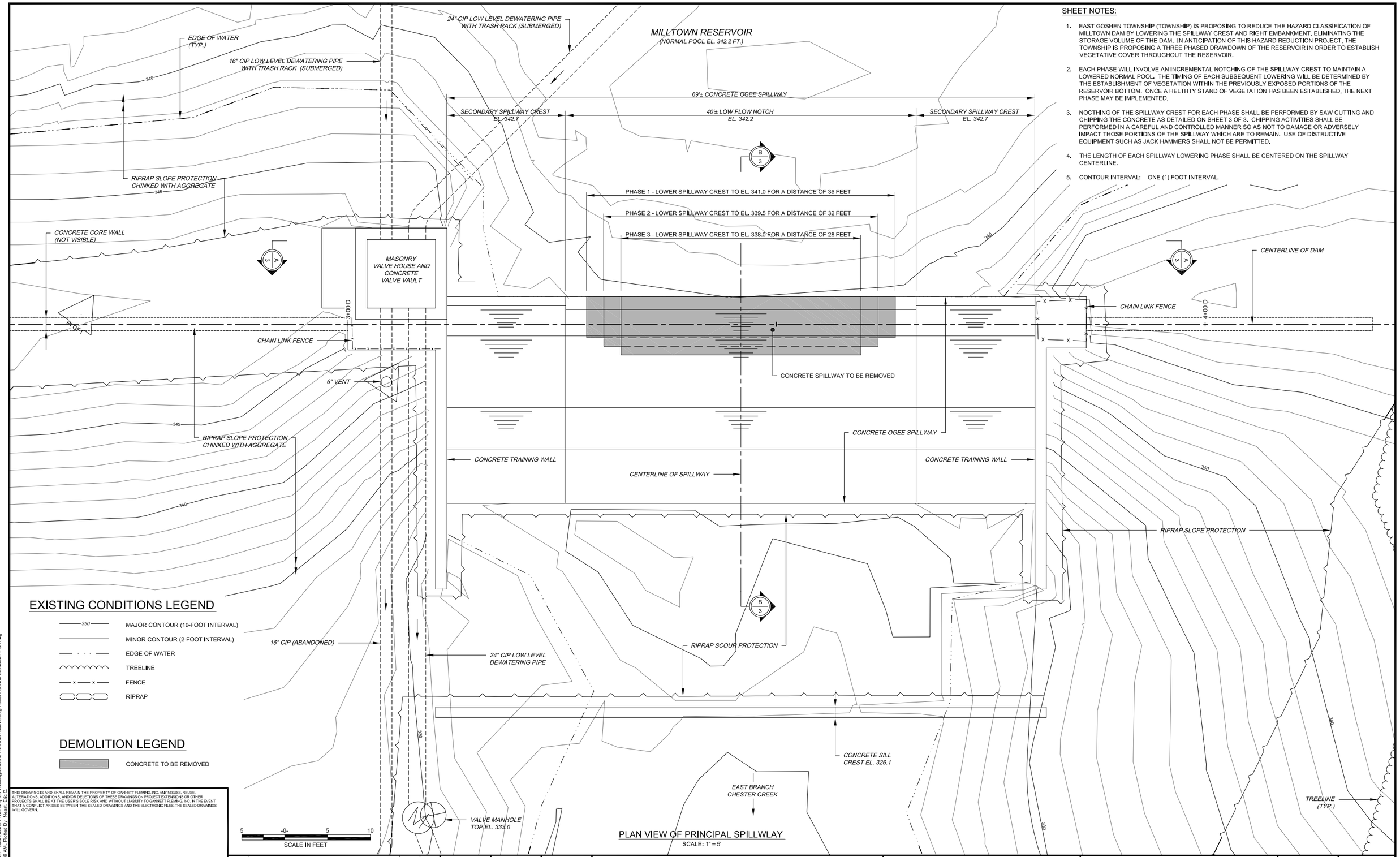
Plot Date: 3/20/2017 8:39 AM, Plotted By: Nicole Cox



PLAN VIEW OF PRINCIPAL SPILLWLAY
SCALE: 1" = 5'

SHEET NOTES:

1. EAST GOSHEN TOWNSHIP (TOWNSHIP) IS PROPOSING TO REDUCE THE HAZARD CLASSIFICATION OF MILLTOWN DAM BY LOWERING THE SPILLWAY CREST AND RIGHT EMBANKMENT, ELIMINATING THE STORAGE VOLUME OF THE DAM. IN ANTICIPATION OF THIS HAZARD REDUCTION PROJECT, THE TOWNSHIP IS PROPOSING A THREE PHASED DRAWDOWN OF THE RESERVOIR IN ORDER TO ESTABLISH VEGETATIVE COVER THROUGHOUT THE RESERVOIR.
2. EACH PHASE WILL INVOLVE AN INCREMENTAL NOTCHING OF THE SPILLWAY CREST TO MAINTAIN A LOWERED NORMAL POOL. THE TIMING OF EACH SUBSEQUENT LOWERING WILL BE DETERMINED BY THE ESTABLISHMENT OF VEGETATION WITHIN THE PREVIOUSLY EXPOSED PORTIONS OF THE RESERVOIR BOTTOM. ONCE A HELTHTY STAND OF VEGETATION HAS BEEN ESTABLISHED, THE NEXT PHASE MAY BE IMPLEMENTED.
3. NOCTHING OF THE SPILLWAY CREST FOR EACH PHASE SHALL BE PERFORMED BY SAW CUTTING AND CHIPPING THE CONCRETE AS DETAILED ON SHEET 3 OF 3. CHIPPING ACTIVITIES SHALL BE PERFORMED IN A CAREFUL AND CONTROLLED MANNER SO AS NOT TO DAMAGE OR ADVERSELY IMPACT THOSE PORTIONS OF THE SPILLWAY WHICH ARE TO REMAIN. USE OF DISTRUCTIVE EQUIPMENT SUCH AS JACK HAMMERS SHALL NOT BE PERMITTED.
4. THE LENGTH OF EACH SPILLWAY LOWERING PHASE SHALL BE CENTERED ON THE SPILLWAY CENTERLINE.
5. CONTOUR INTERVAL: ONE (1) FOOT INTERVAL.

NO.	DESCRIPTION	DATE	BY

REVISIONS

DESIGNED	CADD	SCALE
WCH	WCH	AS SHOWN
DRAWN	CHECKED	APPROVED
TDT	ECN	ECN

Gannett Fleming

EAST GOSHEN TOWNSHIP
CHESTER COUNTY, PENNSYLVANIA

MILLTOWN DAM
DEP ID NO. D15-146

RESERVOIR DRAWDOWN PLAN
SPILLWAY PLAN

JOB NO.	SHEET NO.
60466	2 OF 3
DATE	DRAWING NO.
MAR. 2017	

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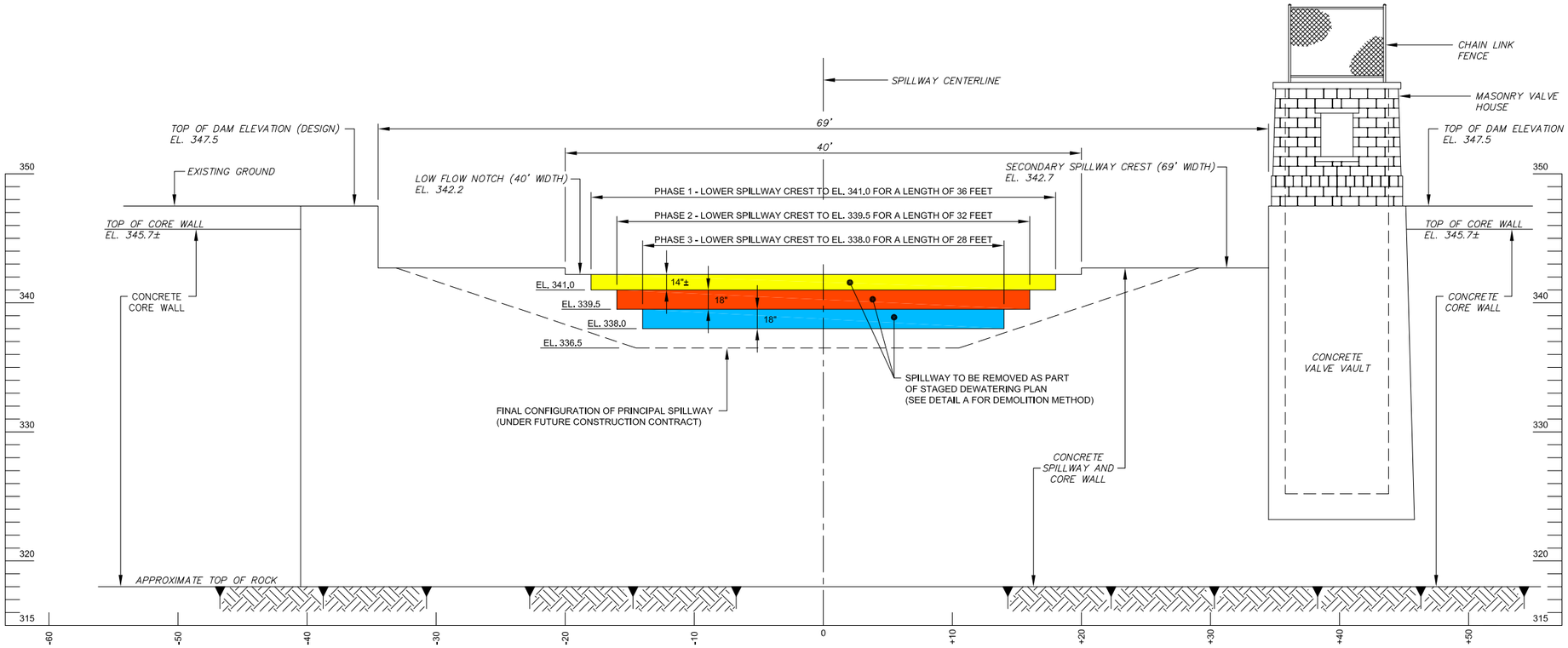
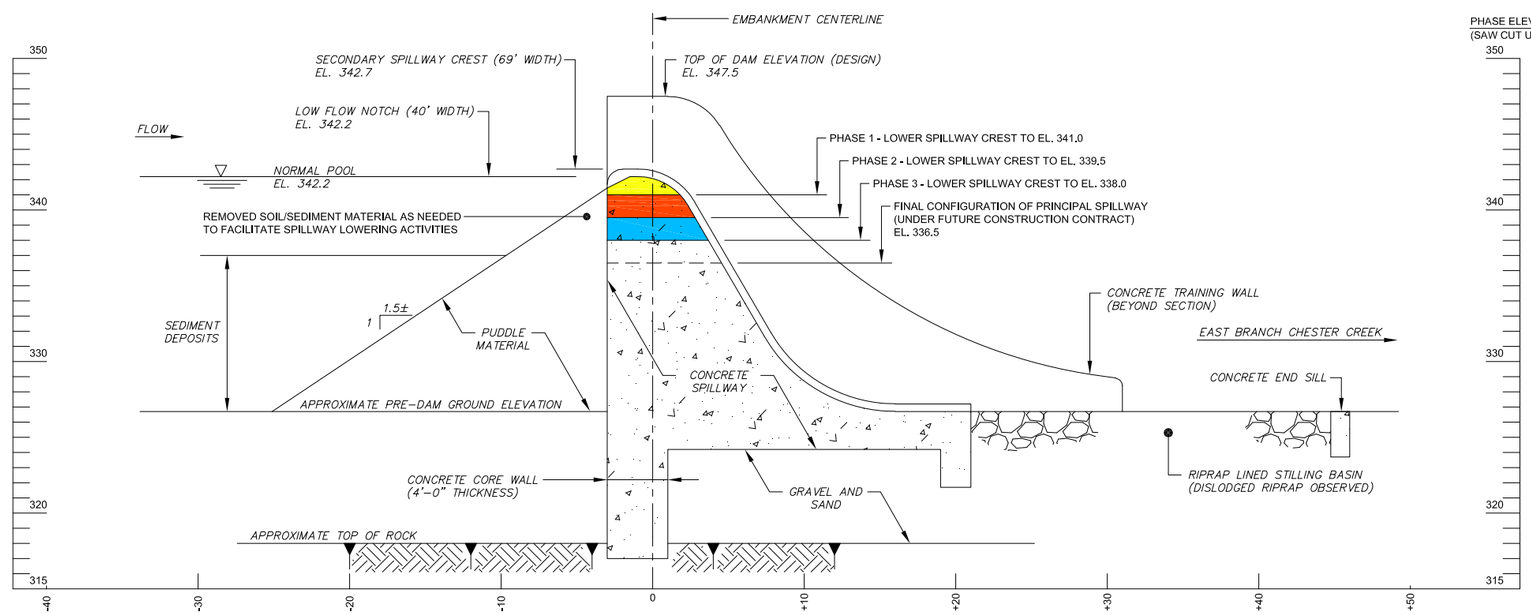
Plot Date: 3/15/2017 2:39 PM, Plotted By: Eric C. Neiser



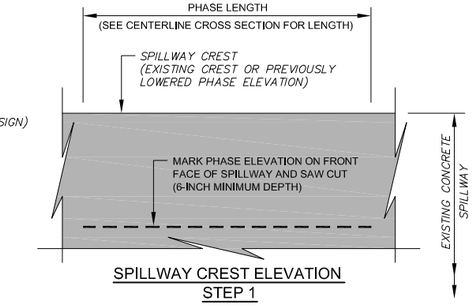
CROSS SECTION A-A ALONG CENTERLINE OF DAM (LOOKING DOWNSTREAM)

SCALE: 1" = 5'



CROSS SECTION B-B THROUGH CONCRETE SPILLWAY

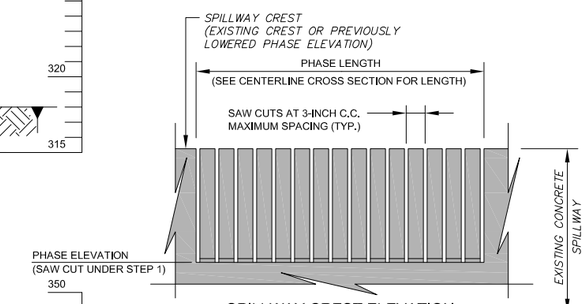
SCALE: 1" = 5'



SPILLWAY CREST ELEVATION
STEP 1

STEP 1 NOTES:

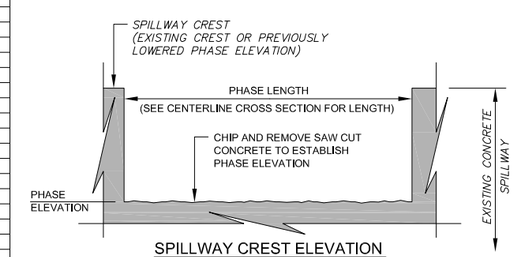
1. ACTIVATE LOW LEVEL DEWATERING SYSTEM AND LOWER RESERVOIR TO THE PHASE ELEVATION BEING ESTABLISHED. PROVIDE ADDITIONAL LOWERING OF THE RESERVOIR AS NEEDED TO FACILITATE ACCESS TO THE SPILLWAY CREST.
2. ACCESS SPILLWAY CREST USING A BOAT AND/OR BARGE SUITABLE FOR THE PERSONNEL AND EQUIPMENT NEEDED TO PERFORM THE WORK. IMPLEMENT APPROPRIATE SAFETY MEASURES TO PROTECT WORKERS DURING THE SPILLWAY LOWERING ACTIVITIES.
3. REMOVE EARTH/SEDIMENT MATERIAL IN FRONT OF THE SPILLWAY AS NEEDED TO EXPOSE THOSE PORTIONS OF THE SPILLWAY CREST TO BE REMOVED.
4. MARK PHASE ELEVATION ON THE FRONT OF THE SPILLWAY AND PROVIDE A HORIZONTAL SAW CUT ALONG THIS ELEVATION FOR THE LENGTH OF THE PHASE. REFER TO THE "CROSS SECTION ALONG CENTERLINE OF DAM" (THIS SHEET) FOR LENGTH AND ELEVATION OF EACH PHASE.



SPILLWAY CREST ELEVATION
STEP 2

STEP 2 NOTES:

1. PROVIDE VERTICAL SAW CUTS AT 3-INCH MAXIMUM CENTER TO CENTER SPACING ALONG THE ENTIRE PHASE LENGTH.



SPILLWAY CREST ELEVATION
STEP 3

STEP 3 NOTES:

1. CAREFULLY CHIP AWAY SAW CUT CONCRETE TO ESTABLISH THE LOWERED SPILLWAY CREST ELEVATION. THE CREST OF THE LOWERED SPILLWAY SHALL BE RELATIVELY SMOOTH AND LEVEL, FREE OF IRREGULARITIES PROTRUDING MORE THAN 2-INCHES ABOVE THE PHASE ELEVATION.
2. DEPENDING ON THE SAW CUT DEPTH OBTAINABLE BY THE EQUIPMENT USED, REPEAT STEPS 2 AND 3 AS NEEDED TO ESTABLISH THE DESIGN PHASE ELEVATION.

DEMOLITION OF CONCRETE SPILLWAY CREST
FOR PHASED LOWERING OF RESERVIOR

NOT TO SCALE

SCALE IN FEET

5 -0- 5 10

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Plot Date: 3/13/2017 8:40 AM, Plotted By: Neuner, Eric C.

NO.	DESCRIPTION	DATE	BY

REVISIONS

DESIGNED	CADD	SCALE
WCH	WCH	AS SHOWN
DRAWN	CHECKED	APPROVED
TDT	ECN	ECN

Gannett Fleming

EAST GOSHEN TOWNSHIP
CHESTER COUNTY, PENNSYLVANIA

MILLTOWN DAM
DEP ID NO. D15-146

RESERVOIR DRAWDOWN PLAN
CROSS SECTIONS AND DETAILS

JOB NO.	SHEET NO.
60466	3 OF 3
DATE	DRAWING NO.
MAR. 2017	