



AQUETONG CREEK RESTORATION PROJECT

2022 RIVERINE MONITORING REPORT

SOLEBURY TOWNSHIP, BUCKS COUNTY, PENNSYLVANIA

NOVEMBER 2022

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Attachment A	As-Built and Monitoring Plans
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PRIMARY AUTHOR

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INTRODUCTION

The purpose of this annual monitoring report is to document the status and development of the riverine resources component of the Aquetong Creek Restoration Project (Site). The restoration project focused on stabilizing a portion of the Aquetong located within the Aquetong Spring Park in Solebury Township, Bucks County, Pennsylvania.

The Aquetong Creek Restoration Project is situated within the former basin of Aquetong Lake, which was a 15-acre impoundment formed in 1870 by the construction of an earthen dam on Aquetong Creek. Solebury Township removed the dam that impounded Aquetong Lake in April 2015 via a controlled partial breach that drained the lake and exposed sediments that had been accumulating in the lake for 145 years. The goal of the dam removal was to remove the impoundment and restore Aquetong Creek. The restoration of the creek would serve to reduce thermal impacts on Aquetong Creek and would restore a section to the creek that would be capable of supporting a high-quality, cold-water fishery. After dam removal an unstable channel formed through the exposed sediments, connecting the upper and lower headwater sections of Aquetong Creek.

The primary source of inflow to the headwater portion of Aquetong Creek is Ingham Spring, an artesian spring formed at the contact of two geologic formations, with a sustained flow rate of 2,000 gallons per minute (F.X. Browne, Inc. 2004). Aquetong Creek also receives flow from an unnamed tributary that enters the Site to the north under Route 202. The tributary receives inflow from a detention basin located to the northeast of the Site, as well as a large pond to the north of the Site. There is supplemental inflow to Aquetong Creek in the form of stormwater runoff discharged from the adjacent developed areas located to the north and south of the Site.

After removal of the dam and the draining of Aquetong Lake, a sinuous channel deeply incised into the deposited sediments began to form. The newly formed channel exhibited signs of ongoing channel incision combined with bank instability. Additionally, the channel that developed was entrenched with limited floodplain development or access for flows greater than bankfull. This type of channel configuration causes more extensive bank erosion until the stream channel reaches an equilibrium point vertically, laterally and with respect to the active channel dimensions. This was the case with Aquetong Creek in the post dam removal years after 2015.

The restoration project design included the establishment of stabilized channel dimensions; expanding and realigning portions of the channel for geomorphic stability; and creating a floodplain bench adjacent to the new channel through the removal of impoundment sediment to facilitate a connection between the stream and its associated floodplain. The design also included installing large woody debris to create aquatic habitat and enhance stability of channel bed and banks; and adding gravel, cobble, and boulder substrate where original/existing channel substrates were absent or insufficient. In addition, the project entailed continuing treatment of invasive species, and restoring and enhancing vegetation within wetlands and riparian buffers, as needed, to ultimately create a forested riparian buffer. The goal of the design was to foster the development of a stable stream system that supports cold-water aquatic species and provides an ecological uplift to wetland, floodplain and upland areas within a sustainable park setting. Construction of the project was completed in 2020 and the first as-built survey/site monitoring post-construction was conducted on October 22, 2020.

The PADEP-approved Restoration Waiver 16 (Authorization ID No. 1278424, dated October 23, 2019) (See Appendix IV) authorized the monitoring of the stream and wetland restoration areas and wetland creation areas in accordance with the Mitigation Plan narrative provided as S4 of the Aquetong Creek Restoration Project Environmental Assessment Addendum, dated June 2019, last updated September 2019. Based on review of the as-built data collected in October 2020 in conjunction with site specific observations, it was recommended that adjustments be made post-construction to foster greater channel stability. Specifically, it was recommended that the floodplain bench on river left directly downstream of the confluence with the tributary be expanded (Figure 1), and lower log steps in the tributary channel be re-installed to achieve the design elevations.

Additionally, the designed bankfull bench was added to river left at the upstream end of the stormwater tributary in conjunction with a separate project that included the replacement of the stormwater outfall combined with a plunge pool for energy dissipation and construction of a path for recreation. These adaptive management measures were completed in 2021, and a second monitoring report was completed in 2021 following the adaptive management construction. The third monitoring site visit took place on November 10, 2022 and included a visual inspection and photo documentation of all installed structures (Figure 1), as well as a survey of the longitudinal profile and select cross section locations to document the as-built conditions (Appendix A). The general condition of the channel, stability of installed structures, and status of erosion control measures were observed. The 2022 inspection is summarized in this report, including notes on the above observations, descriptions of the major components of the restored reach, the signs and modes of any failures, and any recommended adaptive management measures. Additionally, a photo log documenting site conditions has been compiled (Appendix B).

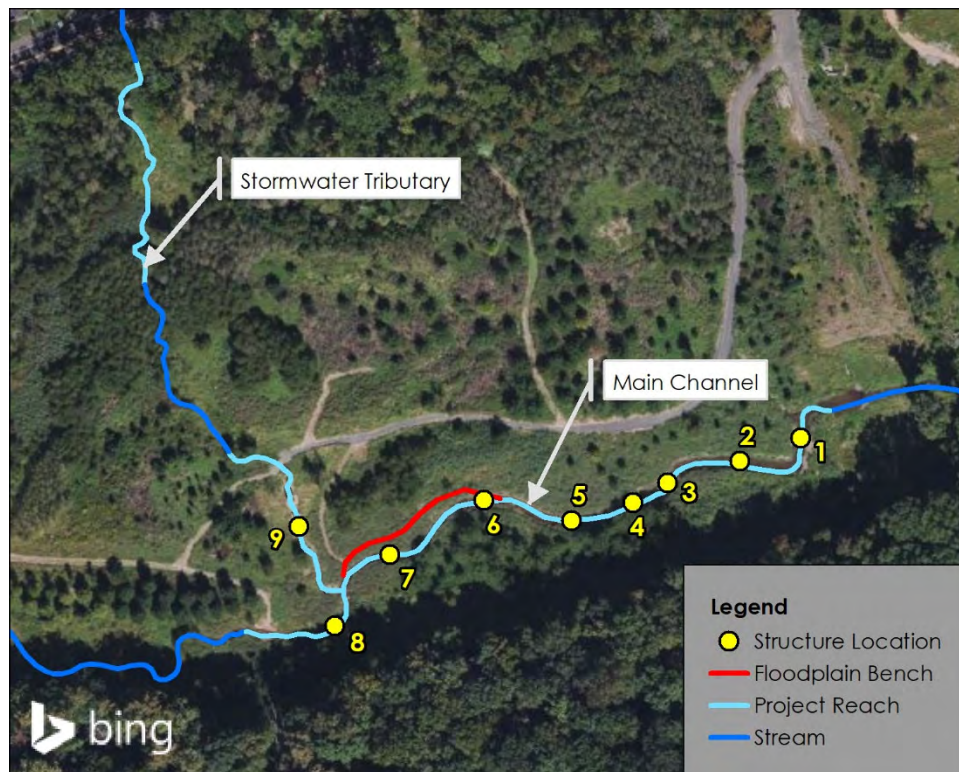


Figure 1: Overview of project site and location of installed structures.



STREAM MONITORING

The following sections describe the status of key elements of the restored stream channel.

STRUCTURE 1

Structure 1 is a grade control woody debris structure located at station 15+15. Water was flowing through and under the logs of the structure, with some undercutting. However, vegetation was well established along the banks and there was no bank erosion associated with the structure.

STRUCTURE 2

Structure 2 is a grade control woody debris structure located at station 14+30. This structure is composed of a single log spanning the channel perpendicular to flow. When observed in 2020 water was flowing over the log, but in 2021 the log was undercut and water was flowing under the log. In 2022, the structure was undercut on the downstream side but had a solid layer of sediment on the upstream side. Water was being diverted towards the banks, causing erosion into the banks around the ends of the structure. To divert water towards the center of the channel and stabilize the banks it is recommended that at minimum a notch be cut in the top log of the structure, and rock placed around the ends of the structure along the banks. Alternatively, the structure could be reinstalled completely to be embedded further into the bed and banks, and constructed to avoid diverting water towards the banks.

STRUCTURE 3

Structure 3 is a grade control woody debris structure located at station 13+50. The structure was originally composed of several cross-channel logs. However, between the 2020 and 2021 site visits, the structure had been broken up with one of the logs washed downstream and other logs rearranged, possibly due to the impact of Hurricane Ida. As of 2022, the structure was composed of a single log well embedded into the stream bed and banks. Water was no longer being diverted against the right bank, and previous erosion has been stabilized by dense vegetation growth. As with all of these stream restoration design structures they are not designed to be there forever but to allow time for the stream channel to stabilize. As such, no action is required.

STRUCTURE 4

Structure 4 was constructed as a grade control log step-pool series from station 12+70 to 13+00. Only the most upstream log out of four could be located during the 2022 monitoring inspection. While well embedded in the stream bed, water was running around the end of the log and cutting into the right bank. To divert water towards the center of the channel and stabilize the banks it is recommended that at minimum a notch be cut in the top log of the structure, and rock placed around the ends of the structure along the banks. Alternatively, the structure could be reinstalled completely to be embedded further into the bank, and constructed to avoid diverting water towards the banks.

STRUCTURE 5

Structure 5 is a grade control woody debris structure located at station 12+25. This structure was in good condition, with water flowing over the logs of the structure and no undercutting. However, some water was being diverted behind the log toe structure of the right bank, bypassing the structure and causing erosion on the bank. To divert water towards the center of the channel and stabilize the banks it is recommended that at minimum a notch be



cut in the top log of the structure, and rock placed around the ends of the structure along the banks. Alternatively, the structure could be reinstalled completely to be embedded further into the bank, and constructed to avoid diverting water towards the banks.

STRUCTURE 6

Structure 6 is a grade control log step-pool series from station 11+20 to 11+50. The bed and banks were stable through this section of the channel, with no undercutting, or bypassing of the structure observed. The downstream extent of the floodplain bench installed in 2021 was located at Structure 6.

FLOODPLAIN BENCH ON MAIN CHANNEL

The floodplain bench on the main channel is located on the river left bank between station 9+50 to 11+50. The bench was installed in 2021 and is now at an elevation ranging from 129.5 to 130 feet, with a maximum width of 30 feet. It extends from the confluence with the tributary to Structure 6 at the downstream end. Construction was completed in the summer of 2021. During the 2021 monitoring site visit, it was observed that part of the bank in this area was unstable and actively eroding, with erosion control matting dislodged, likely due to the impact of Hurricane Ida before vegetation could become established post-construction. As of the 2022 monitoring site visit, vegetation has become well established and the bank appeared stable.

Also in this area of the channel was a headcut located at station 10+30. The headcut has migrated approximately 10 feet upstream and has become less steep than in previous years, indicating that it may self arrest. At this time continued monitoring is recommended.

STRUCTURE 7

Structure 7 is a grade control woody debris structure located at station 10+10. The structure has become undermined, with the top log completely out of the water and water flowing under the other logs. Additionally, the structure is being bypassed by flow to both banks, cutting around the ends of the logs and causing erosion in the banks. To divert water towards the center of the channel and stabilize the banks it is recommended that at minimum a notch be cut in the top log of the structure, and rock placed around the ends of the structure along the banks. Alternatively, the structure could be reinstalled completely to be embedded further into the banks, and constructed such that water will not be diverted towards the banks.

STRUCTURE 8

Structure 8 is a grade control log step-pool series from station 9+00 to 9+50. The bed and banks were stable through this section of the channel, with no bypassing of the structure observed. Minor undercutting of the bank along the outside bend was observed; however, vegetation was dense and the bank appeared stable. A point bar has formed directly downstream of Structure 8 at the inside bend of the channel.

STRUCTURE 9

Structure 9 is a log step-pool series on the stormwater tributary from station 5+00 to 6+55. These steps were installed above the design elevation, and three steps at the downstream end were lowered in 2021. As observed in 2022, the bed and banks were stable through this section of the channel, with no undercutting, or bypassing of the structure observed. An informal path had been created through this section that may contribute to erosion in the future. It is recommended that rock be placed on the bank in the area of the informal path to avoid further erosion.



UPSTREAM END OF STORMWATER TRIBUTARY

A small floodplain bench was constructed on river left at the upstream end of the stormwater tributary, with live stakes added. Additionally, as part of a separate project, the stormwater pipe under Route 202 was replaced, and a path and associated stormwater management features were added nearby. Overall, the bank stabilization structures in this reach were stable and in good condition. No actions are recommended at this time.

DISCUSSION AND RECOMMENDATIONS

As of November 2022, the majority of the constructed bank stabilization measures were stable and functioning well. However, several of the grade control structures were identified as areas of concern. Structures 2, 4, 5, and 7 were exhibiting bypassing of the structure, with flow going around the structure and causing bank erosion on one or both banks. One potential solution would be to place rock around the ends of the structure to stabilize the banks and cut a notch in the top log to encourage flow towards the center of the stream and away from the banks. A more comprehensive solution would be to completely reinstall the structures to accommodate the current conditions of the site, with an emphasis on embedding the logs sufficiently far into the banks (at least 5 feet), and constructed such that water is not being diverted towards the bank.

Structure 3 was impacted by stormflow and the structure logs had been displaced; however, the area appeared stable with no major erosion, undercutting, or bypassing of the remaining structure. Similarly, Structure 1 had been undermined and Structure 6 had been displaced or buried under sediment, but the channel was not exhibiting signs of bank erosion or other instabilities in the vicinity. The floodplain bench constructed in 2021 has largely stabilized since the 2021 site visit, with vegetation becoming well established.

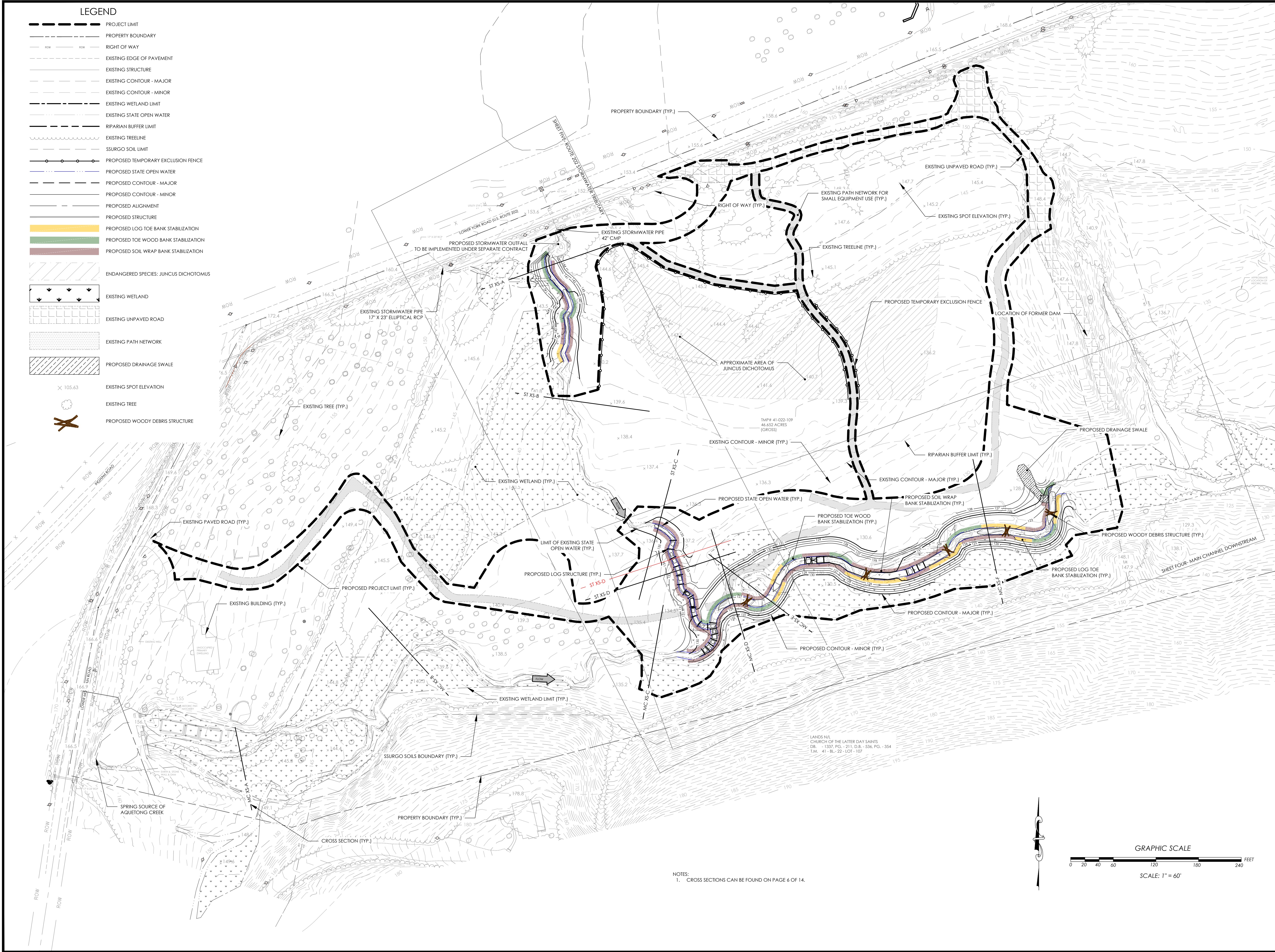
The headcut downstream of Structure 7 has advanced upstream since October of 2020 but has become less steep. At this time, it is recommended that it remain under observation with no immediate action required.

It is important to point out that the concerns expressed in this report are based on ensuring that the stream continues to stabilize and develop in a positive trajectory. While several grade control structures were exhibiting issues with bank erosion, bank stabilization measures installed throughout the project area between the grade control structures were in good condition with no signs of erosion or other failures. It is also important to point out that except for the few examples identified the stream is developing well. As vegetation continues to develop the creek banks should become increasingly more stable and the stream well shaded. The stream continues to support brook trout. For the most part the stream is substantially more stable than it was prior to the project, but like any restoration project continued stewardship is essential to the project's long term success.



ATTACHMENT A

AS-BUILT PLANS



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PROJECT NOTES

- THE VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAV88), FEET. THE FOLLOWING CONVERSION FOR NAV88 TO NGVD29 IS APPLICABLE FOR THIS LOCATION:
NGVD29 = NAV88 - 0.63 FT
- THE HORIZONTAL DATUM IS NORTH AMERICAN DATUM OF 1983 (NAD83), FEET.
- TOPOGRAPHIC MAPPING PREPARED BY ROBINSON PHOTOGRAMMETRIC MAPPING DATED 4/11/2016. FLIGHT DATE 3/7/2016 FOR C. ROBERT WYNN ASSOCIATES, INC.
- TOPOGRAPHIC MAPPING OF THE STREAM PREPARED BY GEOTREK ENVIRONMENTAL AND SURVEYING, LLC IN APRIL OF 2019.
- WETLAND DELINEATION COMPLETED BY PRINCETON HYDRO, LLC. STAFF IN NOVEMBER OF 2018.
- FEMA FIRM NOT MAPPED SINCE DAM REMOVAL: NO FHA AREA AVAILABLE.
- IN A RESPONSE DATED MAY 1, 2019 TO PNDI NO. 482836, PADCNR PROVIDED A MAP OUTLINING A POPULATION OF PA ENDANGERED JUNCUS DICHOTOMUS. BY INSTALLING EXCLUSORY FENCING AROUND THIS AREA, NO IMPACT ANTICIPATED.
- 150-FT RIPARIAN BUFFER DETERMINED IN ACCORDANCE WITH 25 PA CODE CHAPTER 102.14
- AS-BUILT DATA COLLECTED BY PRINCETON HYDRO ON OCTOBER 22, 2020 AND MONITORING DATA COLLECTED ON OCTOBER 15, 2021 AND NOVEMBER 10, 2022.

DATE	DESCRIPTION
10/10/19	REVISED PER BUCKS COUNTY CONSERVATION DISTRICT COMMENTS
7/25/19	REVISED FOR CONSTRUCTION CLARITY

REVISIONS

GEOFFREY M. GOLL
Professional Engineer
PA Lic. No. PE-050997-E

11/18/2022
DATE

PRINCETON HYDRO **ph**

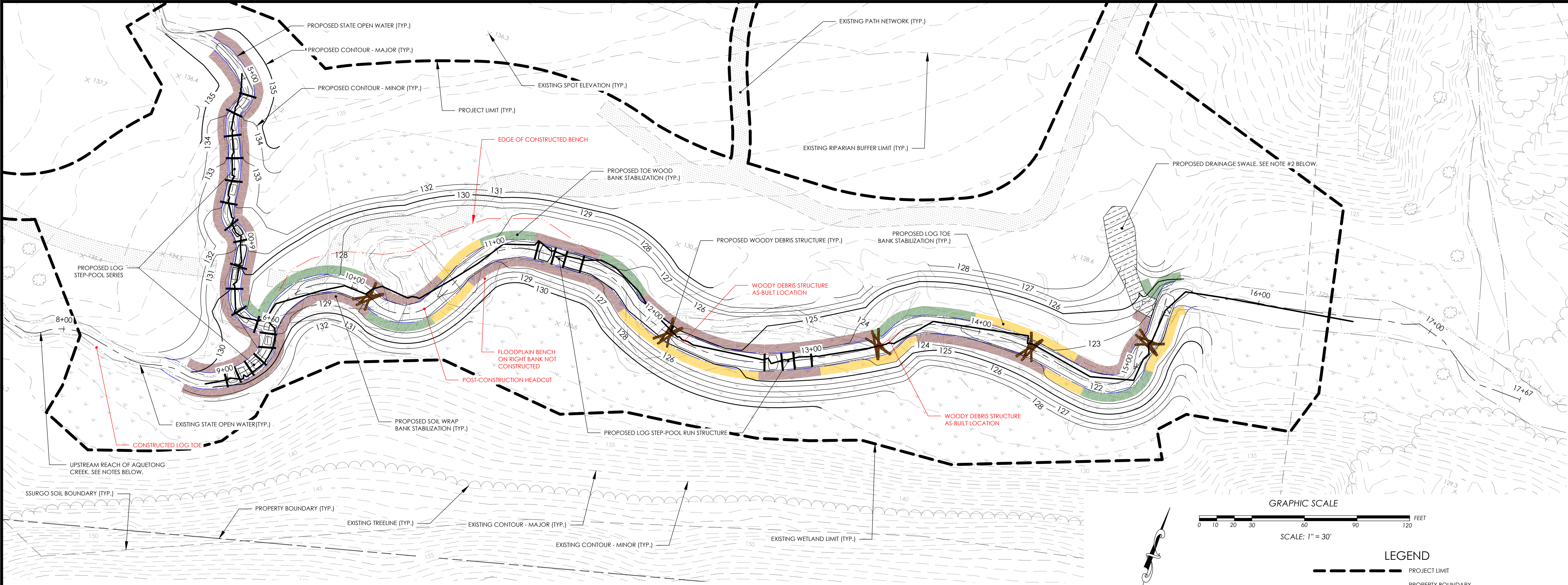
SCIENCE ENGINEERING DESIGN
1108 OLD YORK RD, SUITE 1
RINGOES, NEW JERSEY 08551
PHONE: 908.237.5660
PRINCETONHYDRO.COM

PROJECT NAME/LOCATION:
AQUETONG CREEK RESTORATION
AQUETONG SPRING PARK
TOWNSHIP OF SOLEBURY
BUCKS COUNTY, PENNSYLVANIA
AS-BUILT & MONITORING PLANS

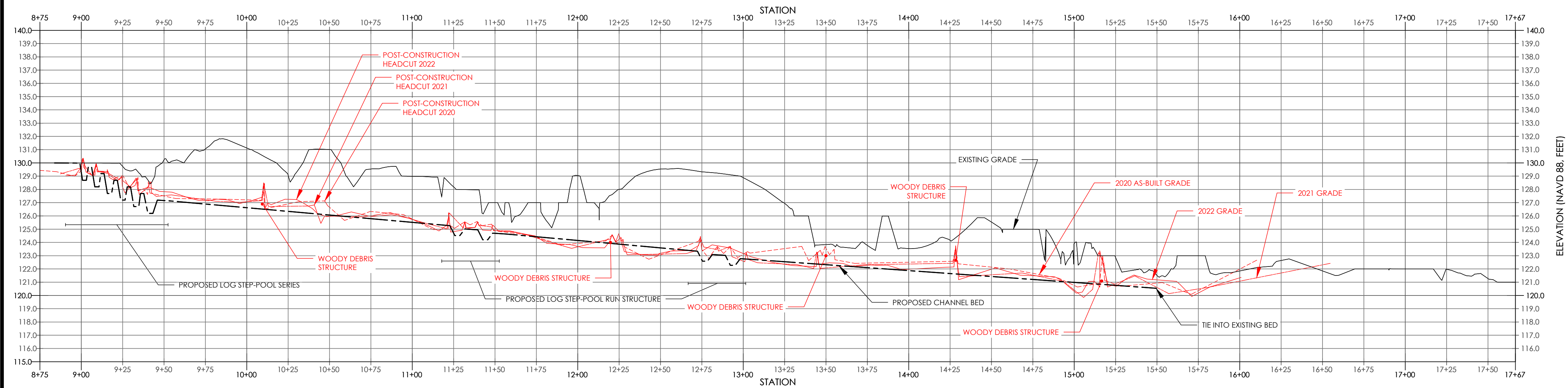
DRAWING NAME:
PROPOSED CONDITIONS OVERVIEW

DATE:	12/21/2020
PROJECT NO.:	0388.011
SCALE:	1"=60'
DRAWN BY:	CPS/BS
CHECKED BY:	GG/AEM/CC

SHEET NO.
3 OF **15**



A PROPOSED PLAN VIEW - MAIN CHANNEL - DOWNSTREAM
1" = 30'



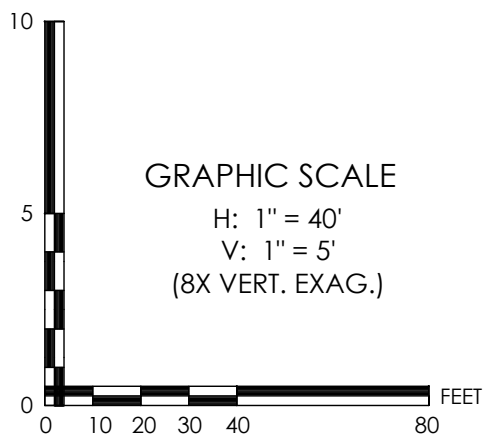
B PROPOSED PROFILE - MAIN CHANNEL - DOWNSTREAM
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 5' (8X VERT. EX.)

NOTES:

- ACTIVE EROSION IS OCCURRING THROUGHOUT THE REACH OF AQUETONG CREEK UPSTREAM OF STATION 08+75, HOWEVER NO TREATMENT OR ACTIVE RESTORATION IS CURRENTLY PROPOSED. IF TREATMENT IS NEEDED IN THE FUTURE, IT SHALL BE COMPLETED UNDER SEPARATE COVER.
- THE DRAINAGE SWALE SHALL BE STABILIZED USING STEP POOLS CONSTRUCTED FROM EXCESS LOGS AND ROCKS. THESE STEP POOLS SHALL BE FIELD FIT BASED ON THE FIELD CONDITIONS AT THE TIME OF CONSTRUCTION AND AS DIRECTED BY ONSITE ENGINEER. THE STEP POOLS SHALL BE CONSTRUCTED IN ACCORDANCE WITH DETAIL A ON SHEET 7 OF 15.
- THE TWO CULVERTS UNDER ROUTE 202 DRAINING INTO THE 202 STORMWATER TRIBUTARY SHALL BE STABILIZED UNDER A SEPARATE CONTRACT.

GRAPHIC SCALE

H: 1" = 40'
V: 1" = 5'
(8X VERT. EXAG.)



GRAPHIC SCALE

SCALE: 1" = 30'

LEGEND

- PROJECT LIMIT
- PROPERTY BOUNDARY
- RIGHT OF WAY
- EXISTING EDGE OF PAVEMENT
- EXISTING STRUCTURE
- EXISTING CONTOUR - MAJOR
- EXISTING CONTOUR - MINOR
- EXISTING WETLAND LIMIT
- EXISTING STATE OPEN WATER
- RIPARIAN BUFFER LIMIT
- EXISTING TREELINE
- SSURGO SOIL LIMIT
- PROPOSED TEMPORARY EXCLUSION FENCE
- PROPOSED STATE OPEN WATER
- PROPOSED CONTOUR - MAJOR
- PROPOSED CONTOUR - MINOR
- PROPOSED ALIGNMENT
- PROPOSED STRUCTURE
- PROPOSED LOG TOE BANK STABILIZATION
- PROPOSED TOE WOOD BANK STABILIZATION
- PROPOSED SOIL WRAP BANK STABILIZATION
- PROPOSED CHANNEL BED
- PROPOSED BANKFULL ELEVATION
- ENDANGERED SPECIES: JUNCUS DICHOTOMUS
- EXISTING WETLAND
- EXISTING UNPAVED ROAD
- EXISTING PATH NETWORK
- PROPOSED DRAINAGE SWALE
- EXISTING SPOT ELEVATION
- EXISTING TREE
- PROPOSED WOODY DEBRIS STRUCTURE
- 2020 AS-BUILT GRADE
- 2021 GRADE
- 2022 GRADE

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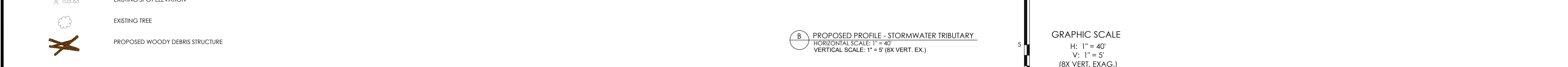
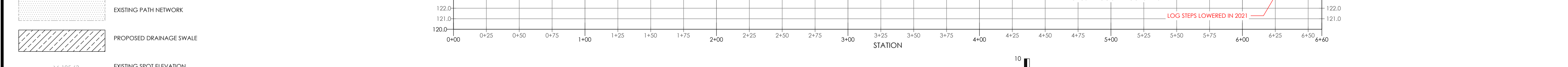
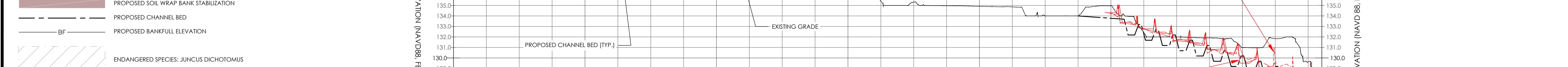
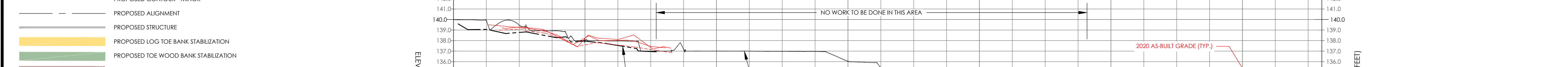
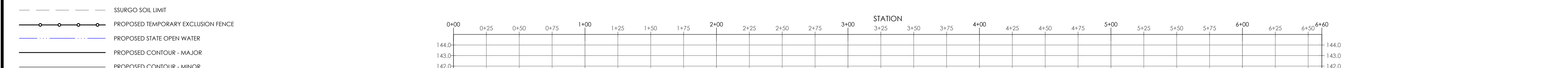
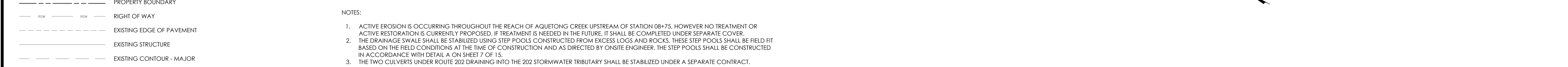
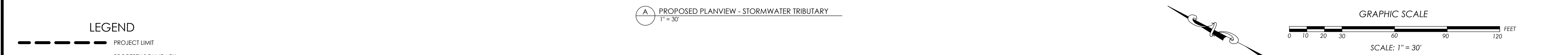
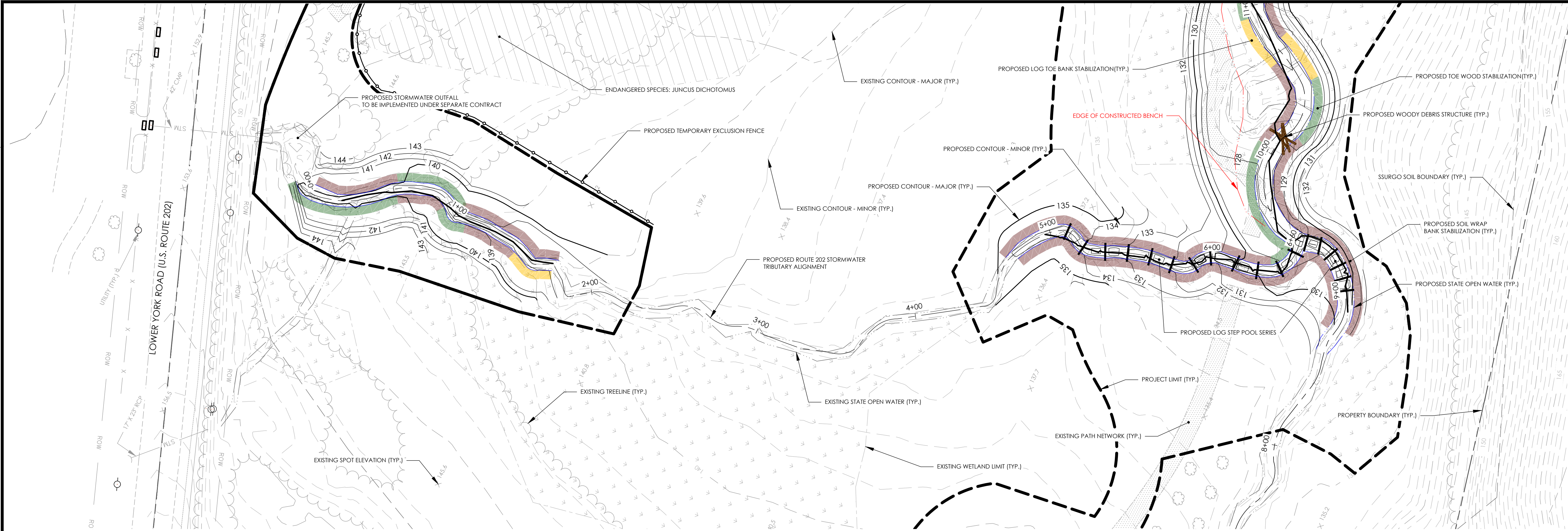
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PROPOSED
CONDITIONS-MAIN
CHANNEL DOWNSTREAM

DATE:	12/21/2020
PROJECT NO.:	0388.011
SCALE:	AS SHOWN
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CHECKED BY:	GG/AEM/CC

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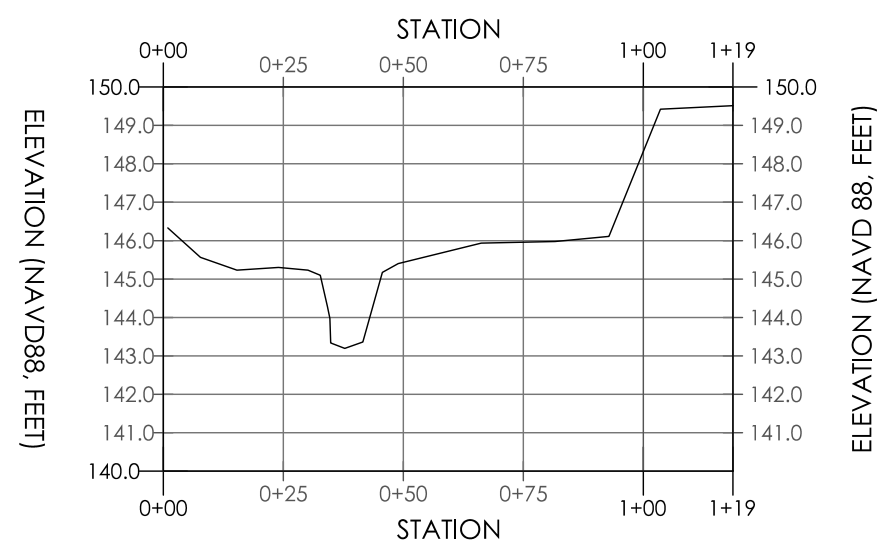
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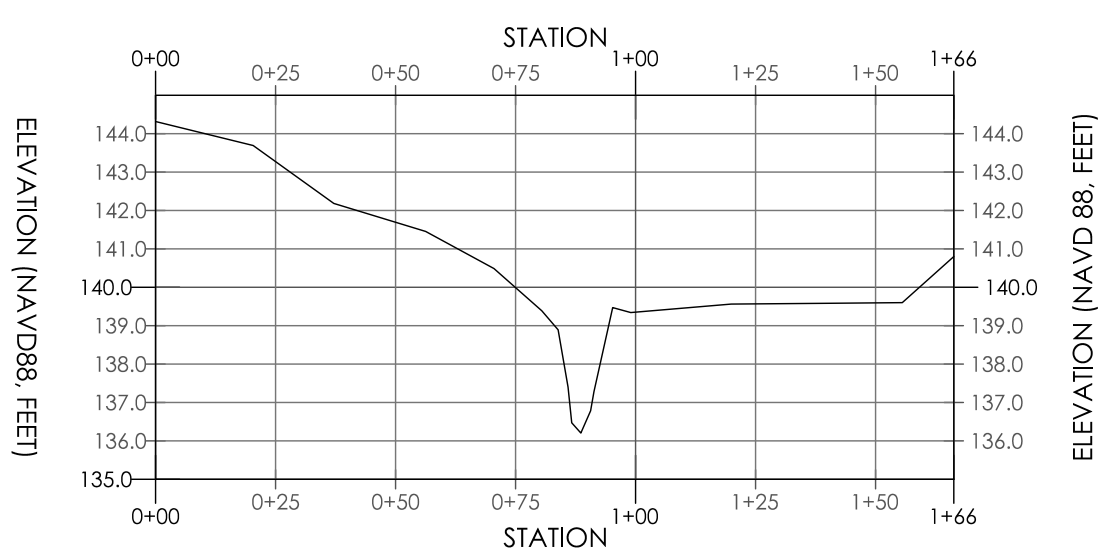
DRAWING NAME:
**PROPOSED CONDITIONS-
ROUTE 202 STORMWATER
TRIBUTARY**

DATE:	12/21/2020
PROJECT NO.:	0388.011
SCALE:	AS SHOWN
DRAWN BY:	CPS/BS
CHECKED BY:	GG/AEM/CC

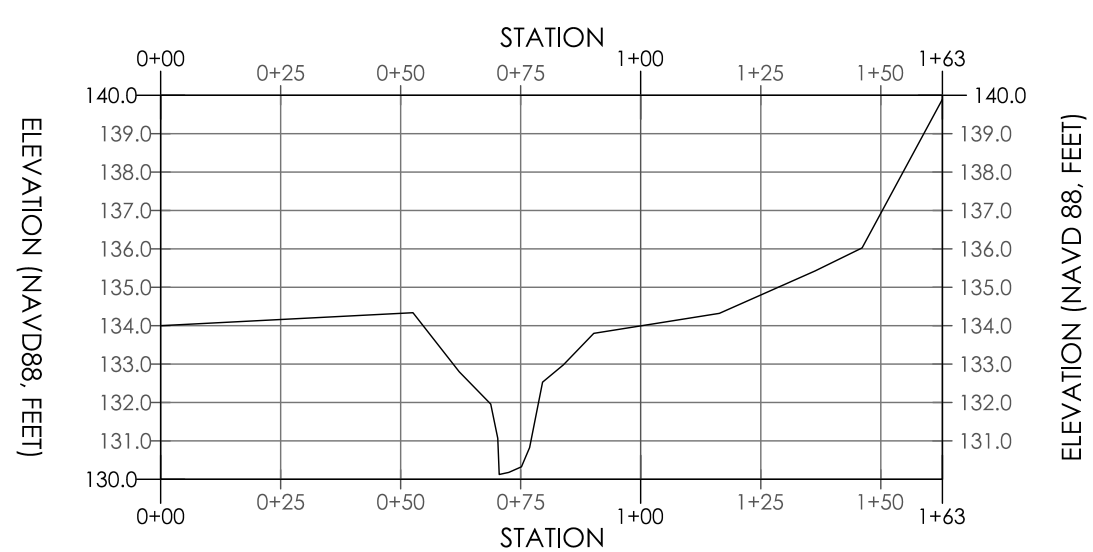
SHEET NO.
5 OF **15**



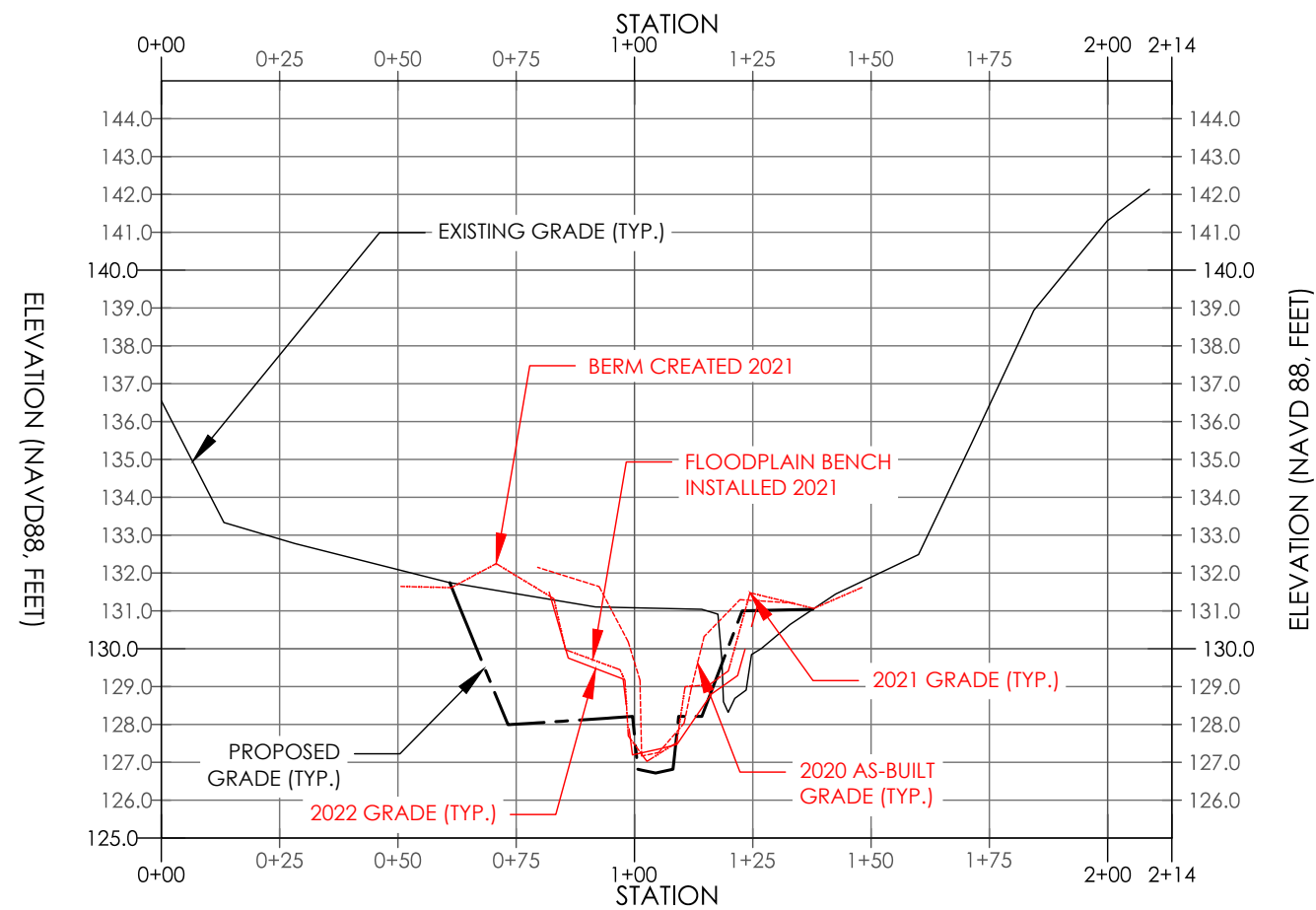
A MAIN CHANNEL CROSS SECTION A (MC XS-A)
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 5' (VERT. EXAG. = 8X)



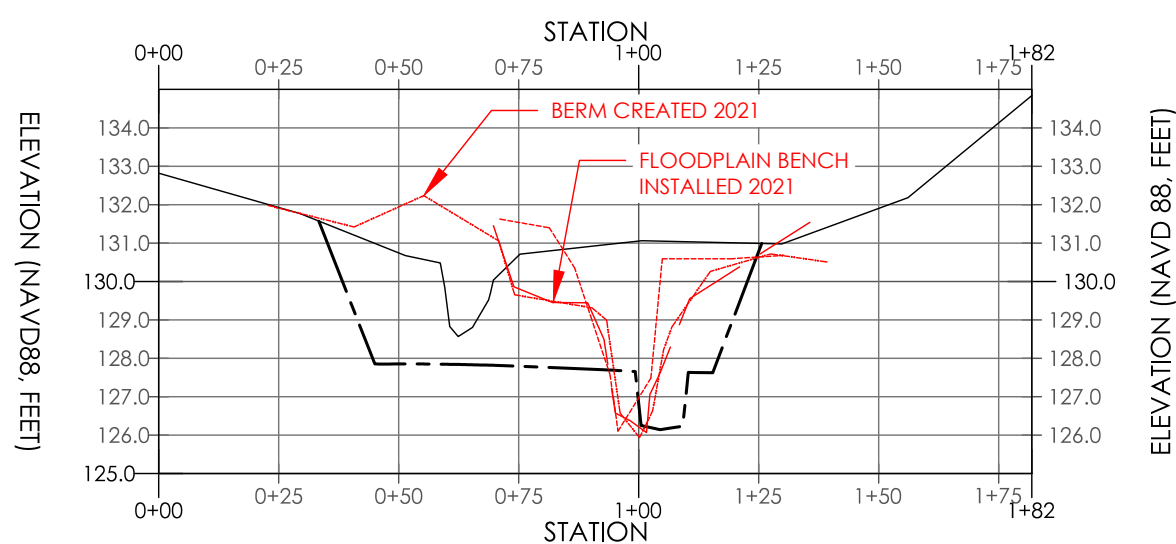
B MAIN CHANNEL CROSS SECTION B (MC XS-B)
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 5' (VERT. EXAG. = 8X)



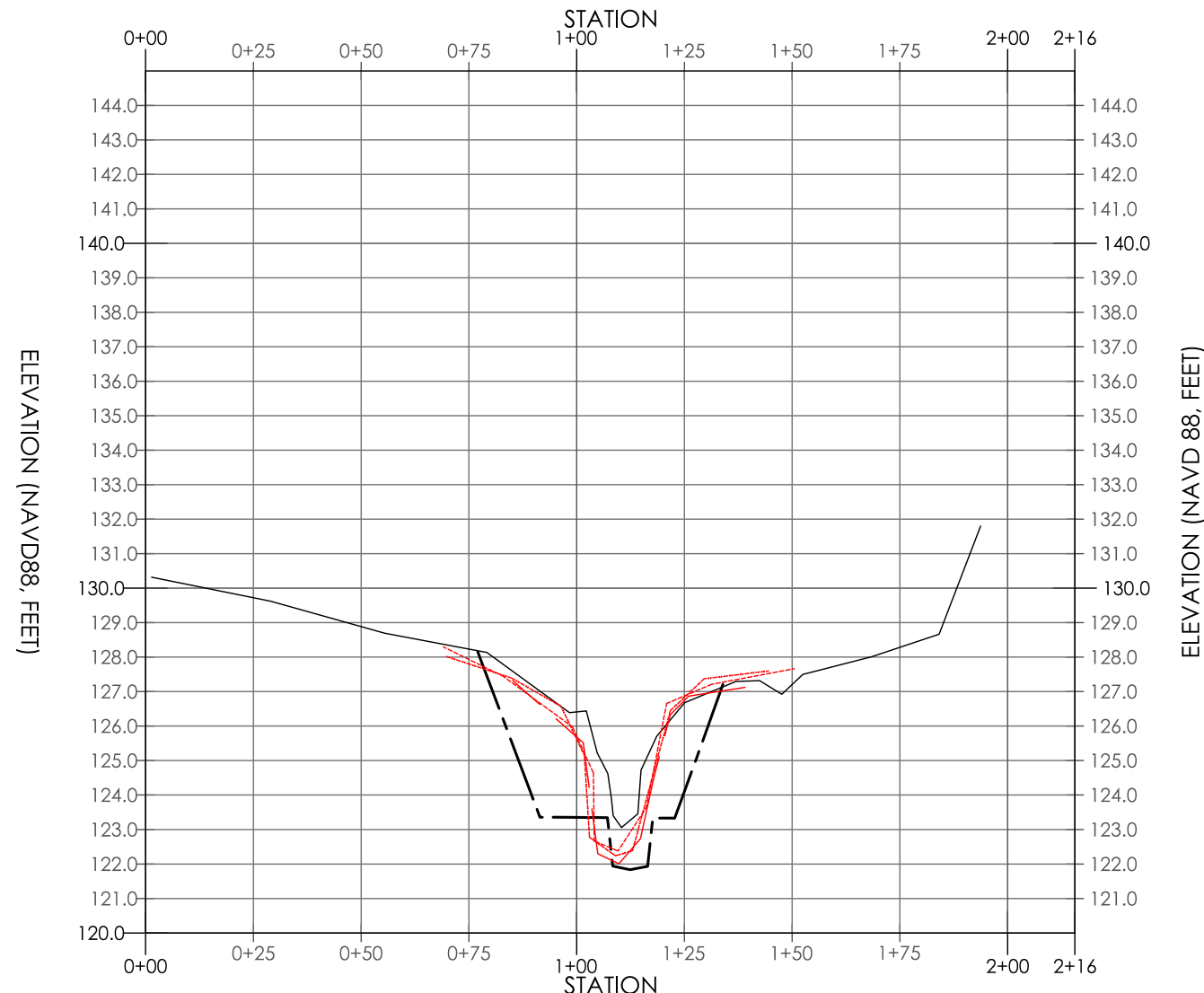
C MAIN CHANNEL CROSS SECTION C (MC XS-C)
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 5' (VERT. EXAG. = 8X)



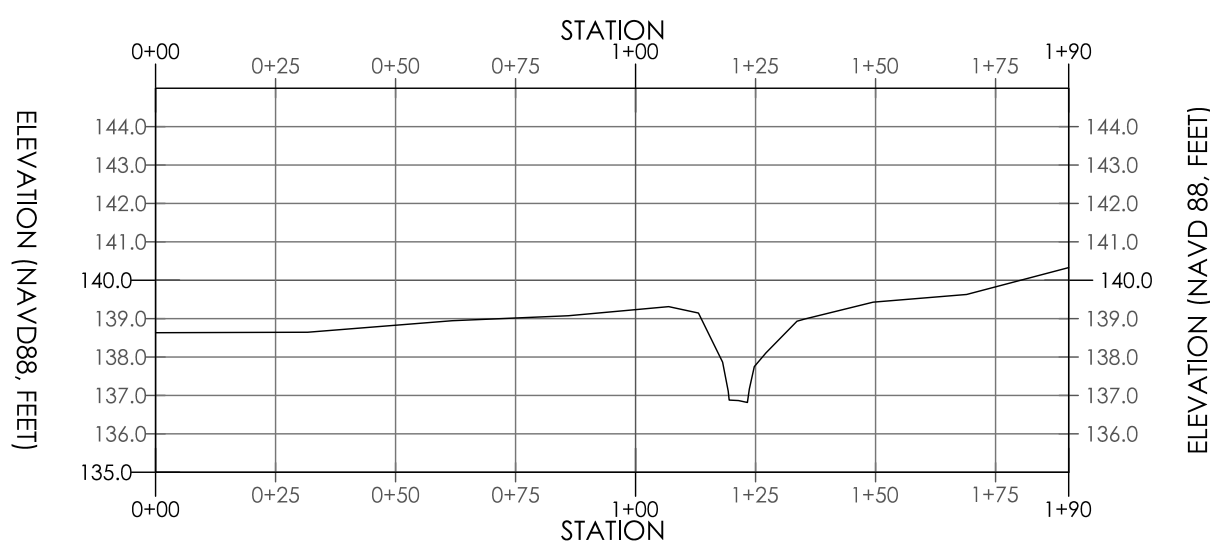
D MAIN CHANNEL CROSS SECTION D (MC XS-D)
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 5' (VERT. EXAG. = 8X)



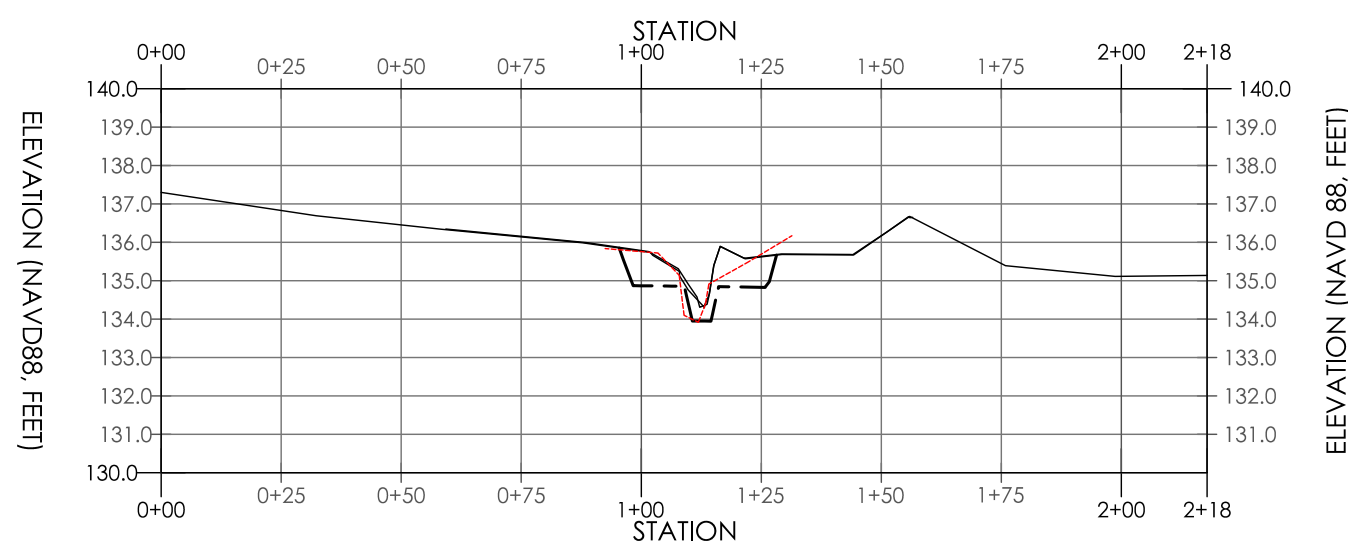
E MAIN CHANNEL CROSS SECTION E (MC XS-E)
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 5' (VERT. EXAG. = 8X)



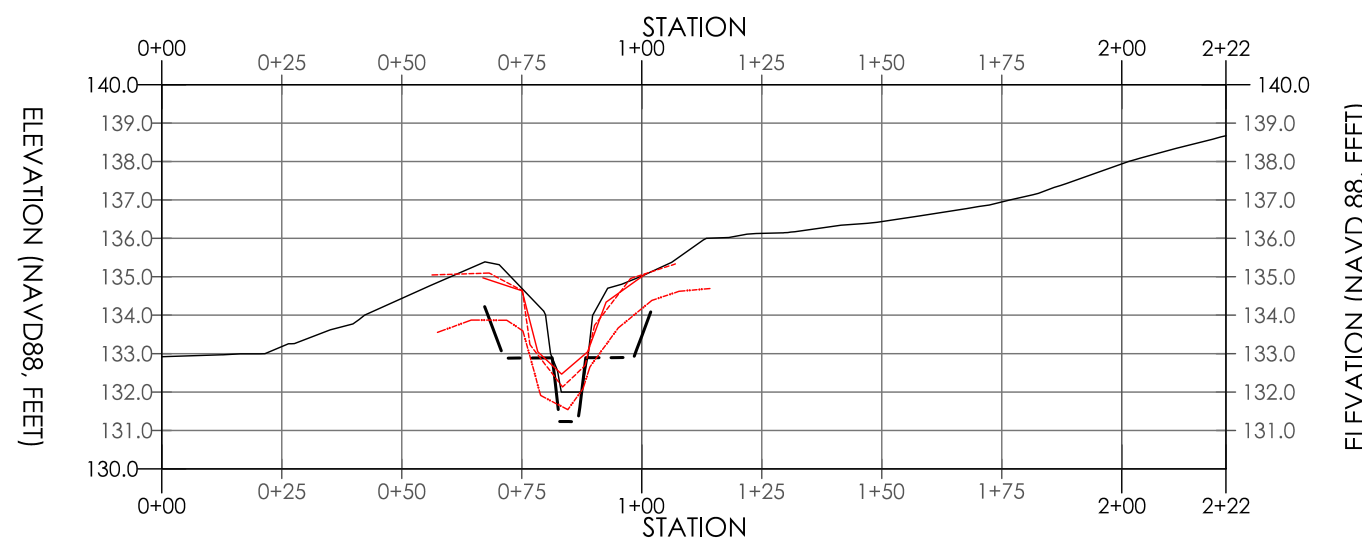
F MAIN CHANNEL CROSS SECTION F (MC XS-F)
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 5' (VERT. EXAG. = 8X)



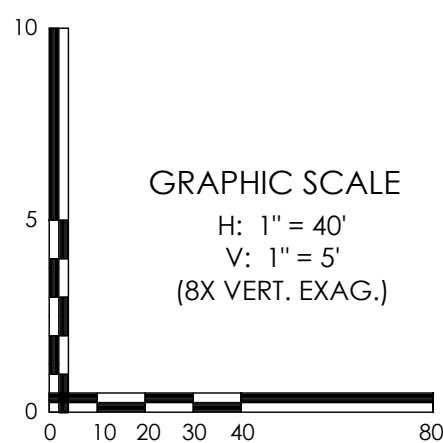
H STORWATER TRIBUTARY CROSS SECTION B (ST XC-B)
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 5' (VERT. EXAG. = 8X)



I STORWATER TRIBUTARY CROSS SECTION C (ST XC-C)
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 5' (VERT. EXAG. = 8X)



J STORWATER TRIBUTARY CROSS SECTION D (ST XC-D)
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 5' (VERT. EXAG. = 8X)



- NOTES:
- ALL CROSS SECTIONS ARE DEPICTED FROM LEFT BANK TO RIGHT BANK, LOOKING DOWNSTREAM.
 - CROSS SECTION LOCATIONS CAN BE FOUND ON PAGE 3 OF 15.

LEGEND

- EXISTING GRADE
- PROPOSED GRADE
- 2020 AS-BUILT GRADE
- 2021 GRADE
- 2022 GRADE

CALL BEFORE YOU DIG!
PENNSYLVANIA LAW REQUIRES
3 WORKING DAYS NOTICE FOR
CONSTRUCTION PHASE AND 10 WORKING
DAYS IN DESIGN STAGE - STOP CALL
PENNSYLVANIA ONE CALL SYSTEM, INC.
REFERENCE PENNSYLVANIA ACT 38
1-800-242-1776

PROJECT NOTES

- THE VERTICAL DATUM IS NORTH AMERICAN VERTICAL DATUM OF 1988 (NAVD88). FEET. THE FOLLOWING CONVERSION FOR NAVD88 TO NGVD29 IS APPLICABLE FOR THIS LOCATION:
NGVD29 = NAVD88 - 0.63 FT
- THE HORIZONTAL DATUM IS NORTH AMERICAN DATUM OF 1983 (NAD83). FEET.
- TOPOGRAPHIC MAPPING PREPARED BY ROBINSON PHOTOGRAMMETRIC MAPPING DATED 4/11/2016. FLIGHT DATE 3/7/2016 FOR C. ROBERT WYNN ASSOCIATES, INC.
- TOPOGRAPHIC MAPPING OF THE STREAM PREPARED BY GEOTREK ENVIRONMENTAL AND SURVEYING, LLC IN APRIL OF 2019.
- WETLAND DELINEATION COMPLETED BY PRINCETON HYDRO, LLC. STAFF IN NOVEMBER OF 2018.
- FEMA FIRM NOT MAPPED SINCE DAM REMOVAL: NO FHA AREA AVAILABLE.
- IN A RESPONSE DATED MAY 1, 2019 TO PNDI NO. 482836, PADCNR PROVIDED A MAP OUTLINING A POPULATION OF PA ENDANGERED JUCUS DICHOTOMUS. BY INSTALLING EXCLUSIONARY FENCING AROUND THIS AREA, NO IMPACT ANTICIPATED.
- 150-FT RIPARIAN BUFFER DETERMINED IN ACCORDANCE WITH 25 PA CODE CHAPTER 102.14
- AS-BUILT DATA COLLECTED BY PRINCETON HYDRO ON OCTOBER 22, 2020 AND MONITORING DATA COLLECTED ON OCTOBER 15, 2021 AND NOVEMBER 10, 2022.

10/10/19 REVISED PER BUCKS COUNTY CONSERVATION DISTRICT COMMENTS
7/25/19 REVISED FOR CONSTRUCTION CLARITY

DATE	DESCRIPTION
	REVISIONS

GEOFFREY M. GOLL
Professional Engineer
PA Lic. No. PE-050997-E

11/18/2022
DATE



1108 OLD YORK RD, SUITE 1
RINGOES, NEW JERSEY 08551
PHONE: 908.237.5660
PRINCETONHYDRO.COM

PROJECT NAME/LOCATION:
AQUETONG CREEK RESTORATION
AQUETONG SPRING PARK
TOWNSHIP OF SOLEBURY
BUCKS COUNTY, PENNSYLVANIA
AS-BUILT & MONITORING PLANS

DRAWING NAME:

CROSS SECTIONS

DATE:	12/21/2020
PROJECT NO.:	0388.011
SCALE:	AS SHOWN
DRAWN BY:	CPS/BS
CHECKED BY:	GG/AEM/CC

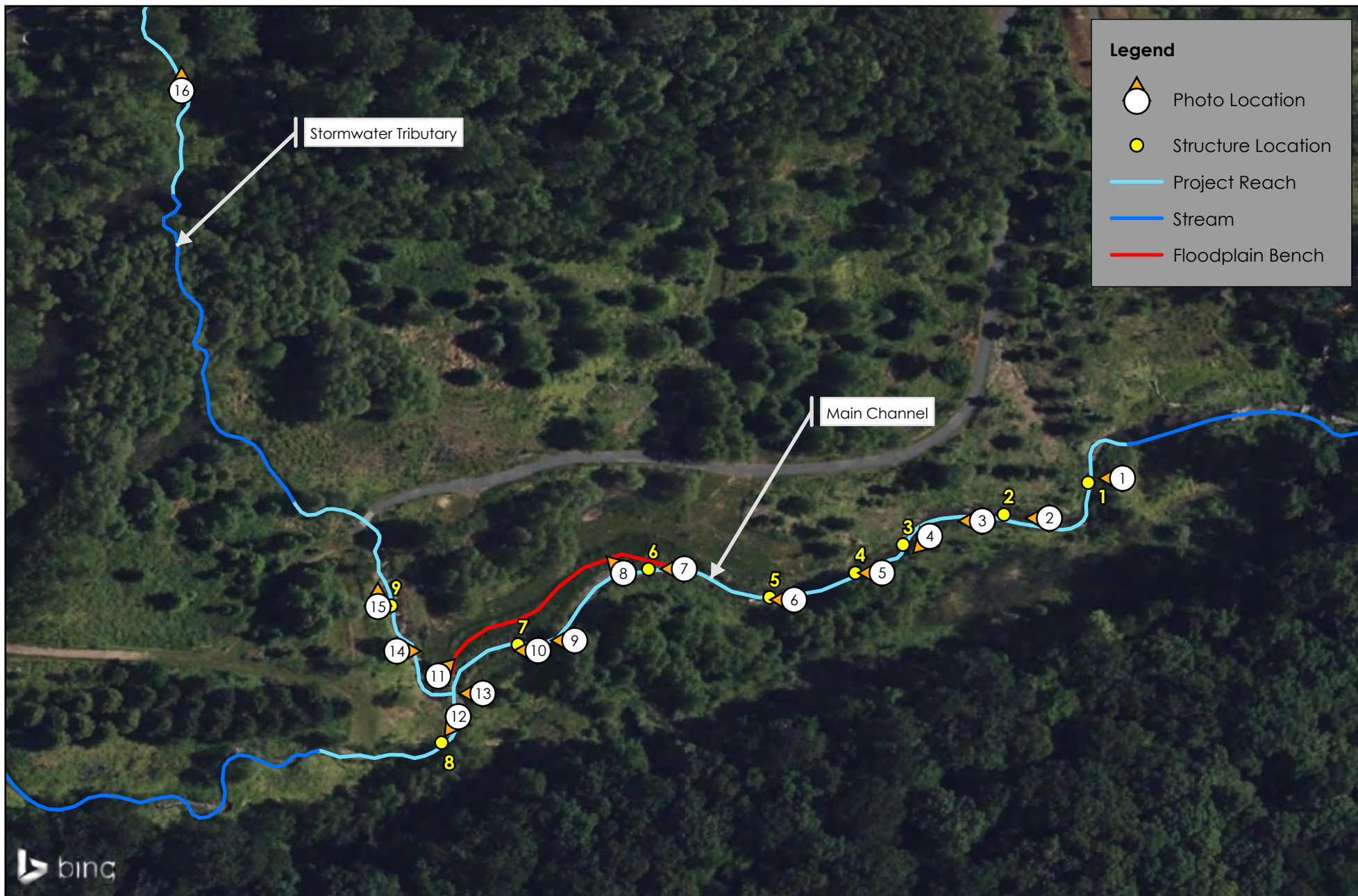
SHEET NO.

6 OF 15



ATTACHMENT B

PHOTO LOCATION MAP & PHOTO LOG



NOTES:
 1. Photo and structure locations are approximate.
 2. Aerial imagery obtained through ArcGIS Online Bing Maps (C)
 2021 Microsoft Corporation and its data suppliers.

PHOTO LOCATION MAP

AQUETONG CREEK RESTORATION PROJECT
 RIVERINE MONITORING 2022
 AQUETONG SPRING PARK
 SOLEBURY TOWNSHIP
 BUCKS COUNTY, PENNSYLVANIA



0 50 100 Feet

Map Projection: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet

Photographic Log
Riverine Monitoring 2022

Client: Solebury Township
Site Name: Aquetong Spring Park Restoration Project

Project Number: 0388.011
Site Location: Solebury Township, PA

Photograph ID: 1

Date: Nov. 10, 2022

Location:
See photo location map.

Direction:
West

Comments:
View from right bank of Structure 1. Note extensive watercress growth.



Photograph ID: 2

Date: Nov. 10, 2022

Location:
See photo location map.

Direction:
West

Comments:
Upstream view of Structure 2. Water is flowing around both sides of the structure.



Photographic Log
Riverine Monitoring 2022**Client:** Solebury Township**Site Name:** Aquetong Spring Park Restoration Project**Project Number:** 0388.011**Site Location:** Solebury Township, PA**Photograph ID:** 3**Date:** Nov. 10, 2022**Location:**
See photo location map.**Direction:**
West**Comments:**
View upstream of Structure 2, showing extensive watercress growth in the channel.**Photograph ID:** 4**Date:** Nov. 10, 2022**Location:**
See photo location map.**Direction:**
Southwest**Comments:**
Upstream view of Structure 3. This structure has been significantly altered, and consisted of a single embedded log. Bed and banks stable in the vicinity of the structure.

Photographic Log
Riverine Monitoring 2022

Client: Solebury Township
Site Name: Aquetong Spring Park Restoration Project

Project Number: 0388.011
Site Location: Solebury Township, PA

Photograph ID: 5

Date: Nov. 10, 2022

Location:
See photo location map.

Direction:
West

Comments:
Upstream view of Structure 4. Only one log of four was observed. Water was cutting around the end of the log and into the right bank.



Photograph ID: 6

Date: Oct. 15, 2021

Location:
See photo location map.

Direction:
West

Comments:
Upstream view of Structure 5. Some water was being diverted behind the log toe structure on the right bank.



Photographic Log
Riverine Monitoring 2022

Client: Solebury Township
Site Name: Aquetong Spring Park Restoration Project

Project Number: 0388.011
Site Location: Solebury Township, PA

Photograph ID: 7

Date: Nov. 10, 2022

Location:
See photo location map.

Direction:
West

Comments:
Upstream view of Structure 6. The structure was stable with no erosion observed.



Photograph ID: 8

Date: Nov. 10, 2022

Location:
See photo location map.

Direction:
Northwest

Comments:
View of downstream extent of floodplain bench constructed in 2021. Vegetation was well established and stabilizing bank.



Photographic Log
Riverine Monitoring 2022

Client: Solebury Township
Site Name: Aquetong Spring Park Restoration Project

Project Number: 0388.011
Site Location: Solebury Township, PA

Photograph ID: 9

Date: Nov. 10, 2022

Location:
See photo location map.

Direction:
West

Comments:
Upstream view of headcut.



Photograph ID: 10

Date: Nov. 10, 2022

Location:
See photo location map.

Direction:
West

Comments:
Upstream view of Structure 7. Water was cutting around the structure into both banks.



Photographic Log
Riverine Monitoring 2022

Client: Solebury Township
Site Name: Aquetong Spring Park Restoration Project

Project Number: 0388.011
Site Location: Solebury Township, PA

Photograph ID: 11

Date: Nov. 10, 2022

Location:
See photo location map.

Direction:
Northeast

Comments:
Downstream view of floodplain bench constructed in 2021. Vegetation is well established.



Photograph ID: 12

Date: Nov. 10, 2022

Location:
See photo location map.

Direction:
Southwest

Comments:
Upstream view of Structure 8. The structure was stable with minor undercutting of the right bank along an outside bend.



Photographic Log
Riverine Monitoring 2022

Client: Solebury Township
Site Name: Aquetong Spring Park Restoration Project

Project Number: 0388.011
Site Location: Solebury Township, PA

Photograph ID: 13

Date: Nov. 10, 2022

Location:
See photo location map.

Direction:
West

Comments:
Upstream view of the stormwater tributary at the confluence of the stormwater tributary with the main channel. Note extensive watercress growth.



Photograph ID: 14

Date: Nov. 10, 2022

Location:
See photo location map.

Direction:
East

Comments:
View of informal trail causing erosion on left bank of stormwater tributary.



Photographic Log
Riverine Monitoring 2022

Client: Solebury Township
Site Name: Aquetong Spring Park Restoration Project

Project Number: 0388.011
Site Location: Solebury Township, PA

Photograph ID: 15

Date: Nov. 10, 2022

Location:
See photo location map.

Direction:
North

Comments:
Upstream view of Structure 9.



Photograph ID: 16

Date: Nov. 10, 2022

Location:
See photo location map.

Direction:
North

Comments:
Upstream view of upper end of stormwater tributary and stormwater outlet installed in 2021. Vegetation was well established along the channel.

