AQUETONG CREEK RESTORATION PROJECT 2025 MONITORING REPORT

SOLEBURY TOWNSHIP, BUCKS COUNTY, PENNSYLVANIA

NOVEMBER 2025

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INTRODUCTION

The purpose of this annual monitoring report, the fifth of five, is to document the status and development of the Aquetong Creek Restoration Project (Restoration Project) located within Aquetong Spring Park in Solebury Township, Bucks County, Pennsylvania (Site; **Figures 1 and 2**).

The Restoration Project is situated within the former impoundment of Aquetong Lake (Lake), which was a 15-acre impoundment formed in 1870 by the construction of an earthen dam on Aquetong Creek (Creek). Solebury Township removed the dam in April 2015 via a controlled partial breach that drained the Lake and re-exposed the Lake bottom. The goal of the dam breach was to reduce thermal impacts on the Creek, a high-quality, cold-water fishery designated waterbody that supports a breeding population of brook trout. With the dam removed and the Lake drained, a meandering channel formed through the exposed Lakebed, connecting the upper and lower headwater sections of the Creek. The primary source of inflow to the headwater portion of the 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). The Creek also receives flow from an unnamed tributary that enters the Site from 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 overland flow which enters the Creek via stormwater runoff discharged from the adjacent developed areas located to the north and south of the Site.

Following the breaching of the dam, stewardship was necessary to guide the early developmental stages of the former impoundment to facilitate the establishment of desirable ecological communities and a productive surface water feature that continues to maintain its population of brook trout. The Restoration Project was implemented following Solebury Township's (herein referred to as "the Township") purchase of the Site. From the onset, the Township and its environmental partners recognized the unique environmental benefits of the cold-water spring and the possibilities associated with the re-establishment of the Creek through the breaching of the dam. Following the dam breach, the Township and its project partner, Bucks County Trout Unlimited, successfully transplanted 1,000 native Pocono brook trout to the re-established Creek channel. Scientific monitoring of the Creek, commissioned by the Township, confirmed that, after a year, the transplanted brook trout population was reproducing.

In 2018, the Township completed its Strategic Master Plan for Aquetong Spring Park which expanded the objectives for the restoration of the former impoundment as part of the park design. The restoration efforts included the management of diseased forest, impoundment restoration (including stormwater management), and park improvements focused on passive recreation, education, and cultural components. Immediately downgradient of the former dam remnants was a forest comprised of mostly diseased green ash (*Fraxinus pennsylvanica*) and black walnut (*Juglans nigra*) trees. The Township removed these hazard trees in 2019 and re-established the area with other desirable native species. The Township concurrently established an invasive species management program. The Township reused the removed trees within the park (with Pennsylvania Department of Environmental Protection (PADEP) approval) in conjunction with the Restoration Project as habitat and park features.

A PADEP-approved Restoration Waiver 16 (Authorization ID No. 1278424, dated October 23, 2019) (See Appendix IV) approved the monitoring of the stream and wetland restoration areas and wetland creation areas in accordance with the Mitigation Plan narrative provided as module S4 of the *Aquetong Creek Restoration Project Environmental Assessment Addendum*, dated June 2019, last updated September 2019. The restoration of the wetlands commenced in 2020 and included the enhancement of 1.09-acres of existing palustrine emergent (PEM) wetlands through floodplain re-connectivity, invasive species removal, subsequent installation of native herbaceous and woody plant material, and the creation of 0.25-acres of forested wetlands. The wetland enhancement and creation elements were designed to provide additional functions and values

File: P:\0388\Projects\0388011\GIS\APRX\Aquetong Monitoring Report\Aquetong Monitoring Report.aprx, 11/18/2025, Drawn by tsrinivasan, Copyright Princeton Hydro, LLC.

NOTES:
1. Stream and project boundary are approximate.
2. Orthoimagery obtained from Nearmap Aerial Imagery Services, flight date 02/24/2024.

0 200 400 Feet

Map Projection: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet

AERIAL OVERVIEW MAP

AQUETONG CREEK RESTORATION PROJECT
WETLAND MITIGATION MONITORING
AQUETONG SPRING PARK
SOLEBURY TOWNSHIP
BUCKS COUNTY, PENNSYLVANIA

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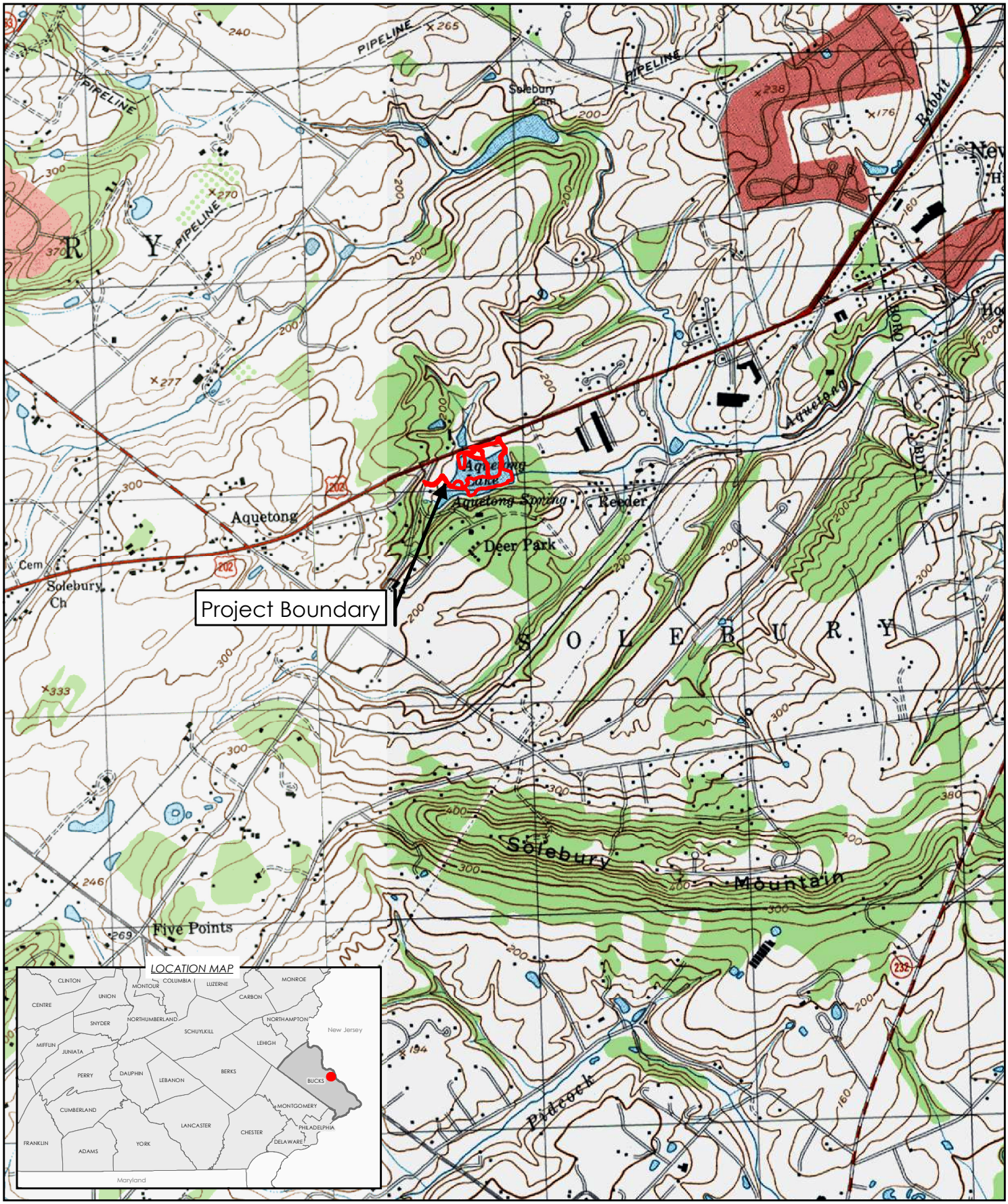

File: P:\0388\Projects\0388011\GIS\MXD\USGS.mxd, 11/18/2021, Drawn by bsmith, Copyright Princeton Hydro, LLC.

NOTES:
1. Project boundary obtained from Princeton Hydro planset titled "Aquetong Creek Restoration" dated 10/18/2019.
2. USGS topographic digital raster graphic obtained from Terrain Navigator Pro, Lambertville and Buckingham, PA quadrangle.

0 1,000 2,000 Feet

Map Projection: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet

USGS LOCATION MAP

AQUETONG CREEK RESTORATION PROJECT
WETLAND MITIGATION MONITORING
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when compared with the pre-existing degraded PEM wetlands. The creation of wetlands was necessitated via the permanent conversion of approximately 0.07-acres of degraded PEM wetlands to open water; thus, 0.25-acres of forested wetland were created in accordance with Chapter 105.20a(a)1 to compensate for the permanent areal loss of wetland. Additionally, the creation of 0.25-acres of forested wetland complies with Chapter 105.20a(a)2 as the forested wetland was designed to provide additional functions and values when compared to the previously degraded PEM wetland. The resulting ratio was 3:1, greater than the required 1:1 wetland replacement criterion outlined in Chapter 105.20a(a)(1). The forested wetlands are located adjacent to the permanently converted PEM wetland in accordance with the Siting Criteria outlined in Chapter 105.20a(a)(3). Overall, the project resulted in a 0.18-acre net gain of wetlands on-Site.

This monitoring report presents data collected during the 2025 growing season, the Site's fifth full growing season after planting, to illustrate compliance and document the status and development of the Restoration Project since monitoring was initiated in 2021. The data collected serves to steward the wetland's development moving forward. The information provided in this monitoring report includes the following: (i) a description of the general success of the Restoration Project at the time of inspection, (ii) an inventory of plant species present, (iii) a qualitative description of wildlife utilization, (iv) a determination of the percent areal coverage of vegetation, (v) color photographs, (vi) a Site plan indicating location and orientation of the photographs, (vii) and a description of adaptive management measures that were and/or need to be implemented to address potential problems or deficiencies identified during the inspection.

Figure 3. View of healthy installed woody species amidst a robust herbaceous stratum within the wetland enhancement area.

As of Year 5, the Site has continued on a positive developmental trajectory that has satisfied the Restoration Project goals, which were to achieve at least 85% vegetative coverage by native, desirable hydrophytic species; to achieve at least 85% woody plant survivorship; to minimize the areal coverage of undesirable, non-native species to the maximum extent practicable; and to stabilize the Creek channel. As further described within Section 4, the Site achieved an average of 100% vegetative cover and 159.1% total vegetative cover; achieved 86.6% woody plant survivorship; significantly reduced the areal coverage of undesirable, non-native plant species due to the herbicide treatments and subsequent colonization of treated areas with desirable native hydrophytic plant species; and established a stabilized Creek channel completely vegetated by desirable native woody and herbaceous plant species.

SECTION 1: PRE-CONSTRUCTION SITE ENVIRONMENT

Following the breaching of the dam and draining of the Lake, a meandering channel formed through the exposed Lakebed sediment, connecting the spring to the reach of the Creek below the former dam. Sufficient sediment had accumulated in the former Lake such that the meandering channel that re-formed following dam removal, which initiated the process of channel incision or "downcutting" (i.e., active erosion of sediment from a stream that results in lowering the elevation of a channel bed and reduces channel slope). The Restoration Project experienced downcutting, creek channel instability, and erosion of the former Lake bottom. Certain sections of the Creek's channel were unstable and underlain by additional erodible sediment. Further, the exposure of Lake sediments following the dam breach facilitated the establishment of invasive species within portions of the former Lakebed, negatively impacting the ecological functions and values of recently exposed floodplain wetlands and associated upland areas.

SECTION 2: DESIGN AND CONSTRUCTION

As indicated within the Introduction above, following the breaching of the dam, stewardship was necessary to guide the early developmental stages of the former impoundment to facilitate the establishment of desirable ecological communities and a productive surface water feature that continues to maintain its population of brook trout. To address the instability of the newly formed Creek channel, the establishment of stabilized channel dimensions, the expansion and realignment of portions of the channel for geomorphic stability, and the creation of 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 was implemented. The design also included installing large woody debris to create aquatic habitat and enhance the 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 Restoration Project was completed in 2020 and the first as-built survey/site monitoring post-construction was conducted on October 22, 2020.

The Restoration Project is comprised of wetland creation and wetland enhancement areas. The wetland creation area consists of 0.25 acres (10,804 square feet) of palustrine forested (PFO) freshwater wetlands designed to replace the permanent loss and conversion of the adjacent degraded PEM wetland to open water. The forested wetland creation area was designed to foster the development of a forested floodplain wetland adjacent to the stabilized Creek channel. The wetland creation area is located adjacent to the Creek and its tributary (Appendix III, Photo 7). The wetland enhancement area is comprised of 1.09 acres (47,301 square feet) of PEM wetlands. The purpose of the wetland enhancement area is to enhance the biological and physical functions of the existing PEM wetlands on-Site, such as providing fish and wildlife habitat, enhancing the water quality of the Creek, providing flood storage, and controlling erosion along the Creek banks. The wetland enhancement areas are located on portions of the western bank of the unnamed tributary to the Creek, and along both the northern and southern bank of the Creek (Appendix III, Photos 9 and 11).

The Restoration Project resulted in the creation of PFO wetland and enhancement of PEM wetland that currently possess and will continue to support a variety of native herbaceous and woody species. The wetland enhancement area was designed to connect the Creek to its floodplain to store floodwater from the Creek and its tributary, which are the primary hydrologic sources for the wetlands within the Restoration Project footprint. In addition to the Restoration Project's wetland creation and enhancement elements, the project also aimed to develop a stable Creek channel capable of passing various flow rates without being subject to erosion.

Specifically, the restoration of the wetlands and Creek channel serves to foster the Site's capability of supporting a high-quality, cold-water aquatic community. Additionally, the Restoration Project improves the Creek's water quality via the stabilization of the Creek channel.

A planting plan was devised for the 1.35-acre wetland portion of the Restoration Project, and is based on the local plant assemblage, hydrology, and other observed Site conditions. In 2020, an initial native seed mix was applied, and 6,600 two-inch herbaceous plugs were installed throughout the wetland portion of the Restoration Project. The type, hydrologic indicator status, and quantity of herbaceous plant material that was installed in the wetlands is provided in **Tables 1** and **2** below.

Table 1. Wetland Restoration Area Seed Mix

Botanical Name	Common Name	Indicator Status	Rate (lb/acre)[1]	Quantity (%)
Bidens frondosa	Devil's beggartick	FACW	1.00	5.00
Calamagrostis canadensis	Bluejoint grass	FACW	1.50	5.00
Cinna arundinaceae	Wood reedgrass	FACW	2.25	8.00
Echinochloa muricata	Rough barnyard grass	OBL	3.00	10.00
Elymus virginicus	Virginia wildrye	FACW	5.25	18.00
Carex vulpinoidea	Fox sedge	OBL	4.00	14.00
Lolium multiflorum	Annual rye	NL	4.50	15.00
Panicum dichotoflorum	Smooth panic grass	FACW	3.00	10.00
Dichanthelium clandestinum	Deertongue	FAC	4.25	15.00
Persicaria pensylvanica	Pennsylvania smartweed	FACW	0.75	3.00
Verbena hastata	Blue vervain	FACW	0.25	1.00
Senna hebecarpa	Wild senna	FACW	0.25	1.00

[1] Seed was spread over entire area (1.35 acres) at a rate of 30 pounds per acre.

Table 2. Wetland Restoration Area Herbaceous Plugs

Botanical Name	Common Name	Indicator Status	Planting Type	Quantity[1]
Asclepias incarnata	Swamp milkweed	OBL	2" Plug	300
Carex comosa	Longhair sedge	OBL	2" Plug	450
Carex crinita	Fringed sedge	OBL	2" Plug	500
Carex lurida	Shallow sedge	OBL	2" Plug	500
Carex scoparia	Broom sedge	FACW	2" Plug	600
Elymus virginicus	Virginia wildrye	FACW	2" Plug	600
Eupatorium perfoliatum	Boneset	FACW	2" Plug	250
Helenium autumnale	Common sneezeweed	FACW	2" Plug	400
Iris versicolor	Blueflag iris	OBL	2" Plug	350
Juncus effusus	Soft rush	OBL	2" Plug	600
Leersia oryzoides	Rice cutgrass	OBL	2" Plug	400
Schoenoplectus tabernaemontani	Soft-stem bulrush	OBL	2" Plug	500
Scirpus cyperinus	Woolgrass	FACW	2" Plug	550
Smphyotrichum novae-angliae	New England aster	FACW	2" Plug	300
Verbena hastata	Blue vervain	FACW	2" Plug	300

[1] The quantity of herbaceous plants is based on a planting density of 3 feet on center.

Additionally, a total of 710 woody plants (385 trees and 325 shrubs) were installed in the wetland creation and enhancement areas in 2020. Woody material was installed where suitable habitat was present and were selected based on (1) being indigenous to the region, (2) providing either good cover or food for wildlife, and (3) having

generally good to high survivorship. The type, wetland hydrologic indicator status, and quantity of woody plant material installed within the wetland portion of the Restoration Project is provided in **Tables 3** and **4**.

Table 3. Wetland Restoration Area Tree Installation

Botanical Name	Common Name	Indicator Status	Planting Type	Quantity[1]
Acer rubrum	Red maple	FAC	24" - 36" Container	20
Betula nigra	River birch	FACW	24" - 36" Container	40
Platanus occidentalis	American sycamore	FACW	24" - 36" Container	60
Quercus bicolor	Swamp white oak	FACW	24" - 36" Container	95
Quercus palustris	Pin oak	FACW	24" - 36" Container	95
Salix nigra	Black willow	OBL	24" - 36" Container	75

[1] The quantity of trees is based on a planting density of 10 feet on center.

Table 4. Wetland Restoration Area Shrub Installation

Botanical Name	Common Name	Indicator Status	Planting Type	Quantity[1]
Alnus serrulata	Smooth alder	OBL	24" - 36" Container	35
Aronia arbutifolia	Red chokecherry	FACW	24" - 36" Container	65
Cephalanthus occidentalis	Common buttonbush	OBL	24" - 36" Container	15
Cornus amomum	Silky dogwood	FACW	24" - 36" Container	65
Ilex verticillata	Winterberry holly	FACW	24" - 36" Container	50
Rosa palustris	Swamp rose	OBL	24" - 36" Container	30
Salix discolor	Pussy willow	FACW	24" - 36" Container	65

[1] The quantity of shrubs is based on a planting density of 10 feet on center.

SECTION 3: MONITORING METHODOLOGY

Vegetative cover of the wetland creation and enhancement areas was determined through the use of eight (8) permanent 1 x 1-meter quadrats. The area within each quadrat that lacked vegetation (hereinafter referred to as the "unvegetated area") was visually estimated in accordance with the *Ocular Estimation of Cover Technique* (USFWS, 1981). The total vegetative cover was the area that remained after excluding the areas determined to be unvegetated. Percent vegetative cover determined by this method is derived by subtracting the unvegetated area from the total area of each quadrat. The formula below was utilized to determine the percent vegetative cover by this method.

Percent Vegetative Cover = {(total area - unvegetated area)/total area} x 100

All references to vegetative cover in this document are based on this formula. Subsequently, the vegetative cover provided by each species was visually estimated. Species that were present, but provided less than 1 percent cover, were indicated to be "P" (present). The species-by-species sampling data for each quadrat is provided in Tables 5 and 6. The estimates of total vegetative cover provided by this method are essentially relative values comparing the area within each quadrat that is covered by vegetation relative to un-vegetated areas within the quadrat. However, since plant cover can overlap, the total vegetative cover present in any given quadrat often exceeds the percent vegetative cover derived by the above referenced formula. The formula used above provides a simple mechanism to portray the area within each quadrat that is covered by vegetation relative to meeting established regulatory objectives. The use of total vegetative cover, however, more effectively conveys the ecological development of the area since it considers the cover provided by each species. Total vegetative cover thus provides a mechanism to see the changes in cover that occur as the wetland matures and becomes more structurally complex.

SECTION 4: MONITORING INSPECTION

The monitoring inspection, the fifth of five, was conducted on September 24, 2025. The inspection included the evaluation of the eight (8) fixed monitoring plots which includes representative locations of both the wetland creation (4) and wetland enhancement (4) areas. Vegetative cover and woody survivorship of the wetland restoration areas was estimated and evaluated in accordance with the methodology detailed in *Section 3.0*. At the time of the inspection, the wetland restoration area exhibited 100% vegetative cover and 159.1% total cover. The monitoring plot data for the wetland creation and wetland enhancement areas are discussed below in *Subsections 4.1 and 4.2,* respectively. In accordance with the *Aquetong Creek Restoration Project Environmental Assessment Addendum* (Princeton Hydro, 2019), a qualitative description of wildlife utilization of the wetland restoration areas is also provided in *Subsection 4.6*.

Figure 4. View of Aquetong Creek's banks that support well-established hydrophytic vegetation.

SUBSECTION 4.1 WETLAND CREATION AREA PLOTS

Four (4) quadrats were established in representative locations throughout the wetland creation area. **As shown in Table 5, the results of the 2025 monitoring inspection indicate that the wetland creation area possessed 100% mean vegetative cover, which exceeds the 85% vegetative cover threshold stipulated by the PADEP. The total vegetative cover was estimated to be 155.3%, which illustrates that a complex heterogeneous community has been established within the wetland creation area.** The high total percent cover observed in 2025 supports the position that the Restoration Project continues on a positive developmental trajectory while also developing increased structural heterogeneity, as depicted between Fall 2021 (left) and Fall 2025 (right).

Vegetative species richness in 2025 (n = 15) slightly decreased from 2024 (n = 17). Similarly to 2023 and 2024, common reed (*Phragmites australis*, FACW) and Nepalese browntop (*Microstegium vimineum*, FAC) continue to be absent from the monitoring plots in the wetland creation area. The decrease in richness is partly attributed to the absence of Canada thistle (*Cirsium, arvense*, FACU), which was one of the three undesirable, non-native plant species observed within the wetland creation monitoring plots in previous years. Japanese bristlegrass (*Setaria faberi*, UPL) and garlic mustard (*Alliaria petiolata*, FACU) were present within the wetland creation area at 0.3% and 7.5%, respectively. These species are acclimated to dryer conditions and likely took advantage of the dry conditions during the growing season of 2025. These species were treated during the herbicide treatment efforts of 2025, and their mean cover is anticipated to decrease. Additionally, the percent cover of these species is anticipated to decrease over time as desirable native species coverage, such as jewelweed (*Impatiens capensis*, FACW), increases.

The five (5) most prevalent native species observed within the wetland creation area were jewelweed (67.5%), American sycamore (25.0%), river birch (12.5%), Maryland senna (*Senna marilandica*, FAC) (7.5%), and silky dogwood (7.5%). Despite the dry conditions observed during the 2025 growing season, the wetland creation area continues to be dominated by hydrophytic species with wetland indicator statuses of FACW and OBL. For example, the mean percent cover of jewelweed increased nearly four-fold from 2024 (27.5%). The dominance of hydrophytic plant species indicates that the Site's hydrologic regime and hydrologic connectivity to the Creek and its tributary is functioning as designed.

No barren areas were observed within the wetland creation area. The continued establishment of a diverse assemblage of native species throughout the wetland creation portions of the Restoration Project supports the

position that the wetland creation areas possess suitable substrate and hydrology resulting in a structurally diverse, desirable plant assemblage that has satisfied the requirements of the PADEP issued permit within the five-year monitoring period.

As stated above, undesirable, non-native species such as Japanese bristlegrass and garlic mustard was observed within the monitoring plots. Despite their presence, the overall presence of these species occurred in small and scattered patches. To address their presence, these species were targeted with an herbicide on October 7th, 2025 (see *Section 4.4*). It is anticipated that the 2025 herbicide treatment will result in these areas being colonized by desirable native plant species.

Table 5. Wetland Creation Area Percent Vegetative Cover

Sampling Plot	Wetland Creation				Mean % Cover
	W3	W5	W6	W7	
Barren Soil	0	0	0	0	0.0
Impatiens capensis	70	80	60	60	67.5
Platanus occidentalis	0	0	0	100	25.0
Betula nigra	50	0	0	0	12.5
Senna marilandica	0	30	0	0	7.5
Cornus amomum	0	0	30	0	7.5
Alliaria petiolata	0	0	0	30	7.5
Symphyotrichum novae-angliae	15	10	0	0	6.3
Erechtites hieraciifolius	0	20	0	0	5.0
Persicaria hydropiperoides	0	0	10	5	3.8
Persicaria pensylvanicum	0	5	10	0	3.8
Epilobium coloratum	0	0	10	0	2.5
Phytolacca americana	0	0	10	0	2.5
Asclepias incarnata	10	0	0	0	2.5
Helenium autumnale	5	0	0	0	1.3
Setaria faberi	1	0	0	0	0.3
Percent Cover	100	100	100	100	**100.0**
Total Cover	151	145	130	195	**155.3**

SUBSECTION 4.2 WETLAND ENHANCEMENT AREA PLOTS

Four (4) quadrats were established in representative locations throughout the wetland enhancement area. **As shown in Table 6, the results of the 2025 monitoring inspection indicate that the wetland enhancement area possessed 100% mean vegetative cover, which exceeds the 85% vegetative cover threshold stipulated by the PADEP. The total vegetative cover was estimated to be 162.8%, which illustrates that a complex heterogenous community has been established within the wetland enhancement area**. The high total percent cover observed in 2025 supports the position that the Restoration Project continues on a positive developmental trajectory while also developing increased structural heterogeneity, as depicted between Fall 2021 (left) and Fall 2025 (right).

As observed within the wetland creation portion of the Restoration Project, the overall total vegetative cover is indicative of (1) a site that is on a positive developmental trajectory, and (2) the continued establishment of a diverse assemblage of desirable native species supports the position that the wetland enhancement areas possess suitable substrate and hydrology.

No barren ground was observed, and all plots were well-established with a diverse native herbaceous plant community. The species richness decreased slightly in 2025 (n = 16) from 2024 (n = 17). Although the total number of plant species (n) slightly decreased in 2025, non-native species, such as common reed, which was present in prior years, were absent from the monitoring plots within the wetland enhancement area. As compared to Fall 2021 (left), the native herbaceous and woody species proliferated within the wetland enhancement areas by Fall 2025 (right).

The five most prevalent species were jewelweed (46.3%), black willow (37.5%), rice cutgrass (*Leersia oryzoides*, FACW) (15.0%), river birch (12.5%), and Canadian clearweed (*Pilea pumila*, FACW) (12.5%). Despite the dry conditions observed during the 2025 growing season, the wetland enhancement area continues to be dominated by hydrophytic species with wetland indicator statuses of FACW and OBL. For example, the mean percent cover of jewelweed and black willow remained the same as observed in 2024, and rice cutgrass increased in mean cover from 5.0% in 2024 to 15.0% in 2025. The dominance of hydrophytic plant species indicates that the Site's hydrologic regime and hydrologic connectivity to the Creek and its tributary is functioning as designed. Overall, the results of the fifth monitoring inspection indicate that the wetland enhancement area has continued on a positive developmental trajectory resulting in satisfying the requirements of the PADEP issued permit within the five-year monitoring period.

Table 6. Wetland Enhancement Area Percent Vegetative Cover

Sampling Plot	Wetland Enhancement				Mean % Cover
	W1	W2	W4	W8	
Barren Soil	0	0	0	0	0.0
Impatiens capensis	30	90	15	50	46.3
Salix nigra	0	0	100	50	37.5
Leersia oryzoides	60	0	0	0	15.0
Betula nigra	0	0	0	50	12.5
Pilea pumila	5	5	20	20	12.5
Epilobium coloratum	40	0	5	0	11.3
Microstegium vimineum	0	10	0	30	10.0
Cardamine impatiens	0	0	15	0	3.8
Persicaria pensylvanicum	0	10	0	0	2.5
Elymus virginicus	0	0	0	10	2.5
Carex lurida	10	0	0	0	2.5
Persicaria hydropiperoides	5	0	5	0	2.5
Galium obtusum	0	0	5	0	1.3
Salix discolor	0	5	0	0	1.3
Ranunculus pusillus	3	0	0	0	0.8
Typha latifolia	3	0	0	0	0.8
Percent Cover	100	100	100	100	**100.0**
Total Cover	156	120	165	210	**162.8**

SUBSECTION 4.3 WOODY PLANT SURVIVORSHIP

As shown in Table 7, the woody plant survivorship within the Restoration Project after the fifth growing season was 86.6%, which is above the 85% survivorship threshold stipulated by the permit. Survivorship increased from 81.7% in 2024 to 86.6% in 2025. The increase in survivorship of certain species, such as red maple, swamp white oak, red chokecherry, and common buttonbush, is due to the spring 2025 supplemental planting effort executed by the Township of Solebury and the Aquetong Watershed Association. In order to address the woody survivorship mortality observed in 2024, the Township of Solebury and the Aquetong Watershed Association obtained funding from the Lower Delaware Wild and Scenic Management Council to install seventy-seven (77) supplemental tree and shrub plantings on-Site (**Table 8**). Native trees and shrubs that have shown an aptitude for the Site's underlying environmental variables including red maple, swamp white oak, common buttonbush, red chokecherry, bald cypress (*Taxodium distichum*, OBL), and sweet bay magnolia (*Magnolia virginiana*, FACW) were installed within the wetland restoration areas.

The increase in survivorship of the remaining species may also be attributable to the decline in vegetative cover by American burnweed (*Erechtites hieraciifolius*), which is a native annual herbaceous species that can reach heights greater than 5-feet, which can make it difficult to locate installed woody material, particularly shrubs. The majority of American burnweed within the wetland restoration areas was replaced by jewelweed, which is shorter, making it easier to locate the planted shrubs.

Table 7. Wetland Restoration Area Woody Plant Survivorship

Botanical Name	Common Name	Quantity Installed	Quantity Observed	Survivorship (%)
Acer rubrum	Red maple	20	29	>100.00
Betula nigra	River birch	40	77	>100.0
Platanus occidentalis	American sycamore	60	72	>100.0
Quercus bicolor	Swamp white oak	95	51	53.7
Quercus palustris	Pin oak	95	38	40.0
Salix nigra	Black willow	75	173	>100.0
Alnus serrulata	Smooth alder	35	11	31.4
Aronia arbutifolia	Red chokecherry	65	18	27.7
Cephalanthus occidentalis	Common buttonbush	15	16	>100.00
Cornus amomum	Silky dogwood	65	88	>100.0
Ilex verticillata	Winterberry holly	50	0	0.0
Rosa palustris	Swamp rose	30	0	0.0
Salix discolor	Pussy willow	65	42	64.6
Total		710	615	**86.6**

The species with the highest survivorship (>100%) were red maple, river birch, American sycamore, black willow, common buttonbush, and silky dogwood. These species continue to colonize the Restoration Project; for example, seventy-five (75) black willow saplings were installed, and one hundred and seventy-five (173) viable black willow saplings were observed in 2025.

Table 8. 2025 Tree and Shrub Plantings

Botanical Name	Common Name	Quantity Installed
Acer rubrum	Red maple	6
Cercis canadensis	Eastern redbud	3
Amelanchier canadensis	Serviceberry	5
Quercus bicolor	Swamp white oak	3
Platanus acerifolia	London planetree	2
Lindera benzoin	Northern spicebush	10
Viburnum acerifolium	Mapleleaf viburnum	10
Cephalanthus occidentalis	Common buttonbush	15
Aronia arbutifolia	Red chokecherry	10
Taxodium distichum	Bald cypress	9
Magnolia virginiana	Sweet bay magnolia	4
Total		77

Figure 5. General view of the newly installed healthy native trees within the wetland restoration areas on-site.

SUBSECTION 4.4 UNDESIRABLE PLANT SPECIES

In 2025, portions of the Restoration Project possessed undesirable non-native species such as common reed, Nepalese browntop, Japanese bristlegrass, charlock mustard, Canada thistle, and purple loosestrife; however, the extent of undesirable and non-native plant species has reduced significantly compared to 2021. For example, a common reed monoculture that was predominantly located outside of the wetland restoration area encroached into portions of the enhancement areas along the tributary to Aquetong Creek (left). After numerous treatments and colonization of desirable native hydrophytic plant species, the common reed had diminished completely within this wetland restoration area by Fall 2025 (culvert circled in red; right). Other patches of common reed that were located outside of the monitoring plots, but within the Restoration Project, have decreased significantly in areal cover and, where remaining, possessed signs of stress, including stunted growth.

In addition to the undesirable non-native species listed above, the following undesirable non-native species were observed in small numbers scattered around the Site over the course of the five-year monitoring period: reed canarygrass (*Phalaris arundinacea*, FACW), watercress (*Nasturtium officinale*, OBL), yellow iris (*Iris pseudacorus*, OBL), multiflora rose (*Rosa multiflora*, FACU), autumn olive (*Elaeagnus umbellata*, NL), purple loosestrife (*Lythrum salicaria*, FACW), Asiatic tearthumb (*Persicaria perfoliata*, FAC), tree of heaven (*Ailanthus altissima*, FACU), and charlock mustard (*Sinapis arvensis,* NL). From 2021-2025, all of these undesirable and non-native plant species were proactively treated on an annual basis which resulted in a significant decrease in Site-wide cover and opportunities for desirable native plant species to colonize.

To address the presence of undesirable non-native species, Princeton Hydro targeted these species with an herbicide application on October 7th, 2025. Additionally, as the installed woody material continues to mature, it is anticipated that the presence of undesirable non-native species will concomitantly reduce in areal coverage as they generally require full sun exposure to proliferate.

SUBSECTION 4.5 SOILS AND HYDROLOGY

As outlined by the U.S. Department of Agriculture (1988), "*a hydric soil is a soil in which the surface horizons are saturated, flooded or ponded long enough during the growing season to develop anaerobic conditions.*" Hydric soils have a water table at less than 1 foot from the surface for a significant period, typically a week or more, during the growing season (U.S. Army Corps of Engineers, 1987).

The Restoration Project was designed to support wetland creation and enhancement areas, and to enhance the floodplain and hydrologic connectivity with the Creek and its tributary (See Appendix III, Photos 4, 9, 10, 12, and 13). The planting plan was informed by the Restoration Project's hydrology. Specifically, selected flora installed within the wetland restoration areas are classified as facultative (FAC), facultative wetland (FACW), or obligate (OBL). Currently, the herbaceous species present within the seed mix are well-established, especially in the periodically inundated zones of the wetland creation area which indicates that the hydrology is adequate to support hydrophytic plant species, even during drought conditions (See Appendix III, Photos 1, 2, 3, 5, 6, and

8). The existing wetland areas are supporting obligate hydrophytes, including hop sedge (*Carex lupulina*, OBL), jewelweed, pussy willow, black willow, swamp smartweed, shallow sedge, and rice cutgrass. The continued presence of desirable hydrophytic vegetation within the wetland creation and wetland enhancement areas supports the position that a suitable wetland hydrologic regime has developed within the wetland portions of the Restoration Project.

SUBSECTION 4.6 WILDLIFE UTILIZATION

During the Site inspection conducted on September 24, 2025, fewer avian, fish, amphibian, mammal, and insect species were visually and/or audibly observed compared to prior years. This is likely associated with the prevailing weather conditions, which included rain with high stream flows. Given these conditions, the reduced levels of activity are not surprising as wildlife activity tends to be reduced during inclement weather.

Despite the inclement weather, a variety of avian species were observed utilizing the Site, particularly within the wetland restoration areas. During the monitoring event, the following avian species were observed: American Goldfinch (*Spinis tristus*), Field Sparrow (*Spizella pusilla*), White-throated Sparrow (*Zonotrichia albicollis*), Savannah Sparrow (*Passerculus sandwichensis*), and Song Sparrow (*Melospiza melodia*), which were observed utilizing the herbaceous wetland portions of the wetland restoration areas actively foraging on American burnweed and other seed-producing plant species. Species that were observed utilizing the shrub and canopy strata within the wetland restoration area along the Creek for foraging and sheltering included Common Yellowthroat (*Geothlypis trichas*), Red-eyed Vireo (*Vireo olivaceus*), Carolina Chickadee (*Thryothorus ludovicianus*), Tufted Titmouse (*Baeolophus bicolor*), American Redstart (*Setophaga ruticilla*), Indigo Bunting (*Passerina cyanea*), Northern Cardinal (*Cardinales cardinales*), Blue Jay (*Cyanocitta cristata*), Cedar Waxwing (*Bombycilla cedrorum*), American Robin (*Turdus migratorius*), White-breasted Nuthatch (*Sitta caroliniensis*), Brown Creeper (*Certhia americana*), Red-bellied Woodpecker (*Melanerpes carolinus*), Hairy Woodpecker (*Leuconotopicus villosus*), and Northern Flicker (*Colaptes auratus*).

Other species that were observed included Turkey Vulture (*Cathartes aura*), Black Vulture (*Coragyps atratus*), Red-tailed Hawk (*Buteo jamaicensis*), Common Raven (*Corvus corax*), Pileated Woodpecker (*Dryocopus pileatus*), Mourning Dove (*Zenaida macroura*), and Ruby-throated Hummingbird (*Archilochus colubris*).

Fish species observed within the pool portions of the Creek and its tributary included creek chub (*Semotilus atromaculatus*), panfish (*Lepomis sp.*), and longnose dace (*Rhinichthys cataractae*). A few green frog (*Lithobates clamitans*) and pickerel frog (*Lithobates palustris*) were also observed throughout the wetland and stream portions of the Restoration Project.

Meadow vole (*Microtus pellsylvanicus*) was observed within the herbaceous wetland portions of the wetland restoration areas on-Site. In 2023, American mink (*Neovison vison*) was observed within the wetland enhancement area along the east bank of the tributary to the Creek. It has not been observed since; however, they are elusive nocturnal creatures, and it is likely that American mink presence continues at the Site due to the variety of suitable aquatic foraging habitats including stream pools and riffles. White-tailed deer (*Odocoileus virginianus*) has been observed within the uplands and northern wetland enhancement portions of the Site during previous inspections; however, was not observed during the September 2025 inspection.

Additionally, previous monitoring inspections yielded observations of a wide assemblage and diversity of avian, fish, amphibian, mammal, and insect species utilizing the wetland restoration areas, which indicate that the Restoration Project is providing quality habitat and is supporting both resident and migratory avifauna.

SECTION 5: DISCUSSION AND RECOMMENDATIONS

During the September 2025 monitoring inspection, the overall woody plant survivorship was 86.6%, which indicates the Site has (1) continued on a positive developmental trajectory, and (2) has satisfied the 85% woody plant survivorship requirement.

The wetland creation area possessed 100% vegetative cover and 155.3% total cover, and the wetland enhancement area possessed 100% vegetative cover and 162.8% total cover. The significant increase in both vegetative and total cover over the course of five growing seasons was primarily driven by the proliferation of desirable native herbaceous and woody plant species in conjunction with a suitable hydrologic regime and suitable soils. Both wetland creation and transition areas maintained a positive developmental trajectory throughout the five-year monitoring period and possessed substantial vegetative cover, structural heterogeneity, and high species richness, ultimately satisfying the required 85% areal coverage and 85% survivorship of installed herbaceous plant material.

Cover of non-native, undesirable species within the wetland restoration areas decreased from 22.4% in 2024 to 17.8% in 2025 (**Tables 5** and **6**). Invasive species observed within the wetland restoration area monitoring plots included Nepalese browntop and garlic mustard. As noted in *Subsections 4.1* and *4.2* above, the increase of non-native invasive species was attributable to the colonization of the aforementioned species within the wetland creation area, whereas the wetland enhancement area observed an overall decrease in Nepalese browntop and elimination of common reed. While other undesirable species such as reed canarygrass, watercress, yellow iris, multiflora rose, autumn olive, purple loosestrife, Asiatic tearthumb, tree of heaven, and charlock mustard were observed, these species mainly occurred outside of the wetland restoration areas and in small, scattered patches. Corrective measures, including herbicide treatments and manual removal of these invasive, undesirable species within all restoration areas were conducted during the treatment efforts on October 7th, 2025. It is anticipated that, as the Restoration Project continues to develop, desirable native species will continue to proliferate and colonize areas where invasive species were present prior to herbicide application.

Overall, the Restoration Project has successfully satisfied the conditions set forth by the PADEP Restoration Waiver 16 and accompanying statutes within the required five-year timeframe. The Site possesses greater than 85 percent survival and 85 percent areal coverage of the mitigation plantings; plant species are healthy and thriving, and all trees are at least five feet in height. The Site is anticipated to continue on a positive developmental trajectory, as evidenced by the diverse suite of desirable native species, structural diversity, and utilization of the Restoration Project by breeding avifauna that require specific habitat associated with the presence of desirable native species and structural diversity. Equally important is the presence of a suitable hydrological regime that supports the development of hydrophytic plant species, both herbaceous and woody. It is anticipated that this positive developmental trajectory will continue moving forward. As the requirements of the permits have been achieved, we respectfully request that the PADEP making the finding that the Restoration Project is a success and that no additional monitoring is required.

SECTION 6: REFERENCES

Environmental Laboratory. 2012. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0). U.S. Army Engineer Research and Development Center, Vicksburg, MS.

F.X. Browne, Inc. 2004. Ingham Spring Dam Removal Study.

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United States Army Corps of Engineers (USACE). (2023). 2022 National Wetland Plant List, version 3.6. U.S. Army Engineer Research and Development Center, Vicksburg, MS. http://wetland-plants.usace.army.mil/

APPENDIX I

PLANT SPECIES LIST

PLANT SPECIES LIST

The following is a list of plant species that occur at the Aquetong Spring Park Restoration Project located in Solebury Township, Bucks County, Pennsylvania. Nomenclature follows the National Wetland Plant List: 2022 wetland ratings (USACE 2023) for the Eastern Mountains and Piedmont Region. NA = Not Applicable, NI = No Indicator, NL = Not Listed.

Scientific Name	Common Name	Indicator Status
Aceraceae	**Maple Family**	
Acer negundo	Boxelder	FAC
Acer rubrum	Red maple	FAC
Acer saccharinum	Silver maple	FACW
Alismataceae	**Water-Plantain Family**	
Sagittaria latifolia	Broadleaf arrowhead	OBL
Anacardiaceae	**Sumac Family**	
Toxicodendron radicans	Eastern poison ivy	FAC
Apiaceae	**Carrot Family**	
Zizia aurea	Golden Alexanders	FAC
Apocynaceae	**Dogbane Family**	
Apocynum cannabinum	Indianhemp	FACU
Aquifoliaceae	**Holly Family**	
Ilex opaca	American holly	FACU
Ilex verticillata	Common winterberry	FACW
Asclepiadaceae	**Milkweed Family**	
Asclepias incarnata	Swamp milkweed	OBL
Asclepias syriaca	Common milkweed	FACU
Asteraceae/Compositae	**Aster Family**	
Ageratina altissima	White snakeroot	FACU
Ambrosia artemisiifolia	Annual ragweed	FACU
Artemisia vulgaris	Common wormwood	UPL
Bidens cernua	Nodding beggartick	OBL
Bidens frondosa	Devil's beggartick	FACW
Cirsium arvense	Canada thistle	FACU
Erechtites hieraciifolius	American burnweed	NL
Erigeron philadelphicus	Philadelphia fleabane	FACU
Eupatorium perfoliatum	Common boneset	FACW
Eupatorium serotinum	Lateflowering thoroughwort	FAC
Helenium autumnale	Common sneezeweed	FACW

Scientific Name	**Common Name**	**Indicator Status**
Helianthus strumosus	Paleleaf woodland sunflower	FACU
Lactuca biennis	Tall blue lettuce	FACU
Rudbeckia laciniata	Cutleaf coneflower	FACW
Solidago altissima	Tall goldenrod	FACU
Solidago canadensis	Canada goldenrod	FACU
Symphyotrichum lateriflorum	Calico aster	FACW
Symphyotrichum novae-angliae	New England aster	FACW
Symphyotrichum novi-belgii	New Belgium American-aster	FACW
Symphyotrichum puniceum	Purplestem aster	OBL
Balsaminaceae	**Touch-Me-Not Family**	
Impatiens capensis	Jewelweed	FACW
Betulaceae	**Birch Family**	
Alnus serrulata	Smooth alder	OBL
Betula nigra	River birch	FACW
Boraginaceae	**Borage Family**	
Hackelia virginiana	Beggar's-lice	FACU
Myosotis scorpioides	True forget-me-not	OBL
Brassicaceae/Cruciferae	**Mustard Family**	
Alliaria petiolata	Garlic mustard	FACU
Cardamine bulbosa	Bulbous bittercress	OBL
Cardamine hirsute	Hairy bittercress	FACU
Cardamine impatiens	Narrowleaf bittercress	FAC
Nasturtium officinale	Watercress	OBL
Sinapis arvensis	Charlock mustard	NL
Thlapsi arvense	Field pennycress	UPL
Buddlejaceae	**Butterfly-bush Family**	
Buddleka davidii	Orange-eye butterfly-bush	FACU
Caprifoliaceae	**Honeysuckle Family**	
Lonicera japonica	Japanese honeysuckle	FACU
Viburnum dentatum	Southern arrowwood	FAC
Viburnum sieboldii	Siebold's viburnum	NL
Cornaceae	**Dogwood Family**	
Cornus amomum	Silky dogwood	FACW
Cucurbitaceae	**Cucumber Family**	
Sicyos angulatus	One-seed bur cucumber	FACU

Scientific Name	Common Name	Indicator Status
Cupressaceae	**Cypress Family**	
Juniperus virginiana	Eastern redcedar	FACU
Taxodium distichum	Bald cypress	OBL
Cyperaceae	**Sedge Family**	
Carex comosa	Longhair sedge	OBL
Carex crinita	Fringed sedge	OBL
Carex gracillima	Graceful sedge	FACU
Carex hystericina	Bottlebrush sedge	OBL
Carex lupulina	Hop sedge	OBL
Carex lurida	Shallow sedge	OBL
Carex scoparia	Broom sedge	FACW
Carex vulpinoidea	Fox sedge	OBL
Cyperus esculentus	Yellow nutsedge	FACW
Schoenoplectus tabernaemontani	Softstem bulrush	OBL
Scirpus atrovirens	Green bulrush	OBL
Scirpus cyperinus	Woolgrass	FACW
Elaeagnaceae	**Oleaster Family**	
Elaeagnus angustifolia	Russian olive	FACU
Elaeagnus umbellata	Autumn olive	NL
Fabaceae/Leguminosae	**Pea Family**	
Cercis canadensis	Eastern redbud	FACU
Chamaecrista fasciculata	Partridge pea	FACU
Robinia pseudoacacia	Black locust	FACU
Senna hebecarpa	American senna	FAC
Senna marilandica	Maryland senna	FAC
Trifolium repens	White clover	FACU
Fagaceae	**Beech Family**	
Quercus bicolor	Swamp white oak	FACW
Quercus palustris	Pin oak	FACW
Quercus phellos	Willow oak	FAC
Iridaceae	**Iris Family**	
Iris versicolor	Harlequin blueflag	OBL
Iris pseudacorus	Paleyellow iris	OBL
Juglandaceae	**Walnut Family**	
Juglans nigra	Black walnut	FACU
Juncaceae	**Rush Family**	
Juncus effusus	Common rush	FACW

Scientific Name	Common Name	Indicator Status
Juncus tenuis	Path rush	FAC
Lamiaceae	**Mint Family**	
Lycopus americanus	Cut-leaf water-horehound	OBL
Lemnaceae	**Duckweed Family**	
Lemna minor	Common duckweed	OBL
Liliaceae	**Lily Family**	
Allium vineale	Wild garlic	FACU
Lythraceae	**Loosestrife Family**	
Lythrum salicaria	Purple loosestrife	FACW
Magnoliaceae	**Magnolia family**	
Liriodendron tulipifera	Tuliptree	FACU
Magnolia virginiana	Sweetbay magnolia	FACW
Malvaceae	**Mallow Family**	
Abutilon theophrasti	Velvetleaf	UPL
Oleaceae	**Olive Family**	
Fraxinus pennsylvanica	Green ash	FACW
Onagraceae	**Evening Primrose family**	
Chamerion angustifolium	Fireweed	FAC
Epilobium coloratum	Purpleleaf willowherb	FACW
Phytolaccaceae	**Pokeweed Family**	
Phytolacca americana	American pokeweed	FACU
Poaceae / Gramineae	**Grass Family**	
Arthraxon hispidus	Small carpetgrass	FAC
Bromus inermis	Smooth brome	UPL
Calamagrostis canadensis	Bluejoint grass	FACW
Cinna arundinacea	Woodreed	FACW
Dichanthelium clandestinum	Deertongue	FACW
Echinochloa muricata	Rough barnyard grass	OBL
Elymus virginicus	Virginia wildrye	FACW
Glyceria striata	Fowl mannagrass	OBL
Leersia oryzoides	Rice cutgrass	OBL
Lolium multiflorum	Italian ryegrass	NL
Microstegium vimineum	Nepalese browntop	FAC
Panicum dichotoflorum	Fall panicgrass	FACW
Panicum virgatum	Switchgrass	FAC

Scientific Name	Common Name	Indicator Status
Poa pratensis	Kentucky bluegrass	FACU
Phalaris arundinacea	Reed canarygrass	FACW
Phragmites australis	Common reed	FACW
Schedonorus arundinaceus	Tall fescue	FACU
Setaria faberi	Japanese bristlegrass	UPL
Tridens flavus	Purpletop tridens	FACU
Polygonaceae	**Buckwheat Family**	
Persicaria hydropiperoides	Swamp smartweed	OBL
Persicaria pensylvanicum	Pennsylvania smartweed	FACW
Persicaria perfoliata	Asiatic tearthumb	FAC
Persicaria punctata	Dotted smartweed	OBL
Polygonum persicaria	Spotted lady's-thumb	FACW
Rumex obtusifolius	Bitter dock	FACU
Potamogetonaceae	**Pondweed Family**	
Potamogeton crispus	Curly pondweed	OBL
Platanaceae	**Plane-Tree Family**	
Platanus occidentalis	American sycamore	FACW
Rosaceae	**Rose Family**	
Amelanchier canadensis	Canadian serviceberry	FAC
Aronia arbutifolia	Red chokecherry	FACW
Rosa multiflora	Multiflora rose	FACU
Rosa palustris	Swamp rose	OBL
Rubus phoenicolasius	Wine raspberry	FACU
Rubiaceae	**Madder Family**	
Cephalanthus occidentalis	Common buttonbush	OBL
Galium obtusum	Bluntleaf bedstraw	FACW
Salicaceae	**Willow Family**	
Populus deltoides	Eastern cottonwood	FAC
Salix discolor	Pussy willow	FACW
Salix nigra	Black willow	OBL
Scrophulariaceae	**Figwort Family**	
Paulownia tomentosa	Princesstree	UPL
Penstemon digitalis	Foxglove beardtongue	FAC
Verbascum thapsus	Common mullein	FACU
Veronica anagallis-aquatica	Water speedwell	OBL
Simaroubaceae	**Quassia Family**	
Ailanthus altissima	Tree of heaven	FACU

Scientific Name	Common Name	Indicator Status
Solanaceae	**Potato Family**	
Solanum dulcamara	Climbing nightshade	FAC
Typhaceae	**Cat-tail Family**	
Typha latifolia	Broadleaf cattail	OBL
Urticaceae	**Nettle Family**	
Boehmeria cylindrica	Smallspike false nettle	FACW
Pilea pumila	Canadian clearweed	FACW
Hydrocharitaceae	**Tape-grass Family**	
Vallisneria americana	American eelgrass	OBL
Verbenaceae	**Verbena Family**	
Verbena hastata	Swamp verbena	FACW
Verbena urticifolia	White vervain	FAC
Vitaceae	**Grape Family**	
Parthenocissus quinquefolia	Virginia creeper	FACU

APPENDIX II

SAMPLING PLOT LOCATIONS

File: P:\0388\Projects\0388011\GIS\APRX\Aquetong Monitoring Report\Aquetong Monitoring Report.aprx, 11/18/2025, Drawn by tsrinivasan, Copyright Princeton Hydro, LLC.

NOTES:
1. Sampling locations, stream, and project boundary are approximate.
2. Orthoimagery obtained from Nearmap Aerial Imagery Services, flight date 02/24/2024.

0 100 200 Feet

Map Projection: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet

SAMPLING LOCATION MAP

AQUETONG CREEK RESTORATION PROJECT
WETLAND MITIGATION MONITORING
AQUETONG SPRING PARK
SOLEBURY TOWNSHIP
BUCKS COUNTY, PENNSYLVANIA

PRINCETON HYDRO
SCIENCE DESIGN ENGINEERING
www.PrincetonHydro.com

APPENDIX III

PHOTOGRAPHS

PHOTO LOCATION MAP

Photographic Log

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

Project Number: 0388.011
Site Location: Solebury Township, PA

Photograph ID: 1

Date: Sept. 24, 2025

Location:
See photo location map.

Direction: South

Comments: View of the well-established hydrophytic plant community along the banks of the tributary to Aquetong Creek, including jewelweed (*Impatiens* capensis), broadleaf cattail (*Typha latifolia*), and shallow sedge (*Carex lurida*).

Photograph ID: 2

Date: Sept. 24, 2025

Location:
See photo location map.

Direction: East

Comments: View of an American sycamore (*Platanus occidentalis)* sapling amidst a robust herbaceous layer of jewelweed which is present on both banks of the tributary to Aquetong Creek.

Photographic Log

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

Project Number: 0388.011
Site Location: Solebury Township, PA

Photograph ID: 3

Date: Sept. 24, 2025

Location:
See photo location map.

Direction: East

Comments:
General view of the diverse and well-established herbaceous layer along the banks of the tributary to Aquetong Creek, including sweet-scented joe-pye-weed (*Eutrochium purpureum*).

Photograph ID: 4

Date: Sept. 24, 2025

Location:
See photo location map.

Direction: Southeast

Comments:
General view of healthy and thriving (>5 ft.) installed woody species within the wetland creation area, including river birch (*Betula nigra*).

Photographic Log

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

Project Number: 0388.011
Site Location: Solebury Township, PA

Photograph ID: 5

Date: Sept. 24, 2025

Location:
See photo location map.

Direction: East

Comments:
General view of healthy and thriving (>5 ft.) installed woody species, including river birch (*Betula nigra*) within the wetland creation area along Aquetong Creek.

Photograph ID: 6

Date: Sept. 24, 2025

Location:
See photo location map.

Direction: West

Comments:
General view of the diverse and well-established woody and herbaceous layer within the wetland creation area along the north bank of Aquetong Creek.

Photographic Log

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

Project Number: 0388.011
Site Location: Solebury Township, PA

Photograph ID: 7

Date: Sept. 24, 2025

Location:
See photo location map.

Direction: East

Comments: View of the diverse plant community within the wetland creation area.

Photograph ID: 8

Date: Sept. 24, 2025

Location:
See photo location map.

Direction: West

Comments: View of thriving black willows within the wetland enhancement area on the northern bank of Aquetong Creek.

Photographic Log

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

Project Number: 0388.011
Site Location: Solebury Township, PA

Photograph ID: 9

Date: Sept. 24, 2025

Location:
See photo location map.

Direction: East

Comments: View of the wetland enhancement area featuring a robust herbaceous stratum and healthy woody species.

Photograph ID: 10

Date: Sept. 24, 2025

Location:
See photo location map.

Direction: East

Comments:
General view of the diverse and well-established vegetation within the wetland enhancement area along Aquetong Creek.

Photographic Log

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

Project Number: 0388.011
Site Location: Solebury Township, PA

Photograph ID: 11

Date: Sept. 24, 2025

Location: See photo location map.

Direction: East

Comments: General view of the diverse and well-established vegetation within the wetland enhancement area along Aquetong Creek.

Photograph ID: 12

Date: Sept. 24, 2025

Location: See photo location map.

Direction: East

Comments: Typical view of Aquetong Creek and its banks that are well-established with a robust herbaceous plant community and healthy and thriving woody plant material.

Photographic Log

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

Project Number: 0388.011
Site Location: Solebury Township, PA

Photograph ID: 13

Date: Sept. 24, 2025

Location: See photo location map.

Direction: West

Comments: Typical view of Aquetong Creek and its banks that are well-established with a robust herbaceous plant community and healthy and thriving woody plant material.

Photograph ID: 14

Date: Sept. 24, 2025

Location: See photo location map.

Direction: South

Comments: View of the well-established hydrophytic herbaceous and woody plants along the banks of the tributary to Aquetong Creek, including silky dogwood and black willow.

File: P:\0388\Projects\0388011\GIS\APRX\Aquetong Monitoring Report\Aquetong Monitoring Report.aprx, 11/18/2025, Drawn by tsrinivasan, Copyright Princeton Hydro, LLC.

NOTES:
1. Photo locations, stream, and project boundary are approximate.
2. Orthoimagery obtained from Nearmap Aerial Imagery Services, flight date 02/24/2024.

0 100 200 Feet

Map Projection: NAD 1983 StatePlane Pennsylvania South FIPS 3702 Feet

PHOTO LOCATION MAP

AQUETONG CREEK RESTORATION PROJECT
WETLAND MITIGATION MONITORING
AQUETONG SPRING PARK
SOLEBURY TOWNSHIP
BUCKS COUNTY, PENNSYLVANIA

PRINCETON HYDRO
SCIENCE DESIGN ENGINEERING
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APPENDIX IV

PADEP CHAPTER 105 RESTORATION WAIVER 16 APPROVAL LETTER

pennsylvania
DEPARTMENT OF ENVIRONMENTAL PROTECTION

October 23, 2019

Mr. Dennis Carney
Solebury Township
3092 Sugan Road
P.O. Box 139
Solebury, PA 18963

Re: Aquetong Creek Restoration Project
DEP File Nos. EA09-013 and WL0919301
APS No. 996246, AUTH ID No. 1278424
Solebury Township
Bucks County

Dear Mr. Carney:

The Department of Environmental Protection (DEP) has reviewed and approved the Environmental Assessment and Restoration Plan, including the 401 Water Quality Certification to restore and maintain approximately 1,200 linear feet of stream channel and to enhance the floodplain grading and riparian corridor along Aquetong Creek (Perennial, HQ-CWF). The southern limit of the site is located at the former terminus of the Aquetong Lake impoundment (Lambertville, NJ, USGS Quadrangle, Latitude: 40.354181N"; Longitude: -74.988711W").

This letter may be considered sufficient authorization for the proposed stream restoration plan with the following special conditions:

A. Stream and wetland restoration areas and wetland creation areas shall be monitored, and reports submitted to DEP, in accordance with the Mitigation Plan narrative included in the Environmental Assessment provided to DEP.

B. All Conservation Measures recommended in the Pennsylvania Department of Conservation and Natural Resource's review letter dated May 1, 2019, shall be incorporated into the project.

C. Temporary stream crossing(s) shall be constructed of suitable nonerodible material in order to prevent any road materials from washing out if structure is overtopped during periods of high water.

D. Streambank disturbance shall be kept to a minimum and stabilized with indigenous vegetation within 20 days of final earthmoving to prevent erosion and provide cover, shading, and food source for aquatic life.

E. All disturbed areas are to be restored to the original or proposed contours and shall be replanted with indigenous plant species.

F. Demolition or excavated materials shall not be deposited in any wetland, watercourse, floodway, floodplain, or other body of water without applying for and receiving the written permit of DEP.

G. Water pumped from the construction area shall be diverted into a sediment trap or basin, or into an appropriate vegetated filter area to prevent sediment from being discharged into any waters of the Commonwealth.

H. Upon discovery of significant changes that could compromise the integrity of the project, the permittee shall immediately notify DEP and the Bucks County Conservation District.

This authorization does not give any property rights, either in real estate or material, nor any exclusive privileges, nor shall it be construed to grant or confer any right, title, easement, or interest in, to, or over any land belonging to the Commonwealth of Pennsylvania; nor any infringement of Federal, State, or local laws or regulations.

Regarding Federal authorization, we have determined that your proposed work, if accomplished in accordance with the enclosed terms and conditions, is authorized by the Pennsylvania State Programmatic General Permit-5 (PASPGP-5). This PASPGP-5 verification provides U.S. Army Corps of Engineers authorization pursuant to Section 10 of the Rivers and Harbors Act and/or Section 404 of the Clean Water Act. This authorization may be subject to modification, suspension, or revocation if any of the information contained in the application, including the plans, is later found to be in error.

The enclosed list of conditions must be followed for purposes of the PASPGP-5 (Enclosure 1). A PASPGP-5 Permit Compliance, Self-Certification Form must be completed and returned to the appropriate Corps of Engineers office upon completion of construction (Enclosure 2).

Proper erosion and sediment control measure are required during and after construction and the adequacy of the measures can be determined by contacting the Bucks County Conservation District at 215.345.7577.

If you have any questions, you may contact Mr. Jason Oseredzuk at the address located in the first page footer or by telephone at 484.250.5158.

Sincerely,

John Hohenstein, P.E.
Regional Manager
Waterways and Wetlands

Enclosure

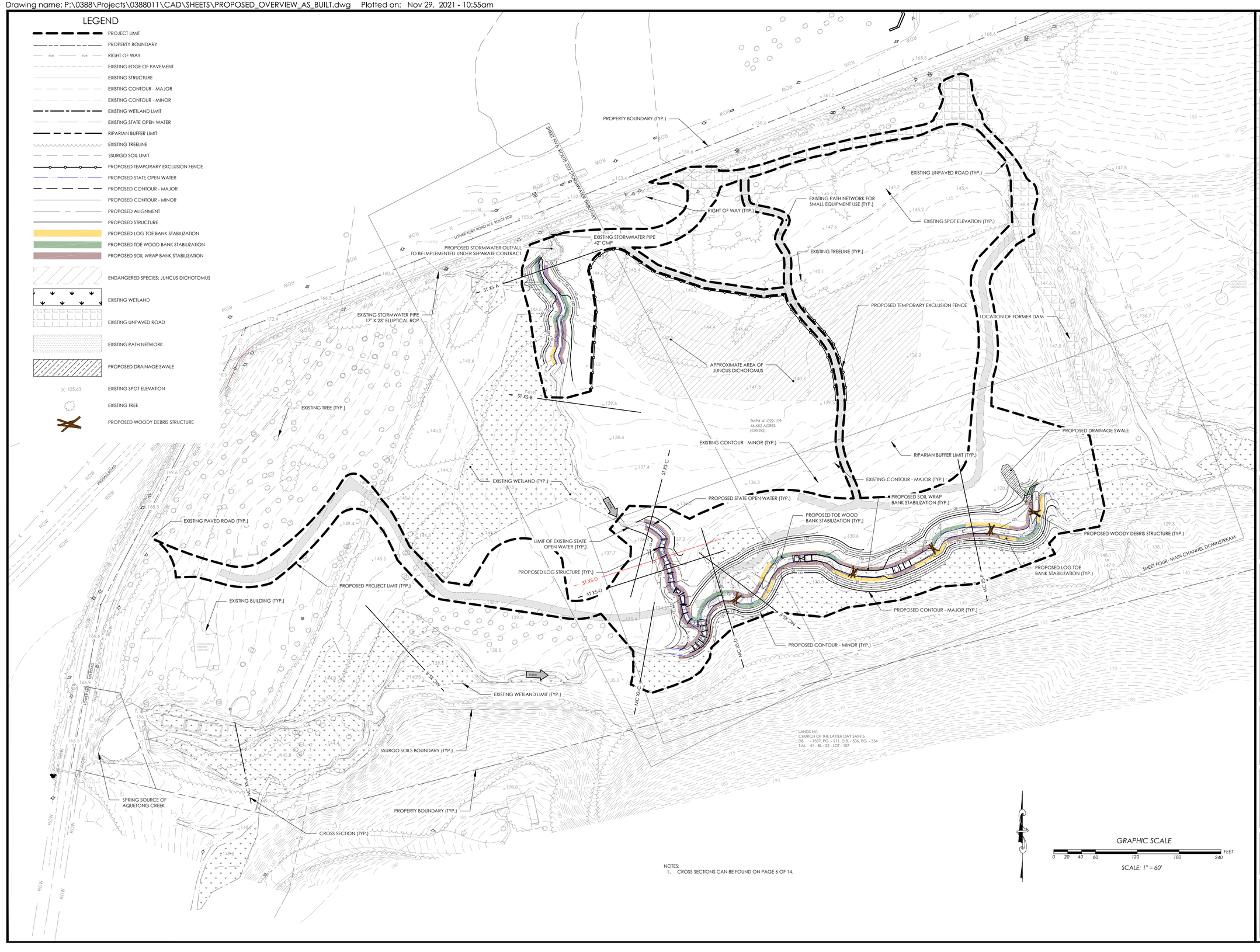
cc: Bucks County Conservation District
PA Fish and Boat Commission
Army Corps of Engineers
Mr. George - Princeton Hydro, LLC
Mr. Oseredzuk
Re 30 (GJS19WAW)296-10

APPENDIX V

SITE PLANS

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
- ENDANGERED SPECIES: JUNCUS DICHOTOMUS
- EXISTING WETLAND
- EXISTING UNPAVED ROAD
- EXISTING PATH NETWORK
- PROPOSED DRAINAGE SWALE
- 105.63 EXISTING SPOT ELEVATION
- EXISTING TREE
- PROPOSED WOODY DEBRIS STRUCTURE



NOTES:
1. CROSS SECTIONS CAN BE FOUND ON PAGE 6 OF 14.

GRAPHIC SCALE
0 20 40 60 120 180 240 FEET
SCALE: 1" = 60'

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

1. 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
2. THE HORIZONTAL DATUM IS NORTH AMERICAN DATUM OF 1983 (NAD83), FEET.
3. TOPOGRAPHIC MAPPING PREPARED BY ROBINSON PHOTOGRAMMETRIC MAPPING DATED 4/11/2016, FLIGHT DATE 3/7/2016 FOR C. ROBERT WYNN ASSOCIATES, INC.
4. TOPGRAPHIC MAPPING OF THE STREAM PREPARED BY GEOTREK ENVIRONMENTAL AND SURVEYING, LLC IN APRIL OF 2019.
5. WETLAND DELINEATION COMPLETED BY PRINCETON HYDRO, LLC. STAFF IN NOVEMBER OF 2018.
6. FEMA FIRM NOT MAPPED SINCE DAM REMOVAL; NO FHA AREA AVAILABLE.
7. IN A RESPONSE DATED MAY 1, 2019 TO PNDI NO. 682836, PADCNR PROVIDED A MAP OUTLINING A POPULATION OF PA ENDANGERED JUCUS DICHOTOMUS. BY INSTALLING EXCLUSIONARY FENCING AROUND THIS AREA, NO IMPACT ANTICIPATED.
8. 150-FT RIPARIAN BUFFER DETERMINED IN ACCORDANCE WITH 25 PA CODE CHAPTER 102.14
9. AS-BUILT DATA COLLECTED BY PRINCETON HYDRO ON OCTOBER 22, 2020 AND OCTOBER 15, 2021.

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

11/19/2021
DATE

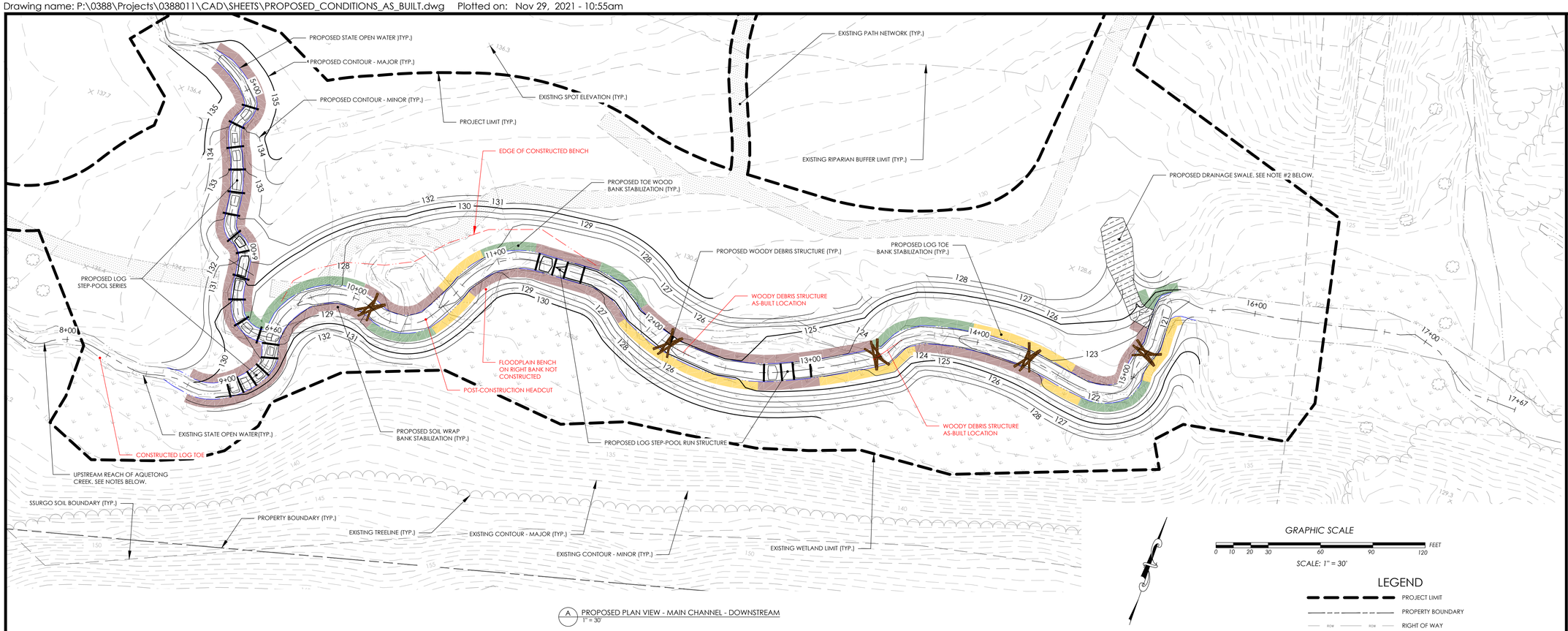
PRINCETON HYDRO
SCIENCE ENGINEERING DESIGN
1108 OLD YORK RD, SUITE 1
RINGOES, NEW JERSEY 08551
PHONE: 908.237.5660
PRINCETONHYDRO.COM

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

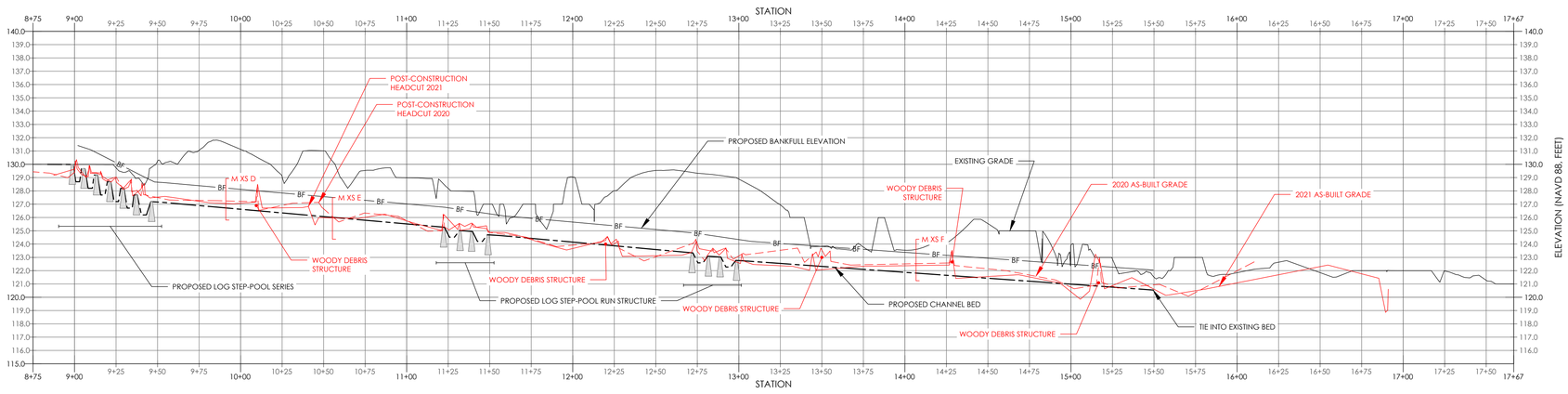
DRAWING NAME:
PROPOSED CONDITIONS OVERVIEW

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.)

GRAPHIC SCALE
H: 1" = 40'
V: 1" = 5'
(8X VERT. EXAG.)
0 10 20 30 40 80 FEET

NOTES:

1. 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.
2. 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.
3. THE TWO CULVERTS UNDER ROUTE 202 DRAINING INTO THE 202 STORMWATER TRIBUTARY SHALL BE STABILIZED UNDER A SEPARATE CONTRACT.

GRAPHIC SCALE
0 10 20 30 60 90 120 FEET
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 AS-BUILT GRADE

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1-800-242-1776

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7/25/19	REVISED FOR CONSTRUCTION CLARITY

REVISIONS

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

11/19/2021
DATE

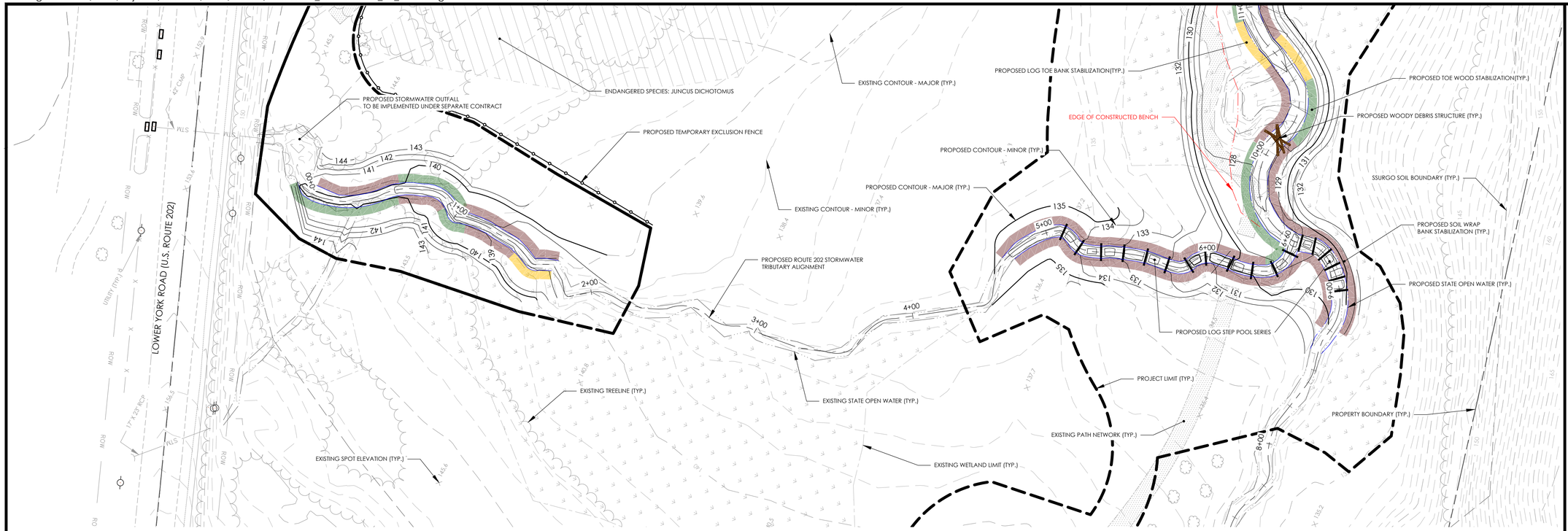
PRINCETON HYDRO
SCIENCE ENGINEERING DESIGN
1108 OLD YORK RD, SUITE 1
RINGOES, NEW JERSEY 08551
PHONE: 908.237.5660
PRINCETONHYDRO.COM

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

DRAWING NAME:
PROPOSED CONDITIONS-MAIN CHANNEL DOWNSTREAM

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

SHEET NO.
4 OF 15



A PROPOSED PLANVIEW - STORMWATER TRIBUTARY
1" = 30'

GRAPHIC SCALE
0 10 20 30 60 90 120 FEET
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
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- PROPOSED STATE OPEN WATER
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- PROPOSED STRUCTURE
- PROPOSED LOG TOE BANK STABILIZATION
- PROPOSED TOE WOOD BANK STABILIZATION
- PROPOSED SOIL WRAP BANK STABILIZATION
- PROPOSED CHANNEL BED
- BF — PROPOSED BANKFULL ELEVATION
- ENDANGERED SPECIES: JUNCUS DICHOTOMUS
- EXISTING WETLAND
- EXISTING UNPAVED ROAD
- EXISTING PATH NETWORK
- PROPOSED DRAINAGE SWALE
- × 105.63 — EXISTING SPOT ELEVATION
- EXISTING TREE
- PROPOSED WOODY DEBRIS STRUCTURE
- 2020 AS-BUILT GRADE
- 2021 AS-BUILT GRADE

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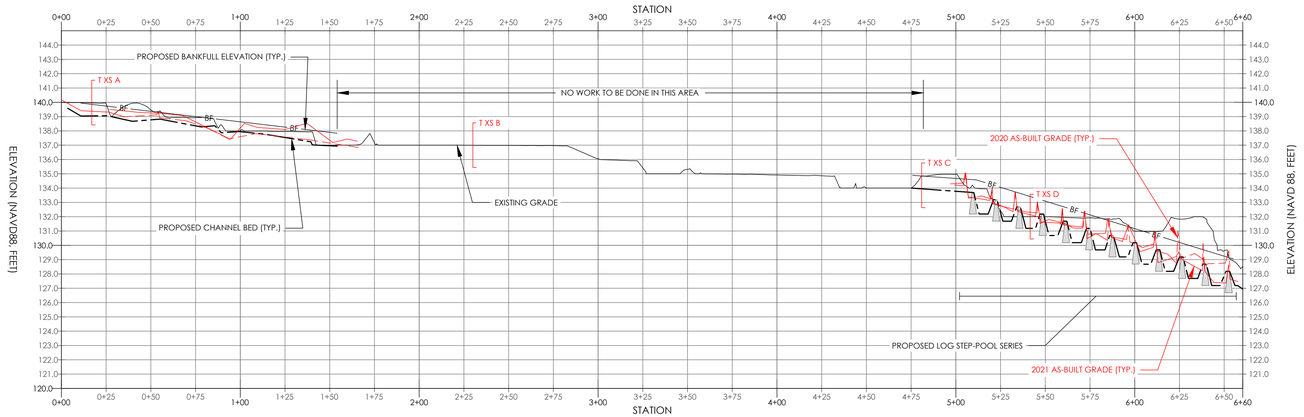

B PROPOSED PROFILE - STORMWATER TRIBUTARY
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 5' (8X VERT. EX.)

GRAPHIC SCALE
H: 1" = 40'
V: 1" = 5'
(8X VERT. EXAG.)
0 10 20 30 40 80
0 5 10

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
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7/25/19	REVISED FOR CONSTRUCTION CLARITY

REVISIONS

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

11/19/2021
DATE

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SCIENCE ENGINEERING DESIGN
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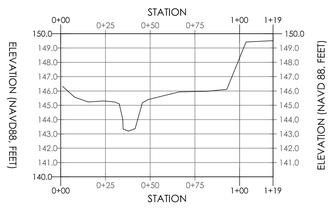
RINGOES, NEW JERSEY 08551
PHONE: 908.237.5660
PRINCETONHYDRO.COM

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

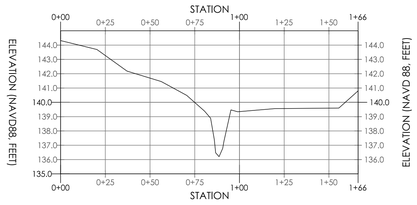
DRAWING NAME:
PROPOSED CONDITIONS-
ROUTE 202 STORMWATER
TRIBUTARY

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

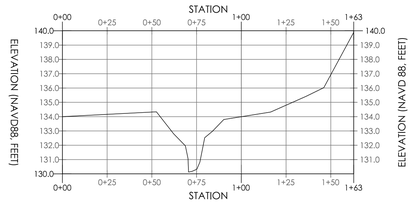
SHEET NO.
5 OF 15



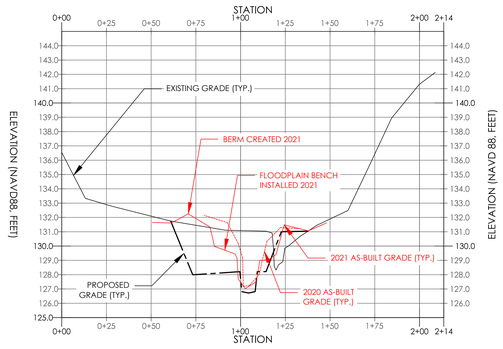
A MAIN CHANNEL CROSS SECTION A (MC XS-A)
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 5' (VERT. EXAG. = 8X)



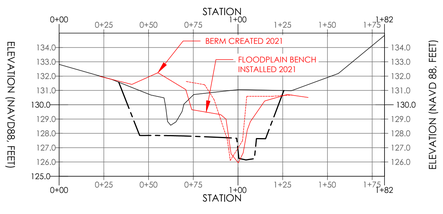
B MAIN CHANNEL CROSS SECTION B (MC XS-B)
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 5' (VERT. EXAG. = 8X)



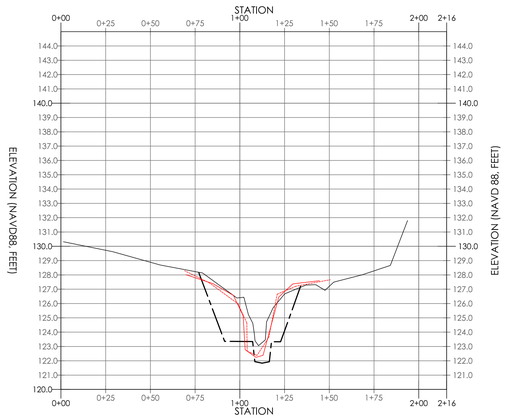
C MAIN CHANNEL CROSS SECTION C (MC XS-C)
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 5' (VERT. EXAG. = 8X)



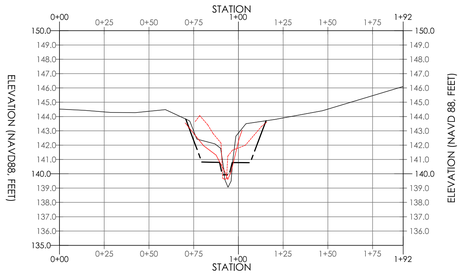
D MAIN CHANNEL CROSS SECTION D (MC XS-D)
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 5' (VERT. EXAG. = 8X)



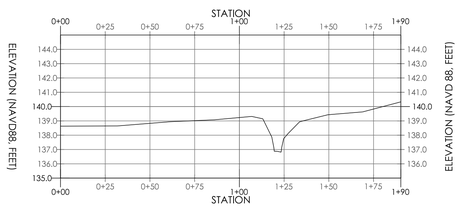
E MAIN CHANNEL CROSS SECTION E (MC XS-E)
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 5' (VERT. EXAG. = 8X)



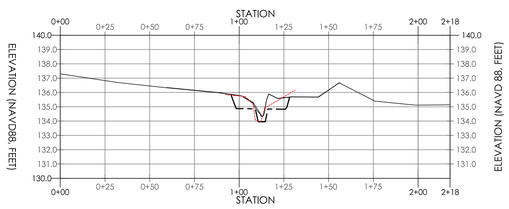
F MAIN CHANNEL CROSS SECTION F (MC XS-F)
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 5' (VERT. EXAG. = 8X)



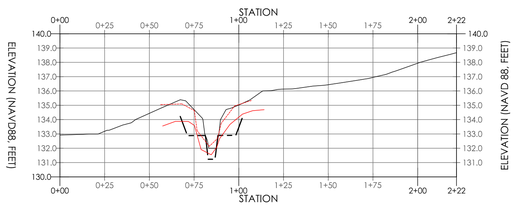
G STORWATER TRIBUTARY CROSS SECTION A (ST XC-A)
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 5' (VERT. EXAG. = 8X)



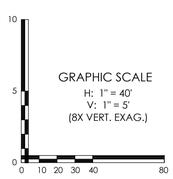
H STORWATER TRIBUTARY CROSS SECTION B (ST XC-B)
HORIZONTAL SCALE: 1" = 40'
VERTICAL SCALE: 1" = 5' (VERT. EXAG. = 8X)



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

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

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1. 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
2. THE HORIZONTAL DATUM IS NORTH AMERICAN DATUM OF 1983 (NAD83), FEET.
3. TOPOGRAPHIC MAPPING PREPARED BY ROBINSON PHOTOGRAMMETRIC MAPPING DATED 4/11/2016. FLIGHT DATE 3/7/2016 FOR C. ROBERT WYNN ASSOCIATES, INC.
4. TOPGRAPHIC MAPPING OF THE STREAM PREPARED BY GEOTREK ENVIRONMENTAL AND SURVEYING, LLC IN APRIL OF 2019.
5. WETLAND DELINEATION COMPLETED BY PRINCETON HYDRO, LLC. STAFF IN NOVEMBER OF 2018.
6. FEMA FIRM NOT MAPPED SINCE DAM REMOVAL; NO FHA AREA AVAILABLE.
7. IN A RESPONSE DATED MAY 1, 2019 TO PNDI NO. 682836, PADCNR PROVIDED A MAP OUTLINING A POPULATION OF PA ENDANGERED JUCUS DICHOTOMUS. BY INSTALLING EXCLUSIONARY FENCING AROUND THIS AREA, NO IMPACT ANTICIPATED.
8. 150-FT RIPARIAN BUFFER DETERMINED IN ACCORDANCE WITH 25 PA CODE CHAPTER 102.14
9. AS-BUILT DATA COLLECTED BY PRINCETON HYDRO ON OCTOBER 22, 2020 AND OCTOBER 15, 2021.

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

11/19/2021
DATE

PRINCETON HYDRO
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 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.
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