



PennEast Pipeline Company, LLC

PENNEAST PIPELINE PROJECT

**L2 - ENVIRONMENTAL ASSESSMENT MODULE 2
RESOURCE IDENTIFICATION
BUCKS COUNTY**

REVISED OCTOBER 2019

Submitted by:
PennEast Pipeline Company, LLC



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ACRONYMS LIST

BO	Biological Opinion
CFR	Code of Federal Regulations
CWA	Clean Water Act
CWF	Cold Water Fishes
dbh	diameter at breast height
EA	Environmental Assessment
EA Form	Environmental Assessment Form
EV	Exceptional Value
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
HDD	horizontal directional drill
HGM	hydrogeomorphic
HQ	High-Quality
JPA	Joint Permit Application
L2RAP	Level 2 Rapid Assessment Protocol
MF	Migratory Fishes
mi ²	square miles
MP	milepost
NCDWQ	North Carolina Division of Water Quality
NEPA	National Environmental Policy Act
NMFS	National Marine Fisheries Service
NRCS	Natural Resources Conservation Service
PA	Pennsylvania
PADCNR	Pennsylvania Department of Conservation and Natural Resources
PADEP	Pennsylvania Department of Environmental Protection
PaGWIS	Pennsylvania Groundwater Information System
PASDA	Pennsylvania Spatial Data Access
PEM	palustrine emergent
PennEast	PennEast Pipeline Company, LLC
PFBC	Pennsylvania Fish and Boat Commission
PFO	palustrine forested
PGC	Pennsylvania Game Commission
PNHP	Pennsylvania Natural Heritage Program
PNDI	Pennsylvania Natural Diversity Inventory
Project	PennEast Pipeline Project
PSS	palustrine scrub-shrub
PWS	public water supplier
ROW	right-of-way
RQBTS	Recognized Qualified Bog Turtle Surveyor
T&E	threatened and endangered
TGD	Technical Guidance Document
TSF	Trout Stocking Fishery



USACE	U.S. Army Corps of Engineers
USCA	U.S. Code Annotated
USFWS	U.S. Fish and Wildlife Service
WWF	Warmwater Fishes



Module S2: Resource Identification and Characterization

In accordance with the requirements contained within the Pennsylvania Department of Environmental Protection’s (PADEP) Comprehensive Environmental Assessment of Proposed Project Impacts for Chapter 105 Water Obstruction and Encroachment Permit Applications Technical Guidance Document (TGD) (Document No. 310-2137-006) and the assessment criteria detailed in Module 2 of the Environmental Assessment (EA) Form (EA Form) Instructions (Document No. 3150-PM-BWEW0017, Revised 6/2017), PennEast Pipeline Company, LLC (PennEast) has provided a complete analysis and discussion of the aquatic habitat resources located within the right-of-way (ROW) workspace limits of the proposed PennEast Pipeline Project (Project) in Bucks County, Pennsylvania. This document follows the sequence of the requirements presented in the EA Form Instructions Module S2 Section.

S2.A Standard Resource Identification

S2.A.1 Identification and Qualifications

The contact information and a summary of qualifications of the professional biologists who have identified resources present on the Project site are included in Table BU-L2-1. Resumes are provided in Appendix BU-L-2A.

**Table BU-L2-1
Resource Identification Information**

Organization Name	Mailing Address	Staff	Email Address	Portions of Work Completed
AECOM Technical Services, Inc.	625 West Ridge Pike Suite E100 Conshohocken, PA 19428	Sarah Binckley	sarah.binckley@aecom.com	Oversaw Aquatic Resource Identification and Permit Application (2015-2019)
AECOM Technical Services, Inc.	625 West Ridge Pike Suite E100 Conshohocken, PA 19428	Bruce Bayne	bruce.bayne@aecom.com	Aquatic Resource Identification Technical Lead (2014-2018)
AECOM Technical Services, Inc.	715 Washington Boulevard Williamsport, PA 17701	Shannon Haight	shannon.haight@aecom.com	Permit Application Technical Lead



Organization Name	Mailing Address	Staff	Email Address	Portions of Work Completed
AECOM Technical Services, Inc.	100 Sterling Parkway, Suite 205 Mechanicsburg, PA 17050	Will Anderson	william.anderson@aecom.com	Wetland and Watercourse Delineations, L2RAP ¹ Field Work (2015-2018)
AECOM Technical Services, Inc.	625 West Ridge Pike, Suite E100 Conshohocken, PA 19428	David Brightbill	david.brightbill@aecom.com	Wetland and Watercourse Delineations, L2RAP Field Work (2015-2019)
AECOM Technical Services, Inc.	625 West Ridge Pike, Suite E100 Conshohocken, PA 19428	Carolyn Steinberg	carolyn.steinberg@aecom.com	Wetland and Watercourse Delineation and L2RAP data management (2014-2018)
AECOM Technical Services, Inc.	Foster Plaza 6, 681 Andersen Drive Suite 400 Pittsburgh, PA 15220	Mark Fox	mark.fox@aecom.com	L2RAP Desktop Analysis
AECOM Technical Services, Inc.	Foster Plaza 6, 681 Andersen Drive Suite 400 Pittsburgh, PA 15220	Colleen Ashbaugh	colleen.ashbaugh@aecom.com	Wetland and Watercourse Delineation Report and L2RAP data management (2017-2018)
AECOM Technical Services, Inc.	625 West Ridge Pike, Suite E100 Conshohocken, PA 19428	Gavin McBrien	gavin.mcbrien@aecom.com	Wetland and Watercourse Delineations, L2RAP Field Work (2014-2017)



Organization Name	Mailing Address	Staff	Email Address	Portions of Work Completed
AECOM Technical Services, Inc.	Foster Plaza 6, 681 Andersen Drive Suite 400 Pittsburgh, PA 15220	Matt Kline	matthew.kline@aecom.com	Wetland and Watercourse Delineations, L2RAP Field Work (2015-2017)
AECOM Technical Services, Inc.	100 Sterling Parkway, Suite 205 Mechanicsburg, PA 17050	Bridger Thompson	bridger.thompson@aecom.com	Wetland and Watercourse Delineations, L2RAP Field Work (2015-2017)
AECOM Technical Services, Inc.	715 Washington Boulevard Williamsport, PA 17701	Mark Benfer	mark.benfer@aecom.com	Wetland and Watercourse Delineations, L2RAP Field Work (2017)
<u>Notes:</u>				
¹ Level 2 Rapid Assessment Protocol (L2RAP) includes both PA Riverine Condition and PA Wetland Condition protocols.				

S2.A.2 Wetland Delineation Report

A Wetland and Watercourse Delineation Report is provided in Appendix BU-L-2B.

S2.A.3 Watercourse Report

A Wetland and Watercourse Delineation Report is provided in Appendix BU-L-2B.

S2.A.4 Location Map

A Project Location Map specific to Bucks County that identifies regulated waters of the Commonwealth, natural areas, wildlife sanctuaries, natural landmarks, political boundaries, publicly available service areas for public water supplies, and historic landmarks within 1 mile of the Project and State Parks and prime farmland within 100 feet of the Project is included in JPA Section I. There are no National Parks, Forests, or Recreation Areas, State Forests, or State Game Lands within 100 feet of the Project. As indicated in Table BU-L2-2 below, there are no National Wildlife Refuges, or Federal, State, Local, or Private Wildlife or Plant Sanctuaries, Public Water Supply sources, Natural Wild or Scenic Rivers, Commonwealth’s Scenic Rivers, or Designated Federal Wilderness Areas within 100 feet of the Project in Bucks County.



S2.A.5 Areas of Special Interest

A portion of the Project in Bucks County crosses a State Park and areas identified as prime farmland, as summarized in Table BU-L2-2. Where areas of special interest will be crossed, a description of these areas is provided below.

**Table BU-L2-2
Areas of Special Interest Crossed by the Project in Bucks County**

Area of Special Interest	Yes	No
National, State or Local Park, Forest or Recreation Areas	X	
National Natural Landmarks		X
National Wildlife Refuge, or Federal, State, Local, or Private Wildlife or Plant Sanctuaries		X
State Game Lands		X
Areas Identified as Prime Farmland	X	
Source for a Public Water Supply		X ¹
Natural Wild or Scenic River or the Commonwealth’s Scenic Rivers System		X
Designated Federal Wilderness Areas		X
<u>Notes:</u>		
¹ No public water supplies have been identified to date.		

National, State or Local Park, Forest or Recreation Areas

The Project crosses Delaware Canal State Park near milepost (MP) 77.6 for an approximate crossing length of 0.04 mile in Bucks County, Pennsylvania. Approximately 0.1 acre will be located in the permanent ROW. The Delaware Canal State Park parallels the Delaware River between Easton and Bristol along the 60-mile historical towpath. The park includes a 90-acre pond, and many miles of shoreline and river islands (Pennsylvania Department of Conservation and Natural Resources [PADCNR], 2018). Impacts are discussed in Module 3.

Areas Identified as Prime Farmland

Based on soil classifications, 28.4 acres of area classified as prime farmland or farmland of statewide importance is located within the construction work area in Bucks County, which includes 18.4 acres in the temporary ROW. In addition, 10.0 acres of area classified as prime farmland or farmland of statewide importance is located within the permanent ROW. The prime farmland and farmland of statewide importance locations are listed by MP in Appendix BU-L-2C.



Source for a Water Supplies

PennEast used several data sources including public sources, consultations with public water suppliers, desktop assessments, and landowner outreach to identify public and private water supplies near the Project area. The data collection methods are described below.

Water Supply Search Radii

In accordance with its Well Monitoring Plan and Federal Energy Regulatory Commission (FERC) Certificate conditions (FERC, 2018), PennEast will monitor all water supply wells within 150 feet of the Project workspace [500 feet in karst areas and surrounding horizontal directional drills (HDDs)]. Monitoring will require the approval of the landowner and will include both public and private water supplies.

In its July 3, 2019 Technical Deficiency letter, PADEP requested that PennEast identify private water supplies within 450 feet of HDDs (1,000 feet in karst areas) and public water supply wells within 0.5 mile of HDD alignments. Within Bucks County, PennEast proposes one HDD under the Delaware River, which is in an area of karst terrain. PADEP also requested that PennEast identify surface water intakes within one mile downstream of the Delaware River crossing.

Public Data Sources

PennEast reviewed the PADCNR Pennsylvania Groundwater Information System (PaGWIS) to identify groundwater wells within 150 feet of the Project workspace, 500 feet of Project workspace in areas of karst terrain, and 0.5 mile of the proposed HDDs, (PaGWIS, 2019).

Public Water Supply Consultations

PennEast reviewed PADEP's Public Water Supplier's (PWS) Service Areas to identify PWS areas with surface water sources within 1 mile upstream or 10 miles downstream of Project workspace and PWS areas with groundwater sources within 0.5 mile of proposed HDD alignments (PADEP, 2019a). The results of this screening were used for direct consultation with public water suppliers. One PWS with a groundwater source within 0.5 mile of the Delaware River HDD was identified: Riegelsville Water Company. PennEast submitted a consultation letter to the Borough Water Operator on July 31, 2019 to request information about the location of any groundwater wells and information about the well and casing depth, production rate, population serviced by the well(s), and any aquifer transmissivity or other aquifer hydraulic parameters that could be used to support a well production zone analysis. PennEast sent a follow up email on August 20, 2019 and called and left a voicemail in September 2019 but has not yet received a response from the outreach attempts. . Correspondence is provided in Appendix BU-L-2H.

PennEast also reviewed PADEP's Water Resources layer available on eMAP PA (<http://www.depgis.state.pa.us/emappa/>) and through the Pennsylvania Spatial Data Access (PASDA), to identify surface water intakes within 1 mile downstream of the Delaware River crossing (PADEP, 2019b). No surface water intakes were identified within 1 mile downstream of the proposed crossing.



Desktop Assessment

PennEast used aerial photography to assess the potential for private and public water wells to exist in parcels within the distances specified above. If homes, businesses, or other buildings were observed on aerial photography within the buffers, PennEast noted whether it was probable for water supply wells to exist on the property. Although all property owners within 1000 feet of the Delaware River HDD were contacted to request information about well presence or absence on their properties, only parcels with commercial, industrial, or multiple buildings on a single parcel within 0.5 mile of the HDD were contacted to request information about public water supply wells.

Landowner Outreach

PennEast's land agents contacted landowners with potential private and public water supply wells within the search radii described above. Landowners with potential private water supply wells were asked to complete questionnaires that included questions about the presence/absence of wells, springs, and septic systems on their property, the status of any wells (abandoned, sealed, currently in use), what the water is used for (human consumption, irrigation, livestock, business/commercial use), and any known information about when wells were installed, well depths, and treatment systems. Landowners with potential public water supply wells were asked to complete questionnaires that included questions related to water use, the community the well services (community water supply, school, hospital, office building, factory, campground, gas station), and any known information about when the wells were installed, depth and diameter of the well and casing, production rate, static water level, and aquifer transmissivity. Landowners were also asked to describe the location of the well and mark the location on a map. When granted permission by the landowner(s), land agents would collect well location information.

Water Supply Investigation Results

In Bucks County, nine private water supply wells have been identified within the well monitoring buffer; no public water supply wells have been identified in the well monitoring buffer. Within the PADEP-specified buffers at HDD locations, PennEast has identified one private water supply well within 1,000 feet of the HDD. No public water supply wells have been identified within 0.5 mile of the Delaware River HDD.

The locations of private wells within the PADEP-specified buffers at HDD locations are shown on a figure in Appendix BU-L-2I. Water supply location information should be treated as privileged information that should not be released.

S2.B Aquatic Resource Identification

Aquatic habitats identified in the general Project area include watercourses (i.e., lakes, ponds, reservoirs, ephemeral, intermittent and perennial watercourses) and wetlands. Watercourses and wetlands within Bucks County were field delineated by AECOM in accordance with U.S. Army Corps of Engineers (USACE) requirements between 2014 and 2018. The identification of regulated wetland and watercourse boundaries occurred within a 400-foot-wide survey corridor centered over the proposed pipeline (i.e., 200-feet on either side of the pipe centerline). Other areas in the survey scope included aboveground



facilities, pipeyards, construction staging areas, and access road areas required to facilitate Project construction and operation.

Results of the field surveys determined construction of the Project in Bucks County would require the crossing of 3 watercourses and 1 wetland. Tables BU-L2-3 and BU-L2-4 below list the unique resource identifier, location, type, size, state designation, and fisheries classifications (where applicable) for watercourses and wetlands, respectively. Proposed impacts are presented in Module 3.

Watercourses

Watercourse flow type classifications for surface waters located within the survey corridor were assigned in accordance with the criteria found in the Pennsylvania Code 025 §93, as well as by determination of watercourse flow using geomorphic, hydrological and biological indicators, utilizing the North Carolina Division of Water Quality (NCDWQ), *Identification Methods for the Origins of Intermittent and Perennial Streams* (NCDWQ, 2010 per PADEP, 2012). Of the 3 watercourses surveyed within the 400-foot-wide survey corridor in Bucks County, 1 was classified as ephemeral, none was classified as intermittent and 2 were classified as perennial. Each of the 3 surveyed watercourses will be impacted by the Project. A summary of the total top-of-bank crossing widths for all watercourses crossed in Bucks County consists of the following:

- 1 watercourse has a top-of-bank crossing width equal to or less than 10-feet;
- 1 watercourse has a top-of-bank crossing width between 11- and 50-feet; and
- 1 watercourse has a top-of-bank crossing width greater than 100-feet.

Major watercourse crossings (i.e., total crossing widths that are 100-feet or larger) within Bucks County consist of the following:

- Delaware River (Watercourse ID 122315_DB_1001_P_MA)

Designated/Existing Uses and High Quality/Exceptional Value Waters

The Commonwealth of Pennsylvania has established Water Quality Standards that classify surface waters in Pennsylvania according to their use. These standards were established to implement Pennsylvania's Clean Streams Law that protects existing and designated surface water uses from degradation and negative change to the water's use. Uses include those associated with aquatic life, water supply, recreation and fish consumption, special protection, and navigation. The water use classification system and criteria are established for Pennsylvania Code Title 25, Chapter 93 and include the following designations related to fisheries:

- Warmwater Fishes (WWF) - Maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat;
- Cold Water Fishes (CWF) - Maintenance and/or propagation of fish species including the family Salmonidae and additional flora and fauna which are indigenous to cold water habitat;



- Migratory Fishes (MF) - Passage, maintenance, and propagation of anadromous and catadromous fishes and other fishes that move to or from flowing waters to complete their life cycle in other waters; and
- Trout Stocking Fishery (TSF) Maintenance of stocked trout from February 15 to July 31, and maintenance and propagation of fish species and additional flora and fauna which are indigenous to a warm water habitat.

In addition, watercourses may be classified as special protection waters, including Exceptional Value (EV) and High-Quality (HQ) based on a variety of criteria. HQ waters are those surface waters with water quality that exceed levels necessary to support propagation of fish, shellfish, and wildlife, and recreation in and on the water by satisfying Pennsylvania Code 025 §93.4b(a). EV waters include high quality surface waters that satisfy Pennsylvania Code 025 §93.4b(b). The water quality of all HQ and EV watercourses must be maintained and protected in accordance with antidegradation requirements (Pennsylvania Code 025 §93.4a). The Pennsylvania Fish and Boat Commission (PFBC) further defines watercourses based upon their status with regard to their ability to support the propagation of trout, wild or otherwise. Stocked Trout Waters include watercourses that have significant portions that are open to public fishing and are stocked with trout by the PFBC. Wild Trout Waters are sections of watercourses that support naturally reproduction populations of trout. Class A Wild Trout Streams are wild trout watercourses that have a population that is of sufficient size and abundance to support a long-term sport fishery. Table BU-L2-3 below provides an overview of the fishery resource classifications based on review of appropriate drainage lists found in Pennsylvania Code, Title 25, Chapter 93, §93.9 and the trout water classification lists published by the PFBC.

Floodways

As defined by the PADEP under Pennsylvania Code 025 §105.1, the floodway of a watercourse is identified as the channel of the watercourse and portions of the adjoining floodplains which are reasonably required to carry and discharge the 100-year frequency flood. Unless otherwise specified, the boundary of the floodway is as indicated on maps and flood insurance studies provided by the Federal Emergency Management Agency (FEMA). In an area where no FEMA maps or studies have defined the boundary of the 100-year frequency floodway, it is assumed, absent evidence to the contrary, that the floodway extends 50-feet from the top of the bank of the watercourse.

PennEast assessed the Flood Insurance Rate Maps issued by FEMA to identify mapped Regulatory Floodways. Where no mapped floodway exists, PennEast assumed that a 50-foot wide buffer on each watercourse, measured landward from the top of bank of both the left and the right bank of the watercourse, represents the floodway. Table BU-L2-3 provides information about the floodway size within the study corridor for each floodway that will be impacted by the Project. Figures contained within Joint Permit Application (JPA) Section H-2 show the FEMA 100-year floodways and the presumed 50-foot PADEP floodways within Bucks County. Impacts are presented in Module 3.

**Table BU-L2-3
Size and Designations of Impacted Watercourses in Bucks County¹**

Milepost ²	Watercourse ID ^{3,4}	Watercourse Name	Resource Type ⁵	Watercourse Type ⁶	Delineated Channel Length within the Study Corridor (feet)	Average Delineated Width (feet)	Floodway acreage within the Study Corridor (acre)	PFBC Wild Trout Water ⁷	PFBC Trout Stocked Water ⁸	Chapter 93 Existing or Designated Use ⁹
PennEast Mainline Pipeline										
76.2	051515_JC_1004_E_MI	UNT to Delaware River	Watercourse-channel and watercourse floodway	Ephemeral	603	6	1.598	-	-	WWF, MF
77.6	052915_JC_1002_C_IN	Delaware Canal	Watercourse-channel and watercourse floodway	Canal	1,103	45	0.905	-	-	WWF, MF
77.6	122315_DB_1001_P_MA	Delaware River	Watercourse-channel and watercourse floodway	Perennial	445	420	3.715	-	-	WWF, MF

- Notes:
1. Source: PennDOT Pennsylvania county boundaries, dated 7/2018. Available at www.pasda.psu.edu.
 2. All route deviations implemented after the FERC Certificate Application are denoted with an "R" and indicate a MP equation. MPs with an "R1" indicate route deviations implemented and provided to FERC prior to the issuance of the DEIS. MPs with an "R2" indicate route deviations implemented as part of the September 2016 Route Update. MPs with an "R3" indicate route deviations implemented post-FERC Certificate issuance. All MPs without an "R" indicate that the route has not changed since the Certificate Application.
 3. In instances where a watercourse is crossed by the proposed pipeline or workspace multiple times, crossing numbers (e.g. "-1", "-2") have been added to the Watercourse ID.
 4. Watercourse ID: P = perennial, I = intermittent, E = ephemeral, MA = major, IN = intermediate, MI = minor, C = canal, D = ditch
 5. Resource type is defined as watercourse channel (riverine) or watercourse floodway consistent with the classification presented in EA Instructions Section B.2.
 6. Ditches identified within the Project area were included as ephemeral waterbody crossings. Canals and lakes identified with the Project area were included as perennial waterbody crossings.
 7. Sources: PFBC Stream Sections that Support Wild Trout Production, dated 7/2019 and PFBC Class A Wild Trout Streams, dated 7/2019. Available at www.pasda.psu.edu. I = Class A Trout Water, II = Wilderness Trout Stream, III = Naturally Reproducing Trout Stream.
 8. Sources: PASDA Stocked Trout Waters (Flowing Waters), dated 2019 and PASDA Trout Stocked Streams, dated 2019. Available at www.pasda.psu.edu.
 9. Sources: PADEP Streams Chapter 93 Existing Use, dated 3/2019 and PADEP Streams Chapter 93 Designated Use, dated 3/2019. If a stream has an existing use, the designated use has been replaced with that value. Available at www.pasda.psu.edu.



Wetlands

As defined under Section 404 of the Clean Water Act (CWA; 33 Code of Federal Regulations [CFR] 328), wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of wetland vegetation adapted for life in saturated soil conditions. PennEast identified, located, classified and delineated wetland resources within and adjacent to the Project area through field surveys conducted from 2014 to 2017. Jurisdictional wetlands crossed by the Project in Pennsylvania were field delineated in accordance with the USACE Wetlands Delineation Manual (Environmental Laboratory, 1987) and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (USACE; 2011, 2012a-b).

The U.S. Fish and Wildlife Service (USFWS) wetland classification system described by Cowardin, et al. (1979) was used to classify the wetlands that would be affected by the Project. The wetlands in the Project area were identified as palustrine forested (PFO), palustrine scrub-shrub (PSS), palustrine emergent (PEM), or a combination of these three cover types. Construction of the proposed Project in Bucks County will result in 1 wetland crossing.

Exceptional Value Wetlands

The State of Pennsylvania has two major classifications of wetlands – EV and Other. The designation of EV wetlands is based on specific characteristics or uses. EV Wetlands are a category of wetlands that deserve special protection. In accordance with Pennsylvania Code 025 §105.17, EV wetlands are to exhibit one or more of the following five characteristics detailed in Sections 105.17(1)(i) through 105.17(1)(v):

- (i) Wetlands which serve as habitat for fauna or flora listed as “threatened” or “endangered” under the Endangered Species Act of 1973 (7 United States Code Annotated [USCA] § 136; 16 USCA § § 4601-9, 460k-1, 668dd, 715i, 715a, 1362, 1371, 1372, 1402 and 1531—1543), the Wild Resource Conservation Act (32 P. S. § § 5301—5314), 30 Pa.C.S.(relating to the Fish and Boat Code) or 34 Pa.C.S. (relating to the Game and Wildlife Code).
- (ii) Wetlands that are hydrologically connected to or located within 1/2-mile of wetlands identified under subparagraph (i) and that maintain the habitat of the threatened or endangered species within the wetland identified under subparagraph (i).
- (iii) Wetlands that are located in or along the floodplain of the reach of a wild trout stream or waters listed as exceptional value under Chapter 93 (relating to water quality standards) and the floodplain of streams tributary thereto, or wetlands within the corridor of a watercourse or body of water that has been designated as a National wild or scenic river in accordance with the Wild and Scenic Rivers Act of 1968 (16 USCA § § 1271—1287) or designated as wild or scenic under the Pennsylvania Scenic Rivers Act (32 P. S. § § 820.21—820.29).
- (iv) Wetlands located along an existing public or private drinking water supply, including both surface water and groundwater sources, that maintain the quality or quantity of the drinking water supply.



- (v) Wetlands located in areas designated by the Department as “natural” or “wild” areas within State Forest or Park lands, wetlands located in areas designated as Federal wilderness areas under the Wilderness Act (16 USCA § § 1131—1136) or the Federal Eastern Wilderness Act of 1975 (16 USCA § 1132) or wetlands located in areas designated as National natural landmarks by the Secretary of the Interior under the Historic Sites Act of 1935 (16 USCA § § 461—467).

Using the definitions above, PennEast evaluated the classification of each wetland that was delineated within the 400-foot-wide survey corridor.

- (i) PennEast consulted with agencies that regulate threatened and endangered (T&E) species. These agencies requested targeted surveys for several species that utilize wetlands as habitat, including: bog turtle (*Glyptemys muhlenbergii*, federal endangered), eastern redbelly turtle (*Pseudemys rubriventris*, state threatened), northeastern bulrush (*Scirpus ancistrochaetus*, federal endangered), northern cricket frog (*Acris crepitans*, state endangered), Collin’s sedge (*Carex collinsii*, state endangered), bog sedge (*Carex paupercula*, state threatened), variable sedge (*Carex polymorpha*, state endangered), and sweetgale (*Myrica gale*, state threatened), white-fringed orchid (*Platanthera blephariglottis*, proposed state endangered and sensitive), screw-stem (*Bartonia paniculata*, state proposed rare), rough-leaved aster (*Eurybia radula*, state proposed threatened), and creeping snowberry (*Gaultheria hispidula*, state rare). Within Bucks County, these targeted surveys were limited to bog turtles, and no bog turtle habitat was observed. Therefore, no EV wetlands in Bucks County met this parameter.
- (ii) In consultation with federal and state agencies that regulate T&E species and through T&E species surveys, no wetlands that are hydrologically connected to and maintaining the habitat of T&E species were identified within Bucks County. Therefore, no EV wetlands in Bucks County met this parameter.
- (iii) The Project crosses multiple wild trout streams and tributaries thereto. The Project also crosses a few EV watercourses and their tributaries. PennEast evaluated each delineated wetland to determine if it was located within the floodplain of a wild trout stream or EV stream. In most instances, wetlands within a wild trout or EV watershed were categorized as EV. However, in some instances in these watersheds, no watercourses were located near a wetland, so it was classified as “other”. The wetland delineated in Bucks County was not in wild trout or EV watersheds, and was classified as “other” wetlands.
- (iv) As discussed in Section S2.A.5, PennEast used desktop analysis, consulted with public water suppliers, and contacted landowners to determine the locations of public or private drinking water supplies. Although private wells were identified near the Project workspace in Bucks County, none were located within 50 feet of a wetland. PennEast has concluded that no wetlands in Bucks County are located along the water supply that would maintain the quality or quantity of the drinking water supply. Therefore, no EV wetlands in Bucks County met this parameter.
- (v) The Project does not cross and wild or scenic rivers, nor is the Project located in any “natural” or “wild areas” within state forests or park lands, areas designated as federal wilderness areas, or areas designated as National Natural Landmarks. Therefore, no wetlands in Bucks County met this parameter.



Table BU-L2-4 below provides an overview of the wetland delineated size and Pennsylvania Code, Title 25, Chapter 025 §105 wetland classification.

**Table BU-L2-4
Size and Classifications of Impacted Wetlands in Bucks County¹**

Milepost ²	Wetland ID ^{3,4}	Delineated Size (acres)	Chapter 105 Wetland Classification ⁵
PennEast Mainline Pipeline			
77.5	110714_JC_001_PFO	0.327	Other

Notes:

1. Source: PennDOT Pennsylvania county boundaries, dated 7/2018. Available at www.pasda.psu.edu.
2. All route deviations implemented after the FERC Certificate Application are denoted with an "R" and indicate a MP equation. MPs with an "R1" indicate route deviations implemented and provided to FERC prior to the issuance of the DEIS. MPs with an "R2" indicate route deviations implemented as part of the September 2016 Route Update. MPs with an "R3" indicate route deviations implemented post-FERC Certificate issuance. All MPs without an "R" indicate that the route has not changed since the Certificate Application.
3. In instances where a wetland is crossed by the proposed pipeline or workspace multiple times, crossing numbers (e.g. "-1", "-2") have been added to the Wetland ID.
4. Wetland ID Key: PEM = palustrine emergent, PFO = palustrine forested, PSS = palustrine scrub shrub
5. Resource Value Definitions: Pennsylvania Exceptional Value Wetland as defined by PA Code §105.17 (relating to special criteria for projects affecting important wetlands). Criteria are:
 - (i) Serves as habitat for fauna or flora listed as "threatened" or "endangered"
 - (ii) Is hydrologically connected to or located within a 1/2-mile from habitat for fauna or flora listed as "threatened" or "endangered" and wetland dependent;
 - (iii) Located in or along the floodplain of the reach or tributaries of a wild trout stream or waters listed as exceptional value;
 - (iv) Located along an existing public or private drinking water supply.

S2.C Federal and State Threatened and Endangered Species Habitat

On behalf of PennEast, AECOM has consulted with the USFWS, National Marine Fisheries Service (NMFS), Pennsylvania Game Commission (PGC), PFBC, and PADCNR to identify the potential presence of federally and state listed T&E species as well as species of special concern and significant habitats within the vicinity of the Project.

Table BU-L2-5 below lists the species identified through consultations with the aforementioned federal and state agencies as threatened, endangered, rare, candidate, or of concern in Bucks County. As requested in the PADEP's EA Form Instructions, PennEast submitted a Large Project Pennsylvania Natural Diversity Inventory (PNDI) review for rare, candidate, threatened, and endangered species under the jurisdiction of the USFWS, PFBC, PGC and PADCNR for the Project. The results of the Large Project Review are included in Table BU-L2-5 below.

**Table BU-L2-5
Federally and State Listed Species Potentially Occurring Within the Action Area in Bucks County**

Species Common Name	Scientific Name	Federal Status	State Status	Survey Status	Reporting Status	Status of State/Federal Review	Final State/Federal Clearance/Concurrence Issued
Indiana bat	<i>Myotis sodalis</i>	Endangered	Endangered	Surveys completed 2015	Survey report submitted October 2015	Concurrence via informal consultation received along with Biological Opinion. In their amended BO, the USFWS determined that the Modifications will not result in affects above what was analyzed in the November 28, 2017, Opinion.	Amended BO issued July 29, 2019
Northern long-eared bat	<i>Myotis septentrionalis</i>	Threatened	Endangered	Surveys completed 2015	Survey report submitted October 2015	Biological Opinion issued November 28, 2017. In their July 29, 2019 amended BO, the USFWS determined that the Modifications will not result in affects above what was analyzed in the November 28, 2017 BO.	Amended BO issued July 29, 2019
Bog turtle	<i>Glyptemys muhlenbergii</i>	Threatened	Endangered	Surveys completed June 2015	Final survey report submitted 2015	Biological Opinion issued November 28, 2017. In their July 29, 2019 amended BO, the USFWS determined that the Modifications will not result in affects above what was analyzed in the November 28, 2017 BO.	Amended BO issued July 29, 2019
Eastern redbelly turtle	<i>Pseudemys rubriventris</i>	Not Listed	Threatened	Surveys completed July 2018	Final survey report submitted September 2018	PFBC review complete for this species	PFBC concurrence issued on October 11, 2018.
Atlantic Sturgeon	<i>Acipenser oxyrinchus</i>	Endangered	Endangered	NA – not required	NA	PFBC and NMFS review complete for this species. Not known to occur at this location, waterbody to be crossed via HDD.	PFBC concurrence issued June 15, 2016. NMFS concurrence issued September 18, 2014
Shortnose Sturgeon	<i>Acipenser brevirostrum</i>	Endangered	Endangered	NA – not required	NA	PFBC and NMFS review complete for this species. Not known to occur at this location, waterbody to be crossed via HDD.	PFBC concurrence issued June 15, 2016. NMFS concurrence issued September 18, 2014



Species Common Name	Scientific Name	Federal Status	State Status	Survey Status	Reporting Status	Status of State/Federal Review	Final State/Federal Clearance/Concurrence Issued
Dwarf Wedgemussel	<i>Alasmidonta heterodon</i>	Endangered	Endangered	No specific surveys conducted in PA – surveys for freshwater mussels conducted in Delaware River	Survey results submitted June 2017	PFBC review complete for this species. USFWS Biological Opinion issued November 28, 2017. Amended BO issued July 29, 2019.	PFBC concurrence on June 15, 2016. USFWS made the determination that the Project was “not likely to adversely affect” the dwarf wedgemussel in the November 28, 2017 Biological Opinion. In their July 29, 2019 amended BO, the USFWS determined that the Modifications will not result in affects above what was analyzed in the November 28, 2017, BO.



S2.C.1 Pennsylvania Natural Diversity Inventory (PNDI) Receipts

Correspondence between PennEast, USFWS, NMFS, PADCNR, PFBC, and PGC is included in Joint Permit Application (JPA) Section G-1. Correspondence and reports that identify the specific locations of protected species has been redacted and is included in a separate, privileged volume in JPA Section G-2.

S2.C.2 PNDI Potential Conflicts

PennEast has completed surveys for threatened and endangered species in Bucks County. The species that may be impacted by the Project in Bucks County include the northern long-eared bat (*Myotis septentrionalis*, federal threatened), bog turtle, and eastern redbelly turtle. A summary of the surveys conducted and PNDI resolutions for these species is included below.

The PADCNR, PGC, and PFBC have provided clearance letters for the Bucks County portion of the Project dated August 24, 2018, January 9, 2019 and October 11, 2018, respectively. These letters are provided in JPA Section G-1. On November 28, 2017, the USFWS issued a Biological Opinion (BO) for impacts that the Project may have on the northern long-eared bat and bog turtle. In its cover letter to the FERC, the USFWS stated that the Project is not likely to adversely affect the dwarf wedgemussel (*Alasmidonta heterodon*, federal endangered), Indiana bat (*Myotis sodalis*, federal endangered), or the northeastern bulrush. FERC has since re-initiated consultation with the USFWS to modify the 2017 BO, and the USFWS issued an amended BO on July 29, 2019. In the revised BO, the USFWS determined that the modifications will not result in affects above what was analyzed in the original BO. The USFWS addressed effects analysis for species under informal consultation in the amended BO cover letter; they also finalized formal consultation with “no jeopardy” findings for the northern long-eared bat and the bog turtle in the amended BO.

PennEast requests that the PADEP utilize a sequential review of the PNDI coordination in accordance with the PADEP’s *Policy for PNDI Coordination during Permit Review and Evaluation* (Document Number 021-0200-001), which allows for a concurrent review of the permit application while the permit applicant completes PNDI coordination.

Northern Long-Eared Bat

In its BO, the USFWS concluded that the amount of tree removal proposed within 0.25 mile of northern long-eared bat hibernacula is not likely to adversely affect the species, and vibrations generated by heavy machinery are not anticipated to result in micro-climatic or structural changes to hibernacula. However, the USFWS also concludes that tree removal within 150 feet of maternity roosts is likely to adversely affect northern long-eared bat individuals with maternity colonies close to the Project. Tree removal will occur outside of the restricted pup season window, so this take is not prohibited by the 4(d) rule. To minimize impacts to the species, PennEast will implement the following conservation measures in Bucks County:

- PennEast will only clear trees ≥ 5 inches diameter at breast height (dbh) between November 1 and March 31.



- PennEast will only clear trees ≥ 3 inches dbh between November 15 and March 31 within known fall swarming habitat areas.
- PennEast will not blast within 0.25-mile of known northern long-eared bat hibernacula.
- Prior to construction, PennEast will file with the FERC Secretary, for review and written approval by the Director of Office of Energy Projects, a list of locations by MP where, in accordance with the BO, the USFWS is requiring tree clearing restrictions that are specifically applicable to federally listed bat species.

Bog Turtle

The wetland that was delineated in Bucks County was assessed by a Recognized Qualified Bog Turtle Surveyor (RQBTS). During the Phase 1 assessment, the RQBTS determined that the wetland did not meet minimum criteria for suitable bog turtle habitat. Based on this assessment, no impacts to bog turtles are expected within Bucks County. However, Bucks County is included in the amount of take permitted by the USFWS' BO for the Project.

Eastern Redbelly Turtle

Because the Project will be crossing the Delaware River via HDD technologies, no impact to the eastern redbelly turtle is expected for that crossing. PennEast biologists conducted nesting habitat assessments on all workspace within 1,000 feet of the Delaware River, which included one access road and portions of the HDD drilling site. Based on survey results, the PFBC concluded that the Project was not likely to adversely affect the eastern redbelly turtle.

S2.D Aquatic Resource Characterization

S2.D.1 Riverine Resources

The watercourse information contained within Table BU-L2-6 has the gradient class for each delineated watercourse in Bucks County as well as the watershed size as defined in the Pennsylvania Natural Heritage Program's (PNHP's) Aquatic Community Classification Project Stream Reach Watersheds data (PNHP 2018) and a summary of the results from the PA Riverine Condition Level 2 Rapid Assessment Protocol (L2RAP). Copies of the assessment area mapping and data sheets are provided in Appendix BU-L-2D. The Riverine Assessment Area, Riparian Vegetation, and Riparian Zone of Influence utilized to complete PA Riverine Condition L2RAP were based on the delineated watercourse boundaries identified pre-construction.

The following section contains information pertaining to the riverine resource types and conditions in Bucks County as they relate to their inherent functions including, but not limited to, those associated with hydrologic, biogeochemical and habitat attributes as well as any applicable recreational uses.

The portion of the Project area in Bucks County is located within the Cooks Creek and Delaware River watersheds. The Cooks Creek and Delaware River watersheds are all located within the Delaware River basin. These watersheds support cold water and warm water aquatic communities.

The watercourses associated with these aquatic communities typically range from smaller, high-gradient, headwater and mid-reach watercourses with watersheds ranging in size from approximately 18 to 54 square miles (mi²) to medium to large sized watercourses and rivers with watersheds up to 626 mi². The surrounding land uses in these watersheds consist primarily of agriculture with some forested, undeveloped land, and residential, with few urban areas. Water quality tends to fluctuate from high to medium in these watercourses with alkalinity and conductivity values ranging from low to relatively high and pH levels in the neutral range. Typical fish species found in these watercourses are comprised of brown trout (*Salmo trutta*), brook trout (*Salvelinus fontinalis*), rainbow trout (*Oncorhynchus mykiss*), fathead minnow (*Pimephales promelas*), pearl dace (*Margariscus margarita*), blacknose dace (*Rhinichthys atratulus*), central stoneroller (*Campostoma anomalum*), northern hogsucker (*Hypentelium nigricans*), creek chub (*Semotilus atromaculatus*), and white sucker (*Catostomus commersoni*). Common aquatic macroinvertebrate taxa found in these waters include species from the Ephemeroptera, Plecoptera, and Trichoptera orders. According to the PFBC, Cooks Creek is listed as supporting natural trout reproduction. As such, this watercourse provides the potential for trout fishing. None of the watercourses within the Project area in Bucks County are listed by the PFBC as Stocked Trout Waters.

Appropriate nesting, spawning, rearing, resting, migration, feeding, and escape cover appear to be provided for the aquatic organisms within the larger watercourses identified within the Project area in Bucks County. Fin fish were observed within the majority of the identified perennial watercourses. Macroinvertebrate taxa were observed primarily within the perennial watercourses of the Project area in Bucks County. The substrate of the identified watercourses most often consisted of cobble and gravel; with boulder, sand, silt, and clay present. Course plant material, such as wood, was observed within the majority of the watercourses. These features can provide microhabitat for aquatic organisms. Resting areas were found within the moderate gradient areas of the watercourses (e.g., pools and runs). Migration within the Project area watercourses is possible but was not observed during field investigations. Food sources appeared to be derived from both terrestrial and aquatic vegetation and invertebrates. Natural flushing occurs within the perennial watercourses as sediments and other particles are deposited along the banks and within the channels. Due to the seasonal flow of intermittent watercourses and periodic flow of the ephemeral watercourses, these features are not regularly flushed.

The flow patterns upstream and downstream of the Project area watercourses are a slightly sinuous channel type. The watercourses within the Project area in Bucks County range from high to low gradient and groundwater and overland runoff support flow for the identified intermittent and perennial watercourses. The identified watercourses carry surface water runoff and influence groundwater through the streambed.

The flood-prone areas of the Project area in Bucks County were observed to be generally functional. Flood-prone areas reduce the force, height, and volume of floodwaters to downstream areas by acting as a floodwater storage area. The flood-prone areas of the Project area in Bucks County were observed to be dominated by both native and non-native shrub and herbaceous vegetative species. Vegetation within flood-prone areas helps to slow runoff, trap sediments, and increase absorption of flood waters. The intact riparian corridors help prevent sedimentation and erosion



The most obvious source of pollution observed within the Project area in Bucks County was roadway and agricultural runoff. The watercourses within the Project area were adjacent to vegetated riparian corridors, which limited the effects of these pollution sources.

The watercourses within the Project area in Bucks County will either be crossed via open cut method or HDD method. The watercourses crossed via open trench method will be restored to their original contours following construction, which is typically within two days. A 75-foot-wide limit of disturbance will typically be cleared around watercourses located in forested areas. Following restoration, a 30-foot-wide operational ROW will be maintained for the life of the pipeline. No trees will be permitted to grow within that width. The watercourses crossed via HDD will have no above-ground disturbance.

**Table BU-L2-6
 Characterization of Impacted Riverine Resources in Bucks County¹**

Milepost ²	Watercourse Identifier ^{3,4}	Gradient Class ⁵	Watershed Size ⁵	PA Riverine Condition L2RAP Score
PennEast Mainline Pipeline				
76.2	051515_JC_1004_E_MI	1	1	0.33
77.6	052915_JC_1002_C_IN	1	4	0.33
77.6	122315_DB_1001_P_MA	1	4	0.74

Notes:

1. Source: PennDOT Pennsylvania county boundaries, dated 7/2018. Available at www.pasda.psu.edu.
2. All route deviations implemented after the FERC Certificate Application are denoted with an "R" and indicate a MP equation. MPs with an "R1" indicate route deviations implemented and provided to FERC prior to the issuance of the DEIS. MPs with an "R2" indicate route deviations implemented as part of the September 2016 Route Update. MPs with an "R3" indicate route deviations implemented post-FERC Certificate issuance. All MPs without an "R" indicate that the route has not changed since the Certificate Application.
3. In instances where a watercourse is crossed by the proposed pipeline or workspace multiple times, crossing numbers (e.g. "-1", "-2") have been added to the Watercourse ID.
4. Watercourse ID: P = perennial, I = intermittent, E = ephemeral, MA = major, IN = intermediate, MI = minor, C = canal, D = ditch
5. Source: PNHP Aquatic Community Classification Project Stream Reach Watersheds available at http://www.naturalheritage.state.pa.us/Aquatic_GIS.aspx
6. Source: USGS Stream Stats available at <https://streamstats.usgs.gov/ss/>

Riparian Property

Properties upstream and downstream of the Project area in Bucks County include existing roadway, agricultural land, forest land, and industrial land. These land uses should not have any further impact on the aquatic habitat within the Project area. Upstream and downstream properties will not be affected during the watercourse and wetland crossings. The areas that are to be open cut for pipeline installation will be restored to original grade as soon as practicable, therefore limiting the open exposure of the trench. This activity will be performed under appropriate weather conditions, and flow will be maintained during construction. The proposed Project will not result in the increase, diminution, or



direction of flow; therefore, the property rights of landowners upstream, downstream, or adjacent to the Project would not be affected by the Project.

S2.D.2 Wetland Resources

Table BU-L2-7 includes the hydrogeomorphic (HGM) classification (as defined by the Natural Resources Conservation Service [NRCS], 2008), Palustrine Community Classification, and Chapter 105 Wetland Classification for each impacted wetland in Bucks County, as well as a summary of the results from the PA Wetland Condition L2RAP. Copies of the assessment area mapping and data sheets are provided in Appendix BU-L-2E. The Assessment Area and 100- and 300-foot Zones of Influence utilized to complete the PA Wetland Condition L2RAP were based on the delineated wetland boundaries identified pre-construction.

In addition to the PA Wetland Condition L2RAP, a functional value assessment was conducted for each wetland delineated within the Project Study Area utilizing the USACE's *The Highway Methodology Workbook: Supplement*. (USACE, 1999). The completed form is located in Appendix BU-L-2F.

The wetland identified within the Study Area in Bucks County is a PFO wetland. The landform/geomorphic settings of this wetland consisted of an isolated depression. The observed primary indicators of hydrology were Water Marks (B1) and Water-Stained Leaves (B9). The most common secondary indicators observed were Sparsely Vegetated Concave Surface (B8) and Drainage Patterns (B10). The primary source of hydrology consisted of surface water runoff collection from the surrounding uplands.

The most common dominant tree species observed was silver maple (*Acer saccharinum*). There were no sapling/shrub species observed within the delineated wetland boundary. The most common herbaceous plant species observed was Water-pepper (*Persicaria hydropiper*).

The matrix hue observed within the delineated wetland was 10YR, with a value of 5 and a chroma of 2. The matrix also contained redox concentrations with a hue of 7.5YR, a value of 4, and a chroma of 6. This soil met the criteria for hydric soil indicator Depleted Matrix (F3). The observed soil texture was sandy loam.

The wetland identified within the Project area in Bucks County was located within forest land surrounded by agricultural land and has the ability to filter overland, storm, and flood flows.

Natural recharge for ground and surface waters did not appear to be present within the delineated wetland in Bucks County. The hydrology of the identified wetland was noted to be influenced by surface water runoff collection. This wetland was influenced by surface water runoff from the surrounding agricultural fields and as such, serves the function of receiving and retaining overland flow with the potential to contain eroded sediment and nutrients from the surrounding land.

The most obvious sources of pollution observed within the Project area in Bucks County were roadway and agricultural runoff. The delineated wetland was located in an isolated depression in a forested area



surrounded by actively farmed agricultural fields. This location contributed to pollution prevention by filtering, detaining, and/or transforming sediment, toxins, litter and/or nutrients carried in the runoff.



**Table BU-L2-7
Characterization of Impacted Wetland Resources in Bucks County¹**

Milepost ²	Wetland ID ^{3,4}	Delineated Size (acres)	Chapter 105 Wetland Classification ⁵	HGM Classification ⁶	Palustrine Community Classification ⁷	PA Wetland Condition L2RAP Score
PennEast Mainline Pipeline						
77.5	110714_JC_001_PFO	0.327	Other	FLn	(SVG) Vernal Pool Community	0.92

Notes:

1. Source: PennDOT Pennsylvania county boundaries, dated 7/2018. Available at www.pasda.psu.edu.
2. All route deviations implemented after the FERC Certificate Application are denoted with an "R" and indicate a MP equation. MPs with an "R1" indicate route deviations implemented and provided to FERC prior to the issuance of the DEIS. MPs with an "R2" indicate route deviations implemented as part of the September 2016 Route Update. MPs with an "R3" indicate route deviations implemented post-FERC Certificate issuance. All MPs without an "R" indicate that the route has not changed since the Certificate Application.
3. In instances where a wetland is crossed by the proposed pipeline or workspace multiple times, crossing numbers (e.g. "-1", "-2") have been added to the Wetland ID.
4. Wetland ID Key: PEM = palustrine emergent, PFO = palustrine forested, PSS = palustrine scrub shrub
5. Resource Value Definitions: Pennsylvania Exceptional Value Wetland as defined by PA Code §105.17 (relating to special criteria for projects affecting important wetlands). Criteria are:
 - (i) Serves as habitat for fauna or flora listed as "threatened" or "endangered"
 - (ii) Is hydrologically connected to or located within a 1/2-mile from habitat for fauna or flora listed as "threatened" or "endangered" and wetland dependent;
 - (iii) Located in or along the floodplain of the reach or tributaries of a wild trout stream or waters listed as exceptional value;
 - (iv) Located along an existing public or private drinking water supply.
6. HGM Classification Key: DFA = Depression temporary, DFC = Depression seasonal, FLg = Flat organic soil, R2 = Riverine lower perennial, R2c = Riverine floodplain complex, R3 = Riverine upper perennial, R3c = Riverine headwater complex, R4 = Riverine intermittent, SLt = Topographic slope
7. Palustrine Community Classification Key: FG = Forest Group , HG = Herbaceous Group , SLG = Shrubland Group , WLG = Woodland Group



Functions and Values

The USACE’s *Highway Methodology Workbook Supplement, Wetlands Function and Values A Descriptive Approach*, (September 1999) was utilized by PennEast to evaluate the functions and values of all wetland areas crossed by the proposed Project. The document provides guidance to permit applicants, consultants, and USACE project managers on how to identify and display wetland functions and values and is generally acceptable to the PADEP and the USACE. The document is a supplement to the Highway Methodology Workbook published by the Regulatory Branch in 1993, which defines procedures to integrate Section 404 permit requirements with highway planning and engineering and the National Environmental Policy Act (NEPA). The evaluation of wetland functions and values is an integral part of the overall phased approach of the Highway Methodology. The USACE defines functions as self-sustaining properties of a wetland ecosystem that exist in the absence of society and values as benefits that derive from either one or more functions and the physical characteristics associated with a wetland.

A Wetland Function-Value Evaluation Form was used to assess the functions/values of the impacted wetland (Table BU-L2-8). In accordance with the method, eight functions (groundwater recharge/discharge, floodflow alteration, fish and shellfish habitat, sediment/toxicant/pathogen retention, nutrient removal/retention/transformation, production export, sediment/shoreline stabilization, and wildlife habitat), and five values (recreation, educational/scientific value, uniqueness/heritage, visual quality/aesthetics, and threatened/endangered species habitat) were assessed for each impacted wetland. Copies of the Wetland Function-Value Evaluation Forms for Bucks County can be found in Appendix BU-L-2F, and a summary table of the ecological functions served by each wetland delineated within the Project workspace Bucks County has been included below.

**Table BU-L2-8
Functions and Values of Impacted Wetland Resources in Bucks County¹**

Milepost ²	Wetland ID ^{3,4}	Function/Value
PennEast Mainline Pipeline		
77.5	110714_JC_001_PFO	Groundwater Recharge/Discharge, Floodflow Alteration, Sediment/Toxicant Retention, Nutrient Removal, Sediment/Shoreline Stabilization, Wildlife Habitat

Notes:

1. Source: PennDOT Pennsylvania county boundaries, dated 7/2018. Available at www.pasda.psu.edu.
2. All route deviations implemented after the FERC Certificate Application are denoted with an "R" and indicate a MP equation. MPs with an "R1" indicate route deviations implemented and provided to FERC prior to the issuance of the DEIS. MPs with an "R2" indicate route deviations implemented as part of the September 2016 Route Update. MPs with an "R3" indicate route deviations implemented post-FERC Certificate issuance. All MPs without an "R" indicate that the route has not changed since the Certificate Application.
3. In instances where a wetland is crossed by the proposed pipeline or workspace multiple times, crossing numbers (e.g. "-1", "-2") have been added to the Wetland ID.
- Wetland ID Key: PEM = palustrine emergent, PFO = palustrine forested, PSS = palustrine scrub shrub



S2.D.3 Lacustrine Resources

There are no lacustrine resources within the Project workspace in Bucks County.



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