



PennEast Pipeline Company, LLC

PENNEAST PIPELINE PROJECT

**L4 - ENVIRONMENTAL ASSESSMENT MODULE 4
MITIGATION PLAN
BUCKS COUNTY**

REVISED OCTOBER 2019

Submitted by:

PennEast Pipeline Company, LLC



TABLE OF CONTENTS

S4.A Impact Avoidance and Minimization Measures 4
S4.B Impacted Resource Mitigation: Repair, Rehabilitation, and Restorative Actions 4
 S4.B.1 Identify and describe repair, rehabilitation, or restorative actions taken to rectify an impacted resource. 5
 Watercourses..... 5
 Wetlands 8
 S4.B.2 Identify and discuss any proposed preservation and maintenance operations that will be taken to reduce or eliminate an impact during the life of the Project. 8
S4.C Compensatory Mitigation 9
S4.D Monitoring Plan..... 10
References..... 11

TABLES

Table BU-L4- 1 Proposed Compensatory Mitigation Ratios..... 9

APPENDICES

- Appendix L-4A – Wetland and Riparian Reforestation Plan (Replaced October 2019)
- Appendix L-4B - Compensatory Mitigation Plan (Replaced October 2019)
- Appendix L-4C – Post-Construction Wetland and Watercourse Monitoring Plan (Replaced October 2019)



Acronyms and Abbreviations

BMP	best management practice
coco mats	coconut coir fiber mats
dbh	diameter at breast height
E&SCP	Erosion and Sediment Control Plan
EA	Environmental Assessment
EA Form	Environmental Assessment Form
EV	Exceptional Value
HDD	horizontal directional drill
HQ	High Quality
JPA	Joint Permit Application
LOD	limit of disturbance
PADEP	Pennsylvania Department of Environmental Protection
PCSM	Post-Construction Stormwater Management
PEM	palustrine emergent
PennEast	PennEast Pipeline Company, LLC
PFO	palustrine forested
Plan	Upland Erosion Control, Revegetation and Maintenance Plan
PPC	Preparedness, Prevention, and Contingency
Project	PennEast Pipeline Project
PSS	palustrine scrub-shrub
ROW	right-of-way
TGD	Technical Guidance Document
USACE	U.S. Army Corps of Engineers



Module S4: Mitigation Plan

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, 12/16/2017) and the assessment criteria detailed in Module 4 of the Environmental Assessment (EA) Form (EA Form) Instructions (Document No. 3150-PM-BWEW0017, Revised 6/2017), PennEast Pipeline Company, LLC (PennEast) has prepared this Mitigation Plan to support its Joint Permit Application (JPA) for the PennEast Pipeline Project (Project).

S4.A Impact Avoidance and Minimization Measures

PennEast has selected the proposed pipeline route to avoid and minimize impacts to wetlands and watercourses to the greatest extent practicable while maintaining the constructability, economic, and safety standards of the Project. As described in greater detail in the Alternatives Analysis (JPA Section S), the centerline alignment and workspace limits were designed to avoid wetlands and watercourses to the extent practicable. Multiple route alternatives and route modifications were assessed and/or implemented to avoid unnecessary impacts to various resources, including aquatic habitats. Given the linear nature of the Project, total avoidance of aquatic habitats is not feasible and therefore installation of the proposed Project facilities will result in temporary and permanent impacts to wetlands and watercourses. Within Bucks County, there will be no surface impacts to wetlands, as the only wetland crossed by the Project will be crossed subsurface with a horizontal directional drill (HDD). Therefore, there will be no permanent impacts to palustrine forested (PFO) wetlands via a cover type conversion to palustrine emergent (PEM) or palustrine scrub-shrub (PSS) cover. To mitigate unavoidable impacts, the workspace was reduced to minimize impacts to watercourses. These features, along with the proposed avoidance or minimization actions, are listed in Section 10 and Section 11 of the Alternatives Analysis (JPA Section S).

S4.B Impacted Resource Mitigation: Repair, Rehabilitation, and Restorative Actions

The proposed repair, rehabilitation and restorative actions are considered 'mitigation' and are referenced to as such in this document. The sections below provide a detailed description of the proposed best management practices (BMPs) contained within the Erosion and Sediment Control Plan (E&SCP, JPA Section M) that will minimize impacts during construction, restoration and operation of the Project. The Project specific E&SCP (JPA Section M) was developed in consultation with applicable state and federal regulatory agencies and contains specific procedures related to construction activities for linear utilities affecting aquatic habitats associated with wetland and riparian communities. Specifically, the wetland and watercourse construction mitigation procedures, erosion and sediment control measures and revegetation and post-construction monitoring processes that are detailed in this document were developed from information contained within the FERC's Upland Erosion Control, Revegetation and Maintenance Plan (Plan) (FERC, 2013a) and Wetland and Waterbody Construction and Mitigation Procedures (Procedures) (FERC, 2013b), the PADEP Erosion and Sediment Control Manual (PADEP, 2012) as well as the permit requirements cited within the PADEP Chapter 102 and 105 regulations.



PennEast has also developed a Wetland and Riparian Reforestation Plan (Appendix L-4A), which outlines the onsite restoration that is proposed at each wetland and riparian crossing. Wetland boundaries have been defined during wetland delineations in accordance with the Modified Routine Wetland Delineation Method as described in the U.S. Army Corps of Engineers' (USACE) *Wetland Delineation Manual, Technical Report Y-87-1* (Environmental Laboratory, 1987) using wetland criteria detailed in the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region* (Version 2.0), and *Northcentral and Northeast Region* (Version 2.0) (USACE, 2012a and 2012b), as appropriate. The accuracy of the delineation boundaries were verified by USACE staff during site visits conducted during 2015-2019. Riparian buffer boundaries have been defined as land within 150 feet of High Quality (HQ) and Exceptional Value (EV) watercourses, and within 100 feet of other watercourses. After each crossing is constructed, PennEast will restore pre-construction contours before seeding the areas with a conservation riparian seed mix (Ernst Riparian Buffer Mix, ERNMX-178), respectively. In riparian buffers where slope exceeds 10%, PennEast's Standard Upland Right-of-Way (ROW) mix will be used. As discussed above, the Project would not result in surface impacts to wetlands in Bucks County; therefore, the restoration plan in Bucks County is specific to riparian buffer restoration.

In addition to the seeded areas, PennEast proposes to replant trees and shrubs within forested riparian buffers and PFO and PSS wetlands, with the exception of a 30-foot wide corridor that is centered on the pipeline. This 30-foot wide ROW will be maintained periodically during Project operation, and to maintain the integrity of the pipeline coating, trees greater than 20 feet tall or 3 inches diameter at breast height (dbh) will be removed. The proposed planting mixes are outlined in Table 1 of the Wetland and Riparian Reforestation Plan (Appendix L-4A). The trees and shrubs will be planted at approximate 10-foot centers. The trees will be protected from herbivory using spiral tree wraps, and 24-inch diameter coconut coir fiber mats (coco mats) will be installed around each planted tree to protect plants from weeds and frost. PennEast will monitor survivorship for two years. If survivorship is below 75% within a restored wetland or riparian area, PennEast will discuss remediation measures with the PADEP and USACE.

S4.B.1 Identify and describe repair, rehabilitation, or restorative actions taken to rectify an impacted resource.

Watercourses

Construction of the Project in Bucks County will result in the temporary crossing of two perennial watercourses and one ephemeral watercourse and their floodways (see Table BU-L2-3, located in Section S2.B of Module 2). Temporary impacts to surface waters during construction activities include watercourse bank vegetation removal, watercourse bank disturbances and, in some instances, temporary flow modifications during the installation of the dry-crossing construction. To minimize impacts, PennEast will implement its Project-specific E&SCP (JPA Section M), Site Restoration Plan (ESCGP Section 3-1 and 3-2), Post-Construction Stormwater Management Plans (PCSM, ESCGP Section 3-3), Preparedness, Prevention, and Contingency Plan (PPC Plan, JPA Section L-3B), Wetland and Riparian Reforestation Plan (Appendix L-4A), and the FERC Procedures (2013b). Such plans would be implemented throughout the duration of the Project to reduce risks of spills or leaks, erosion and sedimentation and stormwater runoff from construction areas with exposed soils. Erosion controls, such



as compost filter socks, straw bales and/or silt fencing, would be utilized in an effort to avoid the transport of disturbed sediments to surface watercourses to the maximum extent practicable. To ensure BMPs are correctly implemented, Environmental Inspectors (EIs) will oversee the installation of erosion control devices. Once installed, BMPs would be monitored by EIs and maintained by contractors until grading and restoration efforts are finalized and complete stabilization is achieved.

PennEast proposes to cross watercourses using a combination of trenchless and conventional installation methods as described in Section 11.1 of the Alternatives Analysis (JPA Section S). To minimize the potential for adverse effects to wetlands and watercourses, PennEast will implement the construction BMPs described in Section 11.2 of the Alternatives Analysis (JPA Section S).

Construction and restoration techniques to be used would be those typical for cross-country construction. Completed stream crossings using the flume or damp and pump methods would be stabilized before returning flow to the channel. Original streambed and bank contours would be re-established, and mulch, jute thatching or bonded fiber blankets would be installed on the stream banks to stabilize seeded areas. Where the flume technique is used, stream banks would be stabilized before removing the flume pipes and returning flow to the watercourse channel. All natural flow patterns will be restored to pre-construction conditions upon Project completion.

Seeding, fertilizing and mulching of disturbed stream approaches would be completed in accordance with the FERC Procedures (FERC, 2013b) and after final grading, weather and soil conditions permitting. As stated in the Wetland and Riparian Reforestation Plan (Appendix L-4A), planting and seeding may occur at different times of the year, or in different growing seasons. If there will be a delay in planting, a cover crop will be installed at 30 pounds/acre. Where necessary, slope breakers would be installed adjacent to stream banks to minimize the potential for erosion. Sediment barriers, such as silt fence and/or straw bales, would be maintained across the ROW until permanent vegetation is established. Temporary equipment bridges would be removed following construction and restoration.

Best Management Practices for Watercourse Crossings

To further minimize the potential for adverse effects to watercourses, PennEast would implement the following BMPs related to the restoration of impacted features:

- PennEast will return all watercourse banks to pre-construction contours or to stable angle of repose as approved by the EI;
- PennEast will segregate and stockpile native streambed material for reinstallation after backfill;
- PennEast will restore stream flow after the banks have been temporarily stabilized;
- PennEast will install erosion control fabric anchored with staples or other appropriate devices along watercourses with low flow conditions;
- PennEast will remove all temporary BMPs when replaced by permanent erosion controls or when restoration of adjacent upland areas is successful;



-
- PennEast will install permanent trench plugs at the edges of watercourses before the trench is backfilled to restore the hydrology to preconstruction conditions;
 - PennEast will install erosion control fabric 50 feet from top of bank on watercourses and 100 feet from top of bank for HQ/EV watercourses to help stabilize the soil until the permanent vegetative cover is achieved;
 - PennEast will revegetate adjacent floodplain locations utilizing PADEP approved measures contained within the E&SCP (JPA Section M).

The construction and restoration procedures identified above are expected to effectively facilitate the proper restoration of impacted watercourses.

Floodways

As identified in the Aquatic Resources Impact Tables in JPA Section A-1, approximately 0.32 acre of the Project in Bucks County will temporarily impact floodways, which includes 0.19 acre of impacts in the temporary workspace and 0.13 acre in the permanent ROW. Given the linear nature of the proposed Project, temporary impacts within areas subject to flooding is unavoidable. To mitigate for temporary disturbances within floodway locations, PennEast will implement the BMPs and construction procedures detailed in the E&SCP (JPA Section M).

PennEast will restore and revegetate temporary workspace areas to minimize or avoid permanent impacts on vegetated floodway areas. Restoration and revegetation will comply with state and federal regulations and monitoring requirements. The construction workspace will be restored to pre-construction contours and is not anticipated to result in increased flood elevations or encroachment within floodways. Additionally, all permanent components of the Project located in floodway areas will be installed at a minimum of 3 feet below surface grade and surfaces will be restored to pre-construction grades and conditions.

Riparian Areas

Similar to the discussion provided for floodways, complete avoidance of riparian corridors is not feasible due to the linear nature of the pipeline Project. Installation of the pipeline facilities will result in temporary vegetation removal as well as surface disturbances within the riparian areas associated with the Project. As mitigation for these temporary disturbances, PennEast will employ multiple measures to reduce the extent and duration of Project impacts to riparian communities which include, but are not limited to the following:

- PennEast will limit the removal of stumps in wetlands and along watercourses to the trench line and what is necessary to safely install the equipment crossings to promote natural revegetation and surface stabilization;
- PennEast will utilize a riparian conservation seed mix within 150 feet of HQ/EV watercourses and within 100 feet of other watercourses. This seed mix will be used to revegetate the entire limit of



disturbance (LOD) in riparian areas where slopes are less than 10%. Tree and shrub plantings will also occur in forested riparian buffers, where all workspace outside of the 30' maintained ROW will be planted.

As stated in the Wetland and Riparian Reforestation Plan (Appendix L-4A), the Ernst Riparian Buffer Mix (ERNMX-178), or an alternative conservation riparian seed mix that contains similar species, will be utilized as the riparian conservation seed mix. Riparian areas that have a slopes >10% will be seeded with the standard Upland ROW seed mix (E&SCP, JPA Section M).

Wetlands

PennEast has routed the proposed pipeline facilities and work areas to avoid and minimize effects on wetlands to the greatest extent practicable. The routing process has allowed PennEast to identify a constructible pipeline alignment that will minimize disturbances on the environment while maintaining engineering standards and safety. As a result, construction of the proposed Project in Bucks County will not result in surface impacts to wetlands; however, the pipeline will be installed under a PFO wetland using HDD technology. The location, cover type classification and construction and post-construction impact information for the field-delineated wetland crossed by the Project can be found in the Aquatic Resources Impact Table in JPA Section A-1.

S4.B.2 Identify and discuss any proposed preservation and maintenance operations that will be taken to reduce or eliminate an impact during the life of the Project.

During maintenance operations, the following actions will be taken to reduce or limit impacts during the life of the Project:

- PennEast will limit routine vegetation mowing or clearing of wetland or riparian areas during maintenance operations. Adjacent to watercourses, a riparian buffer will be maintained and permanently revegetated with native plant species across the entire construction ROW. Routine vegetation mowing or clearing will not be conducted over the full width of the generally 50-foot wide permanent ROW in wetlands or forested riparian buffers. To facilitate periodic corrosion/leak surveys, a 10-foot corridor centered over the pipeline will be maintained in an herbaceous state. In addition, trees that are located within 15 feet of the pipeline with greater than 3 inch dbh or are greater than 20 feet tall that could compromise the integrity of the pipeline may be cut and removed from the 30-foot wide maintained ROW. PennEast will not conduct any routing vegetation mowing or mechanical clearing in wetland or riparian areas that are between HDD entry and exit points;
- PennEast will only conduct routine mowing and clearing of riparian and wetland areas between April 15 – August 1 of any year; and
- PennEast will not use herbicides or pesticides in or within 100 feet of a wetland or watercourse, except as allowed by the appropriate land management or state agency.



S4.C Compensatory Mitigation

No net loss to wetlands or watercourses will occur within the pipeline corridor; PennEast will return all wetlands within the pipeline ROW to pre-construction contours and will restore natural flow conditions to all affected watercourses. Approximately 0.036 acres of PEM wetlands and 0.024 acres of PFO wetland mosaic will be filled to construct and operate the Kidder Compressor Station in Carbon County. Permanent wetland impacts within the pipeline corridor will be associated with the conversion of PFO and PSS wetlands to PSS and PEM wetlands and will be limited to a 30-foot wide maintenance corridor within the permanent ROW. Specifically, PFO and PSS wetlands within a 10-foot wide annually-mowed corridor centered on the pipeline will be permanently converted to PEM wetlands. Within the remaining 20 feet of the 30-foot wide maintained corridor, wetlands will generally be maintained as PSS wetlands. This portion on the maintained ROW will be mowed less frequently than once every three years, allowing shrubs to become established and to resprout after the infrequent mowing.

PennEast is proposing offsite compensatory mitigation to compensate for the permanent impacts to wetland cover types. The proposed mitigation ratios are based on the type of conversion that is proposed (i.e. the frequency of ROW maintenance that will result in either PEM or PSS wetlands) and the wetland classification. These proposed ratios are presented in Table BU-L4-1.

**Table BU-L4- 1
 Proposed Compensatory Mitigation Ratios**

Impact Type	Conversion Description	Wetland Classification	Mitigation Ratio
PSS	10-ft annually mowed ROW will result in permanent conversion to PEM wetlands	EV	1.75 to 1
		Other	1.5 to 1
PFO	10-ft annually mowed ROW will result in permanent conversion to PEM wetlands	EV	2.5 to 1
		Other	2 to 1
PSS	Remaining 20 feet of the 30-ft maintained ROW will remain PSS wetlands but may be mowed as frequently as once every 3 years	EV	1.5 to 1
		Other	1.5 to 1
PFO	Remaining 20 feet of the 30-ft maintained ROW will be converted to PSS wetlands and may be mowed as frequently as once every 3 years	EV	2 to 1
		Other	2 to 1

PennEast has contracted WHM Solutions, Inc. (WHM) to prepare a Compensatory Wetland Mitigation Plan, which is attached as Appendix L-4B. This plan outlines the plan objectives, site selection criteria, baseline information for each of the three proposed mitigation sites, the credit determination methodology, and the mitigation work plan. One site has been selected in the Upper Central Susquehanna River Subbasin (Subbasin 2), and two sites have been selected in the Central Delaware River Subbasin (Subbasin 5). Each mitigation site consists of marginal agricultural land that has been historically or is currently used for pasture, hay harvesting, and/or growing corn or other small grain crops. Each site is bisected by or abutting one or more watercourses. Wetlands at each site would be enhanced by tree and shrub plantings and retiring current pasturing and agricultural operations. The enhancements will increase



functions and values of the degraded wetlands as they develop into mixed wetland / riparian buffer complexes. Functional improvements include water quality benefits through increased sediment and nutrient sequestration, floral and vegetation diversity, and enhanced wildlife habitat. The mitigation sites would be protected in perpetuity through the establishment of Declarations of Restrictive Covenants Agreements and demarcation of the conservation area.

On behalf of PennEast, WHM would monitor each site for a period of not less than five years. Monitoring of the sites will identify the progression of the mitigation areas toward the performance standards outlined in the Compensatory Wetland Mitigation Plan. For any areas that are not progressing toward the performance standards, WHM would follow the adaptive management plan and implement appropriate remedial actions or measures. Monitoring reports will be provided to permitting agencies.

Overall, the Project will result in 7.157 acres of permanent wetland impacts (7.097 acres of wetland conversion and 0.060 acre of wetland fill). PennEast proposes 14.393 acres of offsite mitigation (14.310 acres of wetland enhancement and 0.083 acre of wetland creation) to mitigate wetland impacts. As discussed above, the Project will not result in surface impacts to wetlands within Bucks County; therefore, there will be no permanent conversion of wetlands within Bucks County that would require offsite compensatory mitigation.

S4.D Monitoring Plan

PennEast selected the proposed pipeline route to avoid and minimize effect to wetlands and watercourses to the greatest extent possible while maintaining the economic and safety standards of the Project. To minimize temporary impacts, PennEast would implement an approved E&SCP (JPA Section M), Site Restoration Plan (ESCGP Sections 3-1 and 3-2), PCSM Plans (ESCGP Section 3-3), PPC Plan (JPA Section L-3B), Wetland and Riparian Reforestation Plan (Appendix L-4A), and FERC's Procedures (FERC 2013b). Such plans would be implemented throughout the duration of the Project to reduce risks of spills or leaks, erosion and sedimentation, and stormwater runoff from construction areas with exposed soils. The Project area that will be temporarily impacted will be restored to original grade, stabilized, and vegetated in accordance with the E&SCP (JPA Section M). To ensure the BMPs are correctly implemented, erosion controls would be monitored until grading and restoration efforts are finalized.

PennEast will monitor and record the success of the wetland and watercourse restoration through annual post-construction monitoring for a minimum of five years, or until restoration is considered successful. The proposed Post-Construction Wetland and Watercourse Monitoring Plan is attached as Appendix L-4C.

PennEast will also monitor the success of the offsite compensatory mitigation sites. Periodic inspections will be performed by qualified personnel for a period of at least five consecutive growing seasons. The inspections will take place at an interval of not less than twice per year for the first two years and not less than once per year during the following three years, or as directed by period requirements. Details regarding the proposed monitoring schedule, performance criteria and reporting can be found in the Compensatory Wetland Mitigation Plan that is attached as Appendix L-4B.



References

- Environmental Laboratory. 1987a. Corps of Engineers Wetlands Delineation Manual, Technical Report U-87-1. United States Army Engineer Waterways Experiment Station, Vicksburg, Mississippi.
- Federal Energy Regulatory Commission (FERC). 2013a. Upland Erosion Control, Revegetation, and Maintenance Plan, May 2013 Version. Available at: www.ferc.gov/industries/gas/enviro/plan.pdf. Accessed April 17, 2018.
- Federal Energy Regulatory Commission (FERC). 2013b. Wetland and Waterbody Construction and Mitigation Procedures, May 2013 Version. Available at: <https://www.ferc.gov/industries/gas/enviro/procedures.pdf>. Accessed April 17, 2018.
- Pennsylvania Department of Environmental Protection (PADEP). 2012. Erosion and Sediment Control Program Manual, March 2012 Version. Available at: <http://www.dauphincd.org/erosion/E&S%20Manual%202012.pdf>. Accessed April 17, 2018.
- United States Army Corps of Engineers (USACE). 2012a. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, C. V. Noble, and J. F. Berkowitz. ERDC/EL TR-12-9. Vicksburg, Mississippi: United States Army Engineer Research and Development Center.
- United States Army Corps of Engineers (USACE). 2012b. Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast (Version 2.0), ed. J. S. Wakeley, R. W. Lichvar, C. V. Noble, and J. F. Berkowitz. ERDC/EL TR-12-1. Vicksburg, MS: U.S. Army Engineer Research and Development Center.