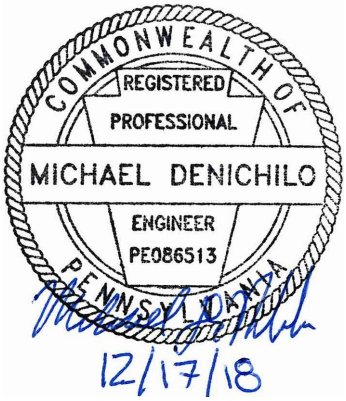
PennEast Pipeline Company, LLC

PENNEAST PIPELINE PROJECT



Erosion and Sedimentation Control Plan

Narrative

Application for:

PA Chapter 102 Erosion and Sediment Control General Permit – 3

December 2018

Contents

Tables

Appendices

EROSION AND SEDIMENT CONTROL DRAWINGS PROVIDED SEPARATELY

1.0 INTRODUCTION

This Erosion and Sediment Control Plan (E&SCP or Plan) has been developed to address control of accelerated erosion and sedimentation resulting from earth disturbance associated with the proposed PennEast Pipeline Project (Project). The Plan consists of this written narrative and the attached appendices and plan drawings. It was developed to be in accordance with the requirements of 25 PA Administrative Code Chapters 78 and 102, as well as the Clean Streams Law (35 P. S. §§ 691.1001), as amended, utilizing guidelines and Best Management Practice (BMP) information provided in the Pennsylvania Department of Environmental Protection (PADEP) Erosion and Sediment Pollution Control Program Manual dated March 2012 (PADEP E&S Manual) and Pennsylvania Stormwater BMP Manual dated December 2006 (PADEP BMP Manual). This E&SCP complements the Site Restoration Plan (SR Plan) /Post Construction Stormwater Management Plan (PCSM Plan) prepared for this project and was planned and designed to be consistent with the SR/PCSM Plan under PA Code § 102.8. An up to date copy of this E&SCP Plan (including this narrative and all appendices, and any subsequently granted variances to the Plan) shall be maintained and available at the Project site during all stages of earth disturbance activity. This Plan was prepared under the direct supervision of a Pennsylvania licensed Professional Engineer trained and experienced in erosion and sediment (E&S) control methods and techniques applicable to the size and scope of the proposed project.

PennEast Pipeline Company, LLC (PennEast) has prepared this E&SCP to support its application to the Federal Energy Regulatory Commission (FERC or Commission) for a certificate of public convenience and necessity (Certificate) for the Project. PennEast designed its Project to provide a direct and flexible path for transporting natural gas produced in the Marcellus Shale production area in northeastern Pennsylvania to growing natural gas markets in New Jersey, eastern Pennsylvania, southeastern Pennsylvania and surrounding states with the capability of providing approximately 1.1 MMDth/day of year-round natural gas transportation service.

The Project consists of the following primary components in Pennsylvania:

- 77.3 miles of new 36-inch diameter mainline transmission pipeline extending from Dallas Township in Luzerne County to Durham Township in Bucks County (PennEast Mainline Pipeline Route);
- 2.1 miles of new 24-inch diameter lateral near Hellertown, Northampton County, Pennsylvania to transport gas to an interconnection with Columbia Gas Transmission (TCO) and UGI Utilities, Inc. (UGI-LEH) known as the Hellertown Lateral;
- 0.5 mile of new 4-inch diameter lateral in Carbon County, Pennsylvania to transport gas to an interconnection with UGI Central Penn Gas, Inc. (Blue Mountain Interconnect) known as the Blue Mountain Lateral;
- One new compressor station in Kidder Township, Carbon County, Pennsylvania; and
- Various associated aboveground facilities including interconnects, launchers, receivers, and mainline block valves (MLVs) to support the pipeline system.

1.1 Purpose of this Plan

This E&SCP has been prepared for use by PennEast and its contractors as a guidance manual for minimizing erosion of disturbed soils and transportation of sediments off the right-of-way (ROW) and into sensitive resources (wetlands, streams, and residential areas) during natural gas pipeline construction. The procedures developed in this E&SCP, which represent the PennEast's BMPs, are designed to accommodate varying field conditions while maintaining rigid minimum standards for the protection of environmentally sensitive areas.

This E&SCP is designed to provide specifications for the installation and implementation of soil erosion and sediment control measures while permitting adequate flexibility to use the most appropriate measures based on site-specific conditions. The intent of this E&SCP is to provide general information on the pipeline

construction process and to describe specific measures that will be employed during and following construction to minimize impacts to the environment along the pipeline ROW.

This E&SCP Narrative is applicable to all earth disturbance associated with the Project, with the exception to the following aboveground facilities:

- Wyoming Interconnect
- Springville Interconnect
- Auburn & Leidy Interconnects
- Kidder Compressor Station
- TCO & UGI-LEH Interconnects
- Hellertown Launcher & Mainline Launcher/Receiver
- Blue Mountain Interconnect

Each of these aboveground facilities has an individual report that includes site specific information.

The goal of this E&SCP is to preserve the integrity of environmentally sensitive areas and to maintain existing water quality by implementing the following objectives:

- Minimize the extent and duration of disturbance;
- Protect exposed soil by diverting runoff to stabilized areas;
- Install temporary and permanent erosion control measures; and
- Establish an effective inspection and maintenance program.

1.2 Guidelines and Requirements

The measures described in this E&SCP have been developed based on guidelines from the FERC, the United States Army Corps of Engineers (USACE), the United States Fish and Wildlife Service (USFWS), the United States Department of Agriculture (USDA), the Pennsylvania Game Commission (PAGC), the PADEP, and the Pennsylvania County Conservation Districts, as well as PennEast's standard construction practices.

1.3 Surveys, Permits, and Notifications

PennEast shall perform the required environmental field surveys, conduct appropriate agency coordination, and acquire the necessary environmental permits prior to start of construction of the Project. PennEast shall notify the appropriate federal and state agencies prior to, during, and/or subsequent to the construction of the Project.

1.4 Inquiries

Inquiries regarding this E&SCP should be addressed to:

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2.0 EXISTING CONDITIONS

2.1 Existing Land Use and Land Cover

Construction and operation of the Project's facilities may result in both temporary and permanent alterations to land use and land cover. This section identifies land requirements for the Project and describes existing land use within the proposed Project areas. The locations of mapped soil types are shown on the E&SCP drawings. Information provided in this section includes land that will be affected by the temporary construction and permanent ROW, MLVs, extra work or staging areas, and wareyards. Land use data was calculated based on information obtained through field surveys, review of aerial photography and USDA National Agricultural Statistics Service (NASS) Cropland Data Layer (USDA-NASS, 2014). The land use characteristics are classified by primary vegetation cover type and/or predominant land use. Land use types within the Project area are classified into the following ten categories:

- Agricultural - Active cropland, pasture, orchards, vineyards, and/or hay fields;
- Commercial/Industrial - Electric power or gas utility stations, manufacturing or industrial plants, landfills, mines, quarries, and commercial or retail facilities;
- Upland Forest - Tracts of upland or wetland forest or woodland that would be removed for the construction ROW or extra work or staging areas;
- Institutional - Land occupied by public buildings such as schools, universities, government office buildings, art galleries, and museums;
- Urban - Land characterized by high human population density and built features in comparison to the areas surrounding it;
- Open Land - Non-forested lands, herbaceous and scrub-shrub wetlands, and maintained utility ROW;
- Residential - Residential yards and residential subdivisions;
- Roadways/Railroads - roadway and railroad ROWs;
- Special Land Use – Characterized by religious and recreational use such as churches, parks, baseball fields, etc.;

  Open Water - Water Crossings.

PennEast compared aerial photography from September 2010 available through Google Earth Pro and compared it to aerial photography that PennEast captured in 2015. There have been no significant changes to land use along the proposed pipeline alignment in the past five years.

2.2 Receiving Waters

PennEast completed a wetland and watercourse investigation of the project area. The boundary of this site investigation, and all environmental resources identified during this investigation are shown in the E&SCP drawings. A Wetland and Watercourse Delineation Report is included in the Section 404 / Chapter 105 General Permit submittal under separate cover for wetlands work completed in Pennsylvania.

The study area associated with the project site is tributary to numerous receiving waters. Refer to the E&SCP alignment sheet drawing watershed name band and watershed classification band for the name of each watershed crossed by the Project and their associated PA Code, Title 25, Chapter 93 Designated or Existing Uses.

High Quality (HQ) and Exceptional Value (EV) waters and waters with trout classifications crossed by the Project in Pennsylvania are summarized in Table 2.2-1.

Table 2.2-1
Summary of Pennsylvania-Designated High Quality Waters, Exceptional Value Waters, and Waters with Trout Designations Crossed by the Pipeline Facilities

Facility	PA Code Designated/Existing Use[1]		PFBC Fishery Designations[2]	
	HQ[3]	EV[3]	Stocked Trout[3]	Wild Trout Waters[3]
PennEast Mainline	83	18	12	160
Hellertown Lateral	0	0	0	3
Blue Mountain Lateral	3	0	0	1

Notes:

1. Sources: PADEP Streams Chapter 93 Existing Use, dated 7/2017 and PADEP Streams Chapter 93 Designated Use, dated 2/2017. If a stream has an existing use, the designated use has been replaced with that value. Available at www.pasda.psu.edu.
2. Sources: PFBC Stream Sections that Support Wild Trout Production, dated 8/2018 and PFBC Class A Wild Trout Streams, dated 8/2018. Available at www.pasda.psu.edu.
3. If the Project crosses a watercourse resource more than once, each crossing is counted separately.

Based on the PADEP 2016 Pennsylvania Integrated Water Quality Monitoring and Assessment Report, the Lehigh River, Monocacy Creek, and East Branch Monocacy Creek are siltation impaired watercourses.

2.3 Watercourses with Regulated Riparian Areas

The Project alignment will cross riparian buffers regulated under PA Chapter 102. Specifically, these regulated areas include 150 feet from the top of bank of perennial and intermittent waters located within Exceptional Value and High Quality watersheds. Anticipated watercourses which will be crossed are delineated on the E&SCP plan view drawings.

PennEast intends to obtain and comply with the applicable Pennsylvania permits required to authorize these disturbances.

2.4 Soil Characteristics

Important attributes of the soils map units crossed by the pipeline are presented on the E&SCP Legends sheet (Drawing 000-01-01-002). The Legends sheet includes the soil use limitations from the PADEP E&S Manual Appendix E for all soils impacted by the Project in Pennsylvania. For all applicable soil use limitations, a resolution has been proposed. The locations of mapped soil types are shown on the E&SCP drawings in plan view as well as in a crossing band on the alignment sheets. These soil boundaries and associated information were obtained from the USDA SSURGO database.

The methods that will be utilized to minimize impacts on soils during construction include, but are not limited to:

- Minimize the area and duration of soil exposure;
- Protect critical areas by reducing the velocity of and controlling runoff;
- Install and maintain erosion and sediment control measures;
- Segregating and stockpiling topsoil on cultivated lands;

- Reestablish vegetation following final grading; and
- Inspect the ROW and maintain erosion and sediment controls, as necessary, until final stabilization is achieved.

2.5 Naturally Occurring Geologic Formations

Coal Mining:

The project crosses the Northern Anthracite Coal Field from MP 5.0R3 to MP 11.5R2. This area was mined via underground mining and surface mining methods from the late 19th century into the mid 20th century. The project crosses directly over worked coal mine seams, strip mines and mining spoil heaps.

PennEast has performed an investigation of the conditions and construction methodology has been reviewed to maintain safe working practice throughout terrain which has been modified by historic mining activities. Hazardous conditions have been identified and will be mitigated as described in Appendix 4, "Geologic Hazard Mitigation Plan."

Mineral Resources:

Information regarding mining activities and locations was obtained from the PADEP Office of Active and Abandoned Mine Operations and USGS Mineral Resources Online Spatial Data (PADEP, 2014a-c; USGS, 2005).

There are two active quarries located within 0.25 miles of the Project area in Pennsylvania located at MP 9.0R2 to 9.2R2 and near MP 9.8R2 to 9.9R2 in Luzerne County. Compost filter sock will be used as perimeter pollution control at these locations as shown on the E&SCP drawings.

In addition, there are numerous reported abandoned mines or reclaimed mines located within 0.25 miles of the Project area in Luzerne County between MP 5.0R3 and 11.5R2 as mentioned above. Refer to Appendix 4 for mitigation measures.

Landslide Susceptibility:

"Landslide" is a general term for downslope mass movement of soil, rock, or a combination of materials on an unstable slope. Landslides can vary greatly in their rate of movement, area affected, and volume of material. The principal types of movement are falling, sliding, and flowing, but combinations of these are common. The primary cause of landslides is when colluvial (loose) soil and old landslide debris on steep slopes give way. The geologic instabilities that cause landslides are often exacerbated by highway projects in which the earth is cut and soil is loosened. Other primary causes of landslides are rainfall or rain-on-snow events that can weaken debris on steep mountain slopes (McCormick Taylor, 2009).

According to the USGS landslide susceptibility map, portions of the Project area in Luzerne, Carbon, and Northampton Counties, Pennsylvania are susceptible to landslides. The Project area between MPs 5.3 and 15.2 in Luzerne County and between MPs 40.7R2 in Carbon County and 53.2R3 in Northampton County have a relatively high susceptibility to landsliding with moderate incidence. The Project area between MP 20.9 in Luzerne County and MP 23.6 in Carbon County and between MPs 33.6R3 and 35.0 and 38.0 and 40.7R2 in Carbon County have a moderate landslide incidence.

PennEast conducted a seismic hazard evaluation, including a screening-level ground failure evaluation, to evaluate potential seismic hazards such as landslides.

In addition, as part of the seismic hazard evaluation, PennEast conducted a preliminary evaluation of seismically induced landslides using the USGS landslide susceptibility maps and induced seismic demand. This procedure provides negligible Permanent Ground Disturbance (PGD) for MPs with low and moderate susceptibility and PGD displacements less than 0.1 m for MPs located in high susceptibility zone including

segments from MP 5.3 to MP 15.2 and MP 40.7R2 to MP 53.2R3. Mitigation measures are provided in Appendix 4.

PennEast has performed a project specific geohazard review. The review process commenced with a desktop study to query topography and geological data to identify areas of potential hazard. A total of 78 locations in Pennsylvania were identified as worthy of a field review to confirm and evaluate conditions. Following the field review, the majority of locations were evaluated to be of low risk and not requiring any specific design changes above the standard E&SC measures for work on slopes. Several of the locations were identified as high risk slopes and to mitigate the risk, the pipeline was rerouted to avoid some of these locations. Refer to Appendix 4 for mitigation measures for the remaining high risk slopes identified for the proposed pipeline route.

Earthquake Probability:

A seismic disturbance is any earth movement (natural or manmade) that is caused by a momentary disturbance of the elastic equilibrium of a portion of the earth. AECOM conducted a seismic hazard evaluation to evaluate the potential seismic hazard of the Project pipeline (79.9 miles in Pennsylvania). The purpose of the study was to estimate the levels of ground motions that will be exceeded at specified annual frequencies (or return periods) by performing a probabilistic seismic hazard analysis (PSHA). Based on the results of the PSHA, design ground motions in terms of peak horizontal ground acceleration (PGA) and peak horizontal ground velocity (PGV) were estimated and provided as input for the seismic design of the pipeline.

In summary, seismic hazard due to wave propagation effects should not pose a significant threat to the PennEast Project. Also, there is no conclusive evidence of Quaternary fault displacement. Therefore, the PGD hazard due to fault offset is considered insignificant.

Potential Geologic Hazard:

Subsidence is the local downward movement of surface material with little or no horizontal movement (Nuhfer, Proctor, and Moser, 1993). Subsidence is a potential geologic hazard in areas where karst terrain occurs and where underground mining has taken place. The project crosses both karst terrain and locations of underground mining.

In karst terrain, limestone and dolomite bedrock are eroded by water and create karst features such as subsurface channels, caves, and sinkholes. USGS Mineral Resources On-Line Spatial Database was used to report the presence or absence of sinkholes for the Project areas. A detailed geophysical survey was completed using electrical resistivity imaging (ERI) to investigate karst conditions proximate to the Project area and borehole drilling program was undertaken at key locations. The presence of karst has been identified at several locations along the proposed pipeline in Pennsylvania and mitigation measures are presented in Appendix 4.

PennEast has installed exploratory borings at select locations where ERI identified potential air-filled and clay-filled voids to confirm their presence and to provide more information to confirm the interpretation of the ERI results. Where large voids are encountered near the surface, they will be excavated and filled using a method that preserves their local drainage function in accordance with Chapter 17 (Areas of Special Concern) in the PADEP E&S Manual.

In mining areas PennEast has conducted a desk study to map documented underground and surface historic mining operations and has drilled boreholes to confirm mine seam locations and evaluate the current conditions. PennEast met with the Pennsylvania Bureau of Abandoned Mine Reclamation to obtain additional mine mapping records. The underground mining operations occurred over 60 years ago and thus the majority of ground settlement has already occurred. The settlement of mine workings has been considered during pipeline design. Sediment and erosion control construction items are designed to manage the conditions identified. The potential for acid mine drainage from flooded mine workings and from mine spoil heaps does exist within the Project area and will be mitigated via appropriate methods if these conditions encountered.

Faults:

The eastern area of North America including the Project site, is far from the boundaries of the North American plate, which are located in the center of the Atlantic Ocean, the Caribbean Sea, and along the west coast of North America.

The project area crosses the Ramapo fault systems (RFS) which extends from Pennsylvania to New Jersey into New York. No Quaternary-active fault capable of producing surface rupture is recognized in the North Eastern US. No authoritative data source recognizes a Quaternary fault in the vicinity of the pipeline or the North Eastern US. Hence, the surface fault displacement hazard along the pipeline is considered to be negligible and no mitigation measures are required.

3.0 PROPOSED CONDITIONS

The amount of earth disturbed is to be minimized as much as possible. Planning of the construction sequencing is required to limit the amount and duration of open trench sections, as necessary, to prevent excessive erosion or sediment flow into environmental resource areas. Approximately 1,289.4 acres will be disturbed throughout the Project work limits in Pennsylvania. The disturbance along the pipeline ROW and within wareyards is to be temporary. Disturbed areas are to be immediately seeded and mulched upon placement of the proposed pipeline and associated fill.

Earth disturbance is to be restricted to the Limit of Disturbance (LOD) delineated on the E&SCP drawings. These drawings contain "Plan views" which depict proposed facilities and site features. This includes the limits of earth disturbance, the locations of existing roads, and the location of proposed BMPs.

3.1 Proposed Land Cover

During the initial construction stage of the project, much of the area will consist of exposed soils. Upon installation of the pipeline, the ROW is to be stabilized with vegetative cover as indicated on the E&SCP drawings. With the exception of long-term maintenance to trim woody vegetation and occasional mowing, no permanent topographic or land cover changes are proposed along the pipeline alignment aside from areas within the tree clearing limits.

In several locations along the pipeline, there are proposed MLVs which will require minimal grading and cover change with the placement of stone. The table below provides a list of the Project's proposed MLV sites. Each of these MLVs listed have a separate E&S facility drawing package, which includes existing and proposed land cover types.

Table 3.1-1
PennEast Pipeline MLV Sites in Pennsylvania

Facility Location	Type	MP[1]	Municipality	County	River Basin	Coordinates
PennEast Mainline	Mainline Block Valve 1	8.3R3	Plains Twp	Luzerne	Upper Susquehanna	41° 17' 29.002" N 75° 49' 51.700" W
PennEast Mainline	Mainline Block Valve 2	19.5	Bear Creek Twp	Luzerne	Upper Delaware	41° 10' 50.892" N 75° 41' 48.652" W
PennEast Mainline	Mainline Block Valve 3	32.3R2	Kidder Twp	Carbon	Upper Delaware	41° 0' 56.261" N 75° 37' 2.993" W
PennEast Mainline	Mainline Block Valve 4	46.0	Towamensing Twp	Carbon	Upper Delaware	40° 51' 42.002" N 75° 31' 52.758" W
PennEast Mainline	Mainline Block Valve 6	57.0	Moore Twp	Northampton	Upper Delaware	40° 46' 6.690" N 75° 26' 39.997" W
PennEast Mainline	Mainline Block Valve 7	62.4R3	Upper Nazareth Twp	Northampton	Upper Delaware	40° 43' 48.756" N 75° 21' 49.920" W
Blue Mountain Lateral	Blue Mountain Side Valve	BL-0.0R3	Lower Towamensing Twp	Carbon	Upper Delaware	40° 49' 10.159" N 75° 29' 43.875" W

Notes:

Source: USGS National Hydrography Dataset (NHD) HUC-6 Watershed Boundaries.

1. MPs shown are based on alignment sheet information and are based on pipeline centerline. 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.

Key:

Twp = Township

Boro = Borough

3.2 Proposed Site Drainage Characteristics

An assessment of the Project site's natural features was completed at the initial stage of Project planning. The proposed facilities have been sited to protect sensitive natural resources by avoiding these areas whenever possible. The site has also been planned and designed to maintain pre-development drainage patterns to the maximum extent practicable. A conscious effort has been made to maintain existing vegetation where possible and limit the extents of earth disturbance to the area necessary to construct the proposed facilities. Where possible, site drainage will be directed to previously established drainage features. No permanent changes to topography or drainage patterns are proposed for the pipeline aside from permanent waterbars to help prevent formation of rivulets. The location of the proposed drainage features are referenced on the E&SCP and Site Restoration drawings. The MLV sites each have separate PCSM reports and drawing packages, which include proposed site drainage.

3.3 Proposed Riparian Buffer

The proposed Project is an oil and gas activity for which site reclamation or restoration is part of the permit authorization in PA Code Chapters 78, 86-90 and 102. The proposed activities will leave existing riparian buffers undisturbed to the extent practicable. Riparian buffers within the Project area will be protected and maintained according to Pennsylvania regulations discussed in Section 2.3.

A riparian conservation seed mix will be used to restore riparian buffers within 150 feet of HQ/EV watercourses and within 100 feet of other watercourses. This seed mix will be used to revegetate the entire LOD in riparian areas where slopes are less than 10%. Tree and shrub plantings will also occur in forested riparian buffers, where workspace outside of the 30-foot maintained ROW will be planted.

As detailed in the Riparian Buffer Waiver Request (ESCGP-3 Section 1-7), PennEast requests riparian buffer waivers in accordance with 25 PA Code §102.14(d)(2)(ii) for linear project impacts, waivers in accordance with 25 PA Code §102.14(d)(2)(vi) for minor impacts at aboveground facilities due to site characteristics, and approval of one riparian buffer impact as an allowable activity under 25 PA Code 102(f)(2)(i).

4.0 SUPERVISION AND INSPECTION

To effectively mitigate Project-related impacts, the approved E&SCP must be available on the site at all times and properly implemented in the field. Quick and appropriate decisions in the field regarding critical issues such as stream and wetland crossings, placement of erosion controls, trench dewatering, spoil containment, and other construction related items are essential.

To properly implement the E&SCP, it is planned that there will be a Chief Environmental Inspector as well as two Environmental Inspectors (EIs) for each spread. FERC third-party monitors will also review construction throughout the construction time period. The EI will have peer status with all other activity inspectors and will report directly to the Resident Engineer/ Chief Inspector who has overall authority on the construction spread. On smaller segments of the Project, the EI role may be carried out by the Resident Engineer/ Chief Inspector or a Craft Inspector, as designated by PennEast. The EI will have the authority to stop activities that violate the environmental conditions of the FERC's Orders (if applicable), other federal and state permits, or landowner requirements, and to order corrective action.

4.1 Responsibilities of the Environmental Inspectors

At a minimum, the EIs shall be responsible for:

1. Inspecting construction activities for compliance with the requirements of this E&SCP, the construction drawings, the environmental conditions of the FERC's Orders (if applicable), proposed mitigation measures, other federal or state environmental permits and approvals, and environmental requirements in landowner easement agreements;
2. Identifying, documenting, and overseeing corrective actions, as necessary to bring an activity back into compliance;
3. Verifying that the limits of authorized construction work areas and locations of access roads are visibly marked before clearing, and maintained throughout construction;
4. Verifying the location of signs and highly visible flagging marking the boundaries of sensitive resource areas, watercourses, wetlands, or areas with special requirements along the construction work area;
5. Identifying erosion/sediment control and stabilization needs in all areas;

6. Verifying that the location design of waterbars will not cause erosion or direct water into sensitive environmental resource areas, including cultural resources sites, wetlands, watercourses, and sensitive species habitat;
7. Verifying that dewatering activities are properly monitored and do not result in the deposition of sand, silt, and/or sediment into a sensitive environmental resource areas, including wetland or watercourse, cultural resource sites, and sensitive species habitats; stopping dewatering activities if such deposition is occurring and checking that the design of the discharge is changed to prevent reoccurrence; and verifying that dewatering structures are removed after completion of dewatering activities;
8. Verifying that subsoil and topsoil are tested in agricultural areas to measure compaction and determine the need for corrective action;
9. Advising the Chief Inspector when environmental conditions (such as wet weather or frozen soil) make it advisable to restrict or delay construction activities to avoid topsoil mixing or excessive compaction;
10. Checking restoration of contours and topsoil;
11. Verifying that the soils imported for agricultural or residential use have been certified as free of noxious weeds and soil pests, unless otherwise approved by the landowner;
12. Verifying that erosion controls are properly installed to prevent sediment flow into environmental resource (e.g., wetlands, watercourses, cultural resource sites, and sensitive species habitats) and onto roads and determining the need for additional erosion control devices;
13. Inspecting temporary erosion control measures at least:
    a) On a daily basis in areas of active construction or equipment operation;
    b) On a weekly basis in areas with no construction or equipment operation; and
    c) Within 24 hours of each 0.5 inch of rainfall.

    NOTE: This responsibility may be transferred to field operations after construction is complete but before restoration is successful;
14. Checking the repair of all ineffective temporary erosion control measures within 24 hours of identification, or as soon as conditions allow if compliance with this timeframe would result in greater environmental impacts;
15. Identifying areas that should be given special attention to verify stabilization and restoration after the construction phase;
16. Verifying that the Contractor implements and complies with PennEast's Preparedness, Prevention, and Contingency (PPC) Plan;
17. Keeping records of compliance with the environmental conditions of the FERC's Orders, proposed mitigation measures, and other Federal or state environmental permits during active construction and restoration; and
18. Verifying that locations for any disposal of excess construction materials for beneficial reuse comply with Section 9.5.3.2 and 9.5.3.3 of this E&SCP.

4.2 Environmental Training for Construction

Environmental training will be given to both PennEast personnel and contractor personnel whose activities will impact the environment during pipeline construction. The level of training will be commensurate with the type of duties of the personnel. All construction personnel from the chief inspectors, EIs, craft inspectors, contractor job superintendents to loggers, welders, equipment operators, and laborers will be given some form of

environmental training. Note that PennEast will use FERC's third-party monitoring program during construction. In addition to the EIs, all other construction personnel are expected to play an important role in maintaining strict compliance with all permit conditions to protect the environment during construction. Training will be given prior to the start of construction and throughout the construction process, as needed, and will cover the following issues:

- The specifics of this E&SCP and the PPC Plan;
- Job or activity specific permit requirements;
- Company policies and commitments;
- Cultural resource procedures and restrictions;
- Threatened and endangered species restrictions; and
- Any other pertinent information related to the job.

Inspectors should be knowledgeable in the principles and practice of erosion and sediment controls and possess the skills to access conditions at the construction site that could impact stormwater quality and assess the effectiveness of any sediment and control measures selected to control the quality of stormwater discharges from the construction site.

5.0 DESCRIPTION OF EROSION AND SEDIMENT CONTROL BMPS

The erosion and sediment control BMPs for this earth disturbance activity have been planned to minimize the extent and duration of the proposed earth disturbance, to protect existing drainage features and vegetation, minimize soil compaction, and employ measures and controls that minimize the generation of increased runoff. Specific BMPs have been selected for the Project in order to achieve these broad goals. The location of each proposed BMP is shown on the E&SCP drawings.

Rock Construction Entrances

Rock construction entrances are specified on the E&SCP drawings to control sediment tracking from the construction site at egress points. The rock construction entrance detail is presented on Drawing 000-03-09-001 (Figure 1). In HQ/EV watersheds, rock construction entrances will be extended to a minimum 100-foot length, as referenced in the detail and shown in applicable locations on the E&SCP drawings.

Broad Based Dips

Broad-based dips may be used to direct runoff from active access roads to well-vegetated areas. Broad-based dips, unlike waterbars, are easily traversed by most construction equipment and typically require less upkeep to maintain their integrity. In HQ/EV watersheds, waterbar end treatment (sump with compost filter sock) should be utilized at the discharge end of the broad-based dip. The locations of broad-based dip installation are specified on the E&SCP plan view drawings and shall be in accordance with Drawing 000-03-09-001 (Figures 2A & 2B).

Sediment Barriers

Compost filter socks are specified on the E&SCP plan view drawings as a perimeter control to prevent silt-laden runoff from exiting the LOD. The compost filter sock detail and specifications are presented on Drawing 000-03-09-002 (Figures 5A, 5B, & 5C).

The J-hook sediment barrier configuration detail is presented on Drawing 000-03-09-003 (Figure 7). This configuration becomes necessary when sediment barrier is needed but cannot be oriented parallel to the contour. It is intended to intercept runoff from disturbed areas and capture some of the flow in a "J-hook" at the low end of each section of sediment barrier.

In locations where failure of a sediment barrier occurs due to concentrated flow, a rock filter outlet shall be installed in accordance with the detail presented on Drawing 000-03-09-003 (Figure 8).

Waterbars

Earthen waterbars (slope breakers) are specified on the E&SCP plan view drawings in hillside locations where it will be necessary to divert both upslope and disturbed area runoff to vegetated areas to help minimize accelerated erosion and sedimentation. A construction detail is provided on Drawing 000-03-09-003 (Figures 9 & 10). They are to be aligned such that runoff will be directed towards the downslope side of the disturbed area and avoid flowing back into the ROW. The construction detail calls for a sump with a compost filter sock barrier at the waterbar point of discharge.

Permanent waterbars within the ROW shall be left in place after permanent stabilization has been achieved. Waterbars will be removed from agricultural and residential areas. Maintenance of waterbars shall be provided until ROW has achieved permanent stabilization.

Trench Plugs

Trench plugs are specified on the E&SCP drawings to inhibit channelized flow which may occur in the trench when open during construction. Trench plugs shall remain in place during and after backfilling to prevent the trench from draining wetlands and/or changing the hydrology along the pipeline. The construction details are presented on Drawings 000-03-09-003 (Figure 12) and 000-03-09-004 (Figure 13).

Erosion Control Blanket

In accordance with the notes listed on Drawing 000-03-09-004 (Figures 14A, 14B, & 15), erosion control blanket is to be placed on disturbed areas within 50 feet of streams and on slopes steeper than 3H:1V. In HQ/EV watersheds, erosion control blanket is to be placed on disturbed areas within 100 feet of streams. Areas to be blanketed are indicated on the E&SCP plan view drawings.

Temporary Equipment Bridges

Temporary equipment bridges are specified on the E&SCP plan view drawings in locations where construction equipment will be crossing an existing stream channel (watercourse with a defined bed and bank). Temporary bridges shall be installed in accordance with the construction details provided on Drawing 000-03-09-005 (Figures 22 & 23).

Timber Mats

Timber mats are specified on the E&SCP plan view drawings in locations where construction equipment will be traveling through an existing wetland. Timber mats shall be installed in accordance with the construction details provided on Drawing 000-03-09-006 (Figures 25 & 26).

Hydrostatic Dewatering Structures

Straw bale dewatering structures will be utilized after hydrostatic testing to minimize erosion of the surrounding area and prevent pollution due to silt-laden runoff. Hydrostatic dewatering structure locations have been specified on the E&SCP plan view drawings and shall be installed in accordance with the construction details provided on Drawing 000-03-09-007 (Figures 28A & 28B).

Pumped Water Filter Bags

In locations where the work area must be dewatered, filter bags may be used to filter water pumped from disturbed areas prior to discharging to surface waters. Compost filter sock shall be installed below filter bags located in HQ/EV watersheds, within 50 feet of any receiving surface water, or where a well-vegetated area is not available. Filter bags shall be installed in accordance with the construction detail provided on Drawing 000-03-09-008 (Figure 29).

Cleanwater Diversions

Temporary diversion channels are proposed to divert runoff from undisturbed upslope areas and convey the runoff around areas of earth disturbance within the pipeline ROW corridor. All temporary diversion channels will utilize a Filtrexx Diversion Sock (or approved equal). From the diversion sock, the channelized flow will outlet to a temporary pipe(s) (clean water) crossing, which is installed across the right-of-way, and discharge to a perforated HDPE pipe level spreader covered in stone. In this scenario, clean water leaving the level spreader will return to sheet flow downslope of the disturbed ROW.

All level spreaders are expected to meet the proposed 200-foot maximum length. All level spreader and slope pipe sizing is presented as part of the Clean Water Diversion summary table on E&SCP Drawing 000-03-09-010.

A downstream analysis of clean water diversion discharge point to the receiving water is not required for the following reasons. Velocities at the discharge of the level spreader are near zero since the stormwater will be discharged through the perforated pipe and minimum 4-inches of stone surrounding the perforated pipe. Once the discharge exits the orifices in the perforated pipe and trickles through the surrounding stone, it loses all its velocity and transforms into sheet flow. The discharge will be to a vegetated area and will ultimately follow the same drainage path as before the clean water diversion installation.

The clean water diversions collect clean stormwater above the disturbance, the slope pipe transports the clean water across the disturbance, and the level spreader connected to the slope pipe outlet discharges the clean water below the disturbance. The clean water diversions are being limited to 5 acres in accordance with the PADEP E&S Manual, except in several locations along the Blue Mountain Lateral and between mainline MPs 49 and 51, as noted in the Clean Water Diversion summary table. The limited project workspace and large drainage areas coming from Blue Mountain restrict the placement of additional slope pipes and level spreaders to break up the drainage areas.

The clean water diversions are temporary in nature and will remain in place from disturbance to after vegetation is established and BMPs are removed. The clean water diversions collect and discharge stormwater in the same drainage area and do not take stormwater from one drainage area and discharge to a different drainage area. The clean water diversions do not change cover types, resulting in no change to the calculated runoff rates or volumes, and the clean water diversion discharge is returned to sheet flow at the level spreader, a flow condition similar to or better than the existing flow condition.

The discharge areas of the clean water diversions will be monitored in accordance with the ESCGP-3 permit required inspection.

Discharges to existing waterways are proposed wherever possible. Refer to the Cleanwater Diversion summary table for locations where temporary diversion channels discharge to a location other than a slope pipe/level spreader. As listed in the summary table, there are several locations where clean water is diverted to a watercourse, roadside ditch, or to overland.

All hydrologic calculations utilized to size the temporary diversion channels, slope pipes, and level spreaders were calculated using Standard E&S Worksheets #9 and #10, for time of concentration and rational equations respectively. The temporary diversion channels were sized utilizing flow rates and allowable shear stress.

Temporary diversion channels are designed using material specifications for North American Green (NAG) products. Shear stresses are analyzed for the proposed temporary diversion channels, which are expected to be in place for a maximum of 12 months. All NAG lining products specified in the Clean Water Diversion

summary table meet a construction period of 12 months. It should be noted that published design shear strengths are valid for the design life of the lining. As a result, no decrease in shear strength is expected over the life of the proposed swale linings. Published design shear strengths and design lives for individual linings are provided in Appendix 3. An iterative approach was used in the design of all proposed temporary diversion channels and liners, which was a function of Manning's 'n,' slope, and depth of water within the channel.

Drainage area mapping as well as Standard E&S Worksheets #9, #10, and #11 are provided for each clean water diversion in Appendix 2 (by county). Clean water diversion locations are specified on the E&SCP plan view drawings. Clean water diversions shall be installed in accordance with the construction details presented on Drawings 000-03-09-008 (Figures 33 & 34A) and 000-03-09-009 (Figures 34B & 34C).

5.1 Temporary and Permanent Revegetation

Revegetation requirements and procedures are presented in Section 9.6.2 of this E&SCP. As indicated on the drawings, disturbed areas are to be temporarily stabilized in accordance with regulatory agency requirements. Upon completion of construction activity, disturbed areas are to be permanently stabilized.

5.2 Protection of Sensitive and Special Value Features

During Project planning, the pipeline layout was field viewed to identify wetlands and streams. Where possible, the alignment was adjusted to minimize impacts. The opportunity to avoid impacts, however, is constrained by landowner preferences and construction requirements.

5.3 Minimize Earth Disturbance

Limiting the extents and duration of earth disturbance to that absolutely necessary to construct the proposed facility is a simple and the most effective BMP available. The LOD delineated on the E&SCP drawings has been established to restrict construction activities to the minimum area needed to effectively and efficiently construct the proposed facilities. In addition to limiting the extents of the proposed earth disturbance, construction activities have been planned to limit the duration of earth disturbance.

Installation of the pipeline will typically proceed from one end of the construction spread to the other in an assembly line or "mainline" fashion. The spacing between the individual crews responsible for each interdependent activity is based on anticipated rate of progress. Construction is sequenced to limit, to the extent possible, the amount and duration of open trench sections, to prevent excessive erosion or sediment flow into environmental resource areas.

5.4 General Erosion and Sediment Control Plan Requirements

The BMPs listed in this E&SCP shall be installed and maintained in accordance with FERC requirements and the PADEP E&S Manual. These BMPs shall be installed as shown prior to earth disturbance (including clearing and grubbing) within the drainage area of the BMP in question. Appropriate BMPs shall be provided for each stage of activity. Each BMP shall be kept functional until all earth disturbances within the drainage area are completed and a minimum vegetative cover (uniform 70% coverage of perennial vegetation over the entire disturbed area) has been achieved or other suitable permanent erosion protection has been installed.

At least 7 days prior to starting any earth disturbance activities (including clearing and grubbing), the owner and/or operator shall invite all contractors, the E&SCP preparer, the SR/PCSM Plan preparer, and a representative from the applicable PADEP regional office to an on-site preconstruction meeting.

Prior to commencement of any earth disturbance activity including clearing and grubbing, the owner and/or operator shall clearly delineate sensitive areas, riparian forest buffer boundaries, areas proposed for infiltration practices, the limits of clearing, and trees that are to be conserved within the Project site. These parties shall

also install appropriate barriers where equipment may not be parked, staged, operated, or located for any purpose.

E&SC measures and facilities shall be installed and operational as indicated in the construction schedule prior to any earth moving activities. See the "Installing Temporary BMPs" in Section 9.5.2 of this E&SCP and on the E&SCP drawings. Control measures must be in place and operational at the end of each workday. Where it is possible, the disturbed area will be permanently stabilized immediately after the final earthmoving has been completed. For disturbed areas not able to be permanently stabilized, interim stabilization in the form of temporary seeding and mulching will be implemented. Until the site is permanently stabilized, all E&S measures must be maintained properly by the Contractor.

After permanent stabilization is achieved, temporary E&SC measures will be removed. Areas disturbed during removal of the controls must be stabilized immediately. For vegetated areas, permanent stabilization is defined as a uniform 70% perennial vegetative cover.

Minor modification to the approved E&SCP shall be noted on the E&SCP that is available at the site and initialed by the appropriate reviewing entity staff from PADEP and/or the County Conservation District. Minor changes to the E&SCP may include adjustments to BMPs and locations within the permitted boundary to improve environmental performance, prevent potential pollution, change in ownership or address, typographical errors and on-site field adjustments such as the addition or deletion of BMPs, or alteration of earth disturbance activities to address unforeseen circumstances.

Major modifications to the approved E&SCP involving new or additional earth disturbance activity other than those described as minor modifications above, and/or the addition of a discharge will require prior approval by the reviewing entity and may require the submittal of a new E&SCP.

6.0 PROJECT SITE RUNOFF PRIOR TO SITE RESTORATION

A primary component of this E&SCP was the design of erosion and sediment control BMPs to minimize and control accelerated erosion and minimize the generation of increased runoff. All proposed E&SC facilities have been designed per design guidance provided in the PADEP E&S Manual. Aside from road crossings, there are significant areas of existing pavement within the proposed limits of disturbance, such as commercial parking lots.

This linear Project traverses many watersheds. Runoff cannot be meaningfully or practically calculated without defining many discharge points and/or boundaries. Also, parameters describing runoff characteristics of disturbed construction zones, giving consideration to the attenuating effect of sediment barriers, trenches, and waterbars are neither readily available nor well-established. Therefore, runoff volume and peak discharge estimates have not been provided. Proposed BMPs were sized based on the maximum tributary drainage area anticipated during construction. Runoff volumes and rates for specific BMPs were calculated utilizing the methods recommended in the PADEP E&S Manual for that type of facility.

7.0 RECYCLING/DISPOSAL OF MATERIALS

Building materials and other construction site wastes must be properly managed and disposed of to reduce potential for pollution to surface and ground waters as per 25 PA Code § 102.4(b)(5)(xi). All building materials and wastes shall be removed from the site and recycled or disposed of in accordance with PADEP's Solid Waste Management Regulations at 25 PA Code 260.1 et seq., 271.1 and 287.1 et. seq. No building materials, wastes, or unused building materials shall be burned, buried, dumped, or discharged at the site. No off-site disposal area has been identified as part of this E&SCP. Construction waste will be disposed of properly by the Contractor at a state-approved facility or recycled.

The Contractor will develop and implement procedures which will detail the proper measures for disposal and recycling of materials associated with or from the Project site in accordance with PADEP regulations.

Construction wastes include, but are not limited to, excess soil materials, building materials, concrete wash water, and sanitary wastes that could adversely impact water quality. The Contractor will inspect the Project area weekly and properly dispose of all construction wastes. Measures will be planned and implemented for housekeeping materials management and litter control. Wherever possible, re-useable wastes will be segregated from other waste and stored separately for recycling.

The Contractor shall be responsible for submitting an E&SCP for any borrow or waste areas required completing the work. Disposal locations for excess soil/rock waste will have appropriate BMPs implemented at the waste site. The disposal locations must be verified with the applicable state department to show compliance with wetland and floodplain regulations. If an off-site location is used for borrow or disposal, the contractor is responsible for developing and implementing an adequate E&SCP(s) and submitting the E&SCP(s) to PADEP or the applicable County Conservation District for review and approval. The Contractor must immediately stabilize the waste site upon completion of any stage or phase of earth disturbance activity at the waste site.

8.0 ANTIDEGRADATION ANALYSIS

As identified in Section 2.2 of this narrative, the pipeline crosses siltation impaired waters as well as HQ/EV watercourses. The following antidegradation analysis has been prepared in accordance with 25 PA Code, §102.4(b)(6).

8.1 Nondischarge Alternatives

The proposed Project has been evaluated for nondischarge alternatives for compliance with state regulatory agency antidegradation requirements. Nondischarge alternatives are defined as environmentally sound and cost effective BMPs that individually or collectively eliminate the net change in stormwater volume, rate and quality for storm events up to and including the 2-year design storm when compared to the stormwater rate, volume and quality prior to the earth disturbance activities.

Various BMPs identified as nondischarge alternatives in the PADEP E&S Manual were considered and evaluated for implementation as part of the proposed activities. These alternatives were evaluated individually, and in various combinations, for their ability to minimize accelerated erosion and sedimentation during the earth disturbance activity in order to achieve no net change from pre-development to post-development volume, rate and concentration of pollutants in stormwater runoff. The following nondischarge alternatives are utilized or considered for implementation on this Project.

8.1.1 Alternative Routes

As part of the overall pipeline route evaluation process PennEast undertook a thorough routing study and Critical Issues Assessment (CIA). The routing study initially focused on the identification of a series of corridors that extended from Dallas Township in Luzerne County, PA to Hopewell Township in Mercer County, NJ. PennEast initially looked at existing utility corridors (natural gas, liquid pipeline, electric transmission, water, and sewer) to identify potential areas where the pipeline could parallel or be co-located within existing maintained ROWs. This assessment found that some of these ROWs had been encroached upon by residential and commercial development resulting in inadequate area for the staging and construction of an additional pipeline between the existing facilities and the neighboring developments. Where environmental impacts were not greater, PennEast has aligned the Project with as many existing utility corridors as possible, while maintaining a Project that can be safely constructed and operated.

PennEast worked with engineering and design professionals to avoid and/or minimize potential direct impacts to environmental resources. The proposed construction work area has been reduced at wetland, watercourse channel, watercourse floodway, and riparian crossings to minimize impacts wherever feasible. In addition,

ROW agents have worked and continue to work with individual landowners to avoid sensitive features on properties and address their concerns.

In accordance with FERC requirements, PennEast selected the most reasonable and practicable alternative route that would maximize the use of co-location along existing corridors and cause the least amount of environmental damage. This was followed by a CIA screening of these corridors to determine which were most feasible from an environmental and engineering perspective. A selected 400-foot wide route corridor was then analyzed for a width of 200 feet on either side of the centerline for the desktop analysis. This distance was chosen in order to be able to adjust the pipeline alignment should constraints be identified during field surveys, and to allow adequate area for construction adjustments. The route was assessed using federal, state and regional secondary source databases to map out resources in proximity to the corridor. Once this mapping was completed, a meeting was held to electronically review the mapping on aerial photographs with engineers, wetland ecologists, wildlife biologists, cultural resource specialists and other professionals. The route was desktop evaluated along its entirety, and the centerline adjusted to avoid and/or minimize direct impacts to known resource areas.

8.1.2 Limited Disturbed Area

As discussed in Section 5.2, the LOD delineated on the E&SCP drawings has been established to restrict construction activities to the minimum area needed to effectively and efficiently construct the proposed facilities. This BMP is very effective at reducing the runoff volume rate, volume and concentration of pollutants in stormwater runoff. This BMP is "self-crediting" in that it automatically reduces the area to be treated and provides a corresponding reduction in stormwater impacts. However, it is not capable of addressing the impacts of the change in land cover associated with the proposed earth disturbance.

8.1.3 Limiting Extent and Duration of the Disturbance

This nondischarge alternative will be utilized to the extent possible on this project. The majority of the proposed earth disturbance will occur in the early activities of the construction sequence of the Project, including clearing and grading, with a much smaller earth disturbance occurring during site restoration. As described in Section 9.5 Construction Sequence, and throughout this E&SCP, the duration and extent of earth disturbances will be limited to the current construction activity to be completed. Temporary or permanent stabilization is to occur as soon as possible upon completion of each activity. This BMP is very effective at reducing the concentration of pollutants in stormwater runoff and reducing the impact of bare earth on runoff volume and rate. However, it is not capable of addressing the impacts of the long-term change in land cover associated with the proposed earth disturbance.

8.1.4 Riparian Buffers and Riparian Forest Buffers

The feasibility of protecting, converting, or establishing a riparian forest buffer meeting the requirements of 25 PA Code §102.14 was analyzed for the proposed Project. Given the linear nature of the proposed Project, temporary impacts within riparian buffers is unavoidable. To mitigate for temporary disturbances within riparian buffers, PennEast has reduced workspace within riparian buffers to the extent practicable and will implement the BMPs detailed in this E&SCP. 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 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-foot maintained ROW will be planted.

PennEast will implement BMPs to minimize riparian impacts and protect existing forested riparian buffers to the extent practicable. However, to manage the pipeline's integrity during Project operation, PennEast must maintain a 30-foot wide tree free corridor over the pipeline; therefore, the entire forested riparian buffer cannot be replanted. Furthermore, because PennEast does not own the property on which the proposed earth disturbance will occur, PennEast cannot, without landowner permission, place deed restrictions or conservation easements to protect, convert, or establish a riparian buffer or riparian forest buffer to satisfy the antidegradation requirements of §102.4(b)(6) for the proposed earth disturbances.

As detailed in the Riparian Buffer Waiver Request (ESCGP-3 Section 1-7), PennEast requests riparian buffer waivers in accordance with 25 PA Code §102.14(d)(2)(ii) for linear project impacts, waivers in accordance with 25 PA Code §102.14(d)(2)(vi) for minor impacts at aboveground facilities due to site characteristics, and approval of one riparian buffer impact as an allowable activity under 25 PA Code 102(f)(2)(i).

8.1.5 Treatment Train Combination of BMPs

A combination of cost-effective and environmentally sound BMPs were considered for installation in a "treatment train" that collectively eliminate the net change in stormwater volume, rate and quality from pre-development to post-development conditions. The primary metric prohibiting the proposed Project from achieving non-discharge alternatives is the additional runoff volume generated by the earth disturbance necessary for the proposed activities. Permanent removal of runoff volume from the design storm hydrograph during earth disturbance phases was excluded from the available design alternatives due to the elevated sediment loadings expected during this stage of site construction. The "treatment train" approach was determined to be infeasible as a non-discharge alternative.

As demonstrated above, there is no combination of nondischarge alternative BMPs that enable the earth disturbance activities to achieve no net change from pre-development to post-development volume, rate and concentration of pollutants in stormwater runoff up to and including the 2-year/24-hour storm. In the absence of feasible nondischarge alternatives, Antidegradation Best Available Combination of Technologies (ABACT) BMPs will be utilized to address antidegradation requirements for the Pennsylvania portion of the Project.

8.2 Antidegradation Best Available Combination of Technologies

As demonstrated in the previous section, nondischarge alternatives do not exist for the proposed Project. Environmentally sound and cost-effective ABACT BMPs will be utilized to demonstrate that any change in PA stormwater runoff rate, volume, or quality will maintain and protect the existing quality and water uses of receiving surface waters and preserve existing baseflow. The E&SCP shows the locations of all planned ABACT BMPs and details for construction of these facilities. The following is a summary of the combination of ABACT BMPs that have been incorporated into the site design and the features that make them ABACT:

8.2.1 Site Access

- 100-foot long Rock Construction Entrance(s)

8.2.2 Sediment Barriers

- Compost filter socks will be utilized for all perimeter control needs

8.2.3 Stabilization

- Disturbed areas immediately stabilized upon completion, or temporary cessation, of earth disturbance activity
- Disturbed areas stabilized with erosion control blanket within 100 feet of special protection surface waters, within 50 feet of all other receiving surface waters, and on slopes 3H:1V or steeper.

9.0 CONSTRUCTION TECHNIQUES FOR NATURAL GAS PIPELINES

9.1 Typical ROW Requirements

During Project review, conditions evaluated include topography, soils, bedrock, boulders, wetlands, and watercourses, as well as proximity to existing roads, railroads, and residences. PennEast has considered these noted conditions along with machinery requirements needed for safe pipeline and support facility installation. Minimum size and area requirements for worker safety involving construction activities established by the U.S. Department of Transportation (DOT) and Occupational Safety and Health Administration (OSHA) were also considered. Under certain conditions, additional workspace may be necessary to maintain safe practices in specific locations and would extend beyond the nominal 100-foot corridor.

The Project requires a 50-foot permanent ROW and an approximately 50-foot temporary construction workspace for a nominal 100-foot-wide construction corridor. This corridor width is based on construction conditions of similar projects within Pennsylvania. From the center of the pipe trench, the spoil side of the construction ROW is proposed to be 35 feet. This footprint will serve as the primary spoil storage area. Thus, the working side of the construction work space will typically be 65 feet wide from the center of the pipe trench to the edge of the ROW and will serve to accommodate trench excavation, bank sloping, and safe equipment mobilization. Agricultural areas with full topsoil segregation will require an additional 25 feet, totaling a 125-foot-wide construction corridor.

In other limited, non-wetland locations, the construction ROW width may be expanded by up to 50 feet without approval from the FERC for the following situations:

1. To accommodate full construction work space topsoil segregation;
2. To maintain safe construction where topographic conditions (i.e., side-slopes) or soil limitations exist; and
3. For truck turn-arounds where no reasonable alternative access exists in limited, non-wetland or non-forested areas.

Use of these limited areas is subject to landowner approval and compliance with all applicable survey, mitigation, and reporting requirements.

9.2 Access Roads

To the extent practicable, existing public and private road crossings will be used as the primary means to access the ROW. Additional access points will be necessary beyond those available by use of existing public roads. Preliminarily, PennEast has identified 79 access roads for use during construction of the Pennsylvania portions of the Project. These Pennsylvania access roads include a total length of approximately 32 miles. These access roads include use of 40 existing roads and construction or enhancement of 23 partially existing access roads. The following access roads are identified by County:

- 33 access roads – Luzerne County, Pennsylvania
- 18 access roads – Carbon County, Pennsylvania

- 1 access road – Monroe and Northampton Counties, Pennsylvania
- 25 access roads – Northampton County, Pennsylvania
- 2 access roads –Bucks County, Pennsylvania

Improved access roads will likely require maintenance activities that may include tree branch clearing, gravel placement, minor grading, lengthening and/or widening. Moreover, ATWS will be located adjacent to several access roads for temporary vehicle parking, vehicle turn-out passing areas, and/or staging of minor supplies (e.g., hay bales for erosion control activities). Temporary access roads (TARs) for construction will be restored in accordance with landowner agreements. Landowner permission will be obtained for all proposed permanent access roads (PARs).

9.3 Wareyards

Wareyards are required for storing and staging equipment, pipe, fuel, oil, pipe fabrication, and other construction related materials. PennEast has identified 11 wareyards in Pennsylvania for use during construction of the Project. The total area of the Pennsylvania wareyards will be approximately 32.9 acres. A Highway Occupancy Permit (HOP) will be acquired from the Pennsylvania Department of Transportation for access to the wareyards if required.

The Contractor shall perform the following measures at wareyards:

1. Strip and segregate topsoil in agricultural lands;
2. Install erosion control structures as directed by the EI, outlined in this E&SCP, or identified on the construction drawings, and maintain them throughout construction and restoration activities;
3. Implement and comply with the PPC Plan; and
4. Restore and revegetate all disturbed areas in accordance with the measures outlined in this E&SCP and as directed by the EI.

9.4 Off-ROW Disturbance

With certain exceptions, which are required in order to comply with FERC Plan and Procedures, all construction activities are restricted to within the limits identified on the construction drawings (exceptions include the installation of waterbars, installation of energy-dissipating devices, installation of dewatering structures, and drain tile repair which are subject to applicable survey requirements). However, in the event that off-ROW disturbance occurs, the following measures will be implemented:

1. The EI will immediately report the occurrence to the Chief Inspector and ROW Agent;
2. The conditions that caused the disturbance will be evaluated by the Chief Inspector and the EI, and they will determine whether work at the location can proceed under those conditions; and
3. If deemed necessary by the Chief Inspector and EI, one or more of the following corrective actions will be taken: immediate restoration of the original contours, seeding and mulching of the disturbed area, and/or installation of erosion control devices. PennEast's Environmental Construction Permitting Department will be notified as soon as practical.

9.5 Construction Sequence

Natural gas pipelines are installed using conventional overland buried pipeline construction techniques. These activities are necessary for the installation of a stable, safe, and reliable transmission facility consistent with DOT requirements and regulations. This section provides an overview of the equipment and operations necessary for the installation of a natural gas pipeline, describes potential impacts that may occur from each

operation, and identifies the measures that will be implemented to control these potential impacts. This section also discusses in detail the erosion and sediment control techniques that apply to each construction activity including clearing, grading, trenching, lowering-in of pipe, backfilling, and hydrostatic testing. ROW restoration will be addressed in Section 9.6. The activities listed below are normally performed in the following sequence:

- Survey and flag the pipeline route, limits of disturbance, foreign line crossings, wetlands and other sensitive areas;
- Installing temporary erosion and sediment controls;
- Clearing the construction work area (CWA);
- Grading the CWA to establish safe work space; installing additional erosion and sediment controls;
- Installing temporary waterbars/best management practices;
- Trenching/excavating the trench;
- Pipe stringing and bending;
- Welding, weld inspection and installing weld coating;
- Trench dewatering;
- Lowering the pipe into the trench; installing trench plugs;
- Backfilling the trench;
- Hydrostatic testing of pipe; and
- Permanent stabilization and restoration;
- Demobilization and site cleanup;
- Post-construction monitoring.

Obstacles to the mainline technique are often encountered and are not considered to be out of the ordinary. These obstacles, which include side hill crossings, rock, wetlands, streams, roads, and residential areas, do not normally interrupt the assembly line flow.

9.5.1 Clearing

Clearing operations will include the removal of vegetation within the CWA. Various clearing methods will be employed depending on tree size, contour of the land, and the ability of the ground to support clearing equipment. Vegetative clearing will either be accomplished by hand or by cutting equipment. The following procedures will be standard practice during clearing:

1. Prior to beginning the removal of vegetation, the limits of clearing will be established and identified in accordance with the construction drawings;
2. All construction activities and ground disturbance will be confined to within the limit of disturbance shown on the construction drawings;
3. Clearly mark and protect trees to be saved as per landowner requests or as otherwise required;
4. All brush and trees will be felled into the CWA to minimize damage to trees and structures adjacent to the CWA. Trees that inadvertently fall beyond the edge of the CWA will be immediately moved onto the CWA and disturbed areas will be immediately stabilized;
5. Trees will be chipped or cut into lengths identified by the landowner and then stacked at the edge of the CWA or removed;
6. Brush and limbs may be disposed of in one or more of the following ways depending on local restrictions, applicable permits, construction Line List stipulations, and landowner agreements:
    a) Stockpiled along the edge of the CWA or in staging areas or;
    b) Chipped, spread evenly across the CWA in upland areas; and plowed in; or

c) Hauled off site or;
d) Blown off-site with landowner approval.

7. Existing surface drainage patterns will not be altered by the placement of timber or brush piles at the edge of the construction ROW.

9.5.1.1 Thermal Impacts

On this Project, the principal source of thermal impacts would be related to disturbance of vegetative cover. The following provisions are included in this E&SCP to avoid, minimize, or mitigate potential pollution from thermal impacts:

- Section 11.2.3 requires minimal disturbance within 50 feet of streams. Section 11.2.6 requires immediate revegetation (or mulch in non-germinating season) when earth disturbing activities are complete.
- Section 11.2.3 limits removal of vegetation, especially tree cover, to only that necessary for construction.

The permanent pipeline ROW may be mowed periodically and woody vegetation may be trimmed to allow safe pipeline operation. Some tree cover may be permanently removed in wooded areas. As discussed in Section 8.1.4, PennEast will replant forested riparian buffers, and the canopy is anticipated to expand over the pipeline ROW to mitigate long-term thermal impacts.

9.5.2 Installing Temporary BMPs

BMPs, which are temporary erosion controls intended to minimize the flow of sediment and to prevent the deposition of sediments beyond approved workspaces or into sensitive resources, shall be installed following vegetative clearing operations. They may be constructed of materials such as compost filter socks, staked straw bales, compacted earth (e.g., drivable berms across travel lanes), sandbags, HDPE piping, riprap and stone, jute matting, timber mats, wood stakes, clay, bentonite, synthetic foam, concrete, or an equivalent material as identified by the EI. Where permitted by regulatory agencies, hay bales may be used in lieu of straw bales with the following restrictions: hay bales shall not be used for mulching and the Contractor is responsible for their removal and disposal.

Install temporary BMPs at the base of slopes adjacent to road crossings and at watercourse and wetland crossings in accordance with Section 9.5.4.

1. Do not stake or trench in place straw bales used on equipment bridges or on mats across the travel lane.
2. Inspect temporary BMPs daily in areas of active construction to verify proper functioning and maintenance. In other areas, BMPs will be inspected and maintained on a weekly basis throughout construction, and within 24 hours following storm events.
3. Maintain all temporary BMPs in place until permanent revegetation measures are successful or the upland areas adjacent to wetlands, watercourses, or roads are stabilized.
4. Remove temporary BMPs from an area when replaced by permanent erosion control measures or when the area has been successfully restored as specified in Section 14.1.

9.5.3 Grading

The construction ROW will be graded as needed to provide a level workspace for safe operation of heavy equipment used in pipeline construction. The following procedures will be standard practice during grading.

9.5.3.1 Topsoil Segregation

Topsoil segregation methods will be used in all residential areas and when the construction CWA is wider than 30 feet in cultivated or rotated croplands, managed pastures, hayfields, and other areas at the landowner's or land managing agency's request.

1. Prevent the mixing of topsoil with subsoil by stripping topsoil from either the full work area or from the trench line and subsoil storage area (ditch plus spoil side method) as stipulated in the Construction Contract or Line List.
2. Segregate at least 12 inches of topsoil in deep soils with more than 12 inches of topsoil. In soils with less than 12 inches of topsoil, make every effort to segregate the entire topsoil layer.
3. Where topsoil segregation is required, maintain separation of salvaged topsoil and subsoil throughout all construction activities.
4. For wetlands, segregate the top 12 inches of topsoil within the ditchline, except in areas where standing water is present or soils are saturated.
5. Leave gaps in the topsoil piles for the installation of temporary interceptor dikes to allow water to be diverted off CWA.
6. Topsoil replacement (i.e., importation of topsoil) may be used as an alternative to topsoil segregation if approved by the landowner and PennEast.
7. Never use topsoil for padding the pipe, constructing temporary slope breakers or trench plugs, improving or maintaining roads, or as a fill material.
8. Stabilize topsoil piles and minimize loss due to wind and water erosion with use of BMPs, mulch, temporary seeding, tackifiers, or functional equivalents, where necessary.

9.5.3.2 Tree Stump Removal and Disposal

1. Remove tree stumps in upland areas along the entire width of the permanent ROW to allow adequate clearance for the safe operation of vehicles and equipment. Stumps within the CWA will be removed or ground to a suitable height that will allow the safe passage of equipment, as stipulated by the Chief Inspector or EI.
2. Dispose of stumps by one of the following methods, pending approval by the Chief Inspector and the landowner, and in accordance with regulatory requirements:
    - Moved to PennEast-approved off-site location (except in wetlands and agricultural areas);
    - Chipped on-site. Removed from ROW and hauled off site or blown off-site with landowner approval. Chipped material not removed from the site may be spread across the upland areas of the CWA in a manner that will not inhibit revegetation or broadcast into off-ROW and stable areas. Wood chips will not be left within agricultural lands, wetlands, or within 50 feet of wetlands. Wood chips will not be stockpiled in a manner that they may be transported into a wetland.
    - Ground to grade in wetlands, excess chips must be removed from wetlands for reuse on-site or properly disposed off-site.

9.5.3.3 Rock Disposal

When rock is encountered it will be broken up either by drilling, pneumatic hammer or blasting. If blasting is required PennEast will conduct pre-blast surveys with landowner permission to assess the condition of

structures, wells, springs and utilities within 150 feet. Blasting will follow all procedures and safety measures according to PennEast's Blasting Plan.

Rock (including blast rock) will be disposed of in one or more of the following ways:

1. Buried on the ROW or in approved construction work areas either in the ditchline or as fill during grade cut restoration in accordance with the construction specifications. In cultivated/agricultural lands, wetlands, and residential areas, rock may only be backfilled to the top of the existing bedrock profile;
2. Windrowed per written landowner agreement with PennEast;
3. Removed and disposed of at a PennEast approved site.

9.5.4 Installing Temporary Waterbars

Temporary waterbars, which are temporary erosion control measures intended to reduce runoff velocity and divert water off the CWA, shall be installed following grading operations. The waterbars are to be installed on all disturbed areas as necessary to avoid excessive erosion. Temporary waterbars will be constructed of materials such as compacted soil and staked compost filter sock.

Waterbars must be installed on either side of watercourses and wetlands and upslope of road crossings at the locations shown on the E&SCP plan view drawings or as determined by the EI (closer spacing should be used if necessary).

9.5.5 Trenching

The trench centerline will be staked after the CWA has been prepared. In general, a trench will be excavated to a depth that will permit burial of the pipe with a minimum of 3 feet of cover, 4 feet of cover in agricultural areas and 5 feet beneath watercourses. Overland trenching may be accomplished using a conventional backhoe or a rotary wheel-ditching machine. In shale or rocky areas where the use of the wheel-ditching machine is limited, a tractor-drawn ripper will be employed to break and loosen hard substratum material. In areas where rock cannot be ripped, drilling and blasting may be required. A backhoe may then be used to remove rock and soil from the ditch.

The following procedures will be standard practice during ditching:

1. Flag drainage tiles damaged during ditching activities for repair; and
2. Place spoil at least 10 feet from the edge of watercourses. Spoil will be contained with erosion and sediment control barriers (BMPs) to prevent spoil materials or heavily silt-laden water from transferring into watercourses and wetlands or off of the CWA.

9.5.6 Trench Dewatering

Trench dewatering may be periodically required along portions of the proposed pipeline prior to and/or subsequent to installation of the pipeline to remove collected water from the trench.

1. Trench dewatering will be conducted (on or off the CWA) in such a manner that does not cause erosion and does not result in silt-laden water flowing into any watercourse or wetland.
2. The intakes of the hoses used to withdraw the water from the trench will be elevated and screened to minimize pumping of deposited sediments.
3. Water may be discharged into areas where adequate vegetation is present adjacent to the CWA to function as a filter medium.

4. Where vegetation is absent or in the vicinity of watercourse/ wetland areas, water will be pumped into a filter bag or through a structure composed of BMPs. When using filter bags, secure the discharge hose to the bag with a clamp.
5. Remove dewatering structures as soon as practicable after the completion of dewatering activities.

9.5.7 Pipe Installation

The following sections describe how the pipe will be installed for the Project.

9.5.7.1 Stringing and Bending

Following trench excavation, pipe sections will be delivered to the construction site by truck or tracked vehicle and strung out along the trench. Individual pipe sections will be placed on temporary supports or wooden skids and staggered to allow room for work on the exposed ends. Certain pipe sections will be bent, as necessary, to conform to changes in slope and direction of the trench.

9.5.7.2 Welding and Weld Inspection

Once the bending operation is complete, the pipe sections will be welded together on supports using approved welding procedures that comply with Company welding specifications. After welding, the welds will be inspected radiographically or ultrasonically to check their structural integrity.

9.5.7.3 Lowering-in

Lowering-in consists of placing the completed pipeline sections into the trench where a tie-in weld will be made. Lowering-in is usually accomplished with two or more sideboom tractors acting in unison and spaced so as not to buckle or otherwise damage the pipe. The pipeline will be lifted from the supports, swung out over the trench, and lowered directly into the trench. The equipment uses a "leap frogging" technique requiring sufficient area to safely move around other tractors within the CWA to gain an advanced position on the pipe.

9.5.8 Backfilling

Backfilling consists of covering the pipe with the earth removed from the trench or with another fill material hauled to the site when the existing trench spoil is not adequate for backfill. Backfilling will follow lowering-in of the pipeline as close as is practical.

In areas where the trench bottom is irregularly shaped due to consolidated rock or where the excavated spoil materials are unacceptable for backfilling around the pipe, padding material may be required to prevent damage to the pipe. This padding material will generally consist of sand or screened spoil materials from trench excavation.

1. Under no circumstances shall topsoil be used as padding material.
2. Excess rock, including blast rock, may be used to backfill the trench to the top of the existing bedrock profile in accordance with Company specifications. Rock that is not used to backfill the trench will be treated as described in Section 9.5.3.3.
3. Any excess material will be spread within the CWA in upland areas and land contours will be roughed-in to match adjacent topography.
4. The trench may be backfilled with a crown over the pipe to compensate for compaction and settling. Openings will be left in the completed trench crown to restore pre-construction drainage patterns. Crowning shall not be used in wetland areas.

9.5.8.1 Trench Plugs

Trench plugs are intended to slow subsurface water flow and erosion along the trench and around the pipe in sloping terrain. Trench plugs will be constructed with clay, bentonite, synthetic foam, sand or concrete filled sacks. On severe slopes greater than 30 percent, "Sakrete" may be used at the discretion of the Chief Inspector. Topsoil shall not be used to construct trench plugs. Trench plugs, which are used in conjunction with waterbars (slope breakers), shall be installed at the locations shown on the E&SCP alignment sheet drawings or as determined by the EI. Trench plugs shall be installed at the base of slopes adjacent to watercourses and wetlands, and where needed to avoid draining of a resource.

9.5.9 Hydrostatic Testing

Once the pipeline is completed and before it is placed into service, it will be hydrostatically tested for structural integrity in accordance with FERC regulations. Hydrostatic testing involves filling the pipeline with clean water and maintaining a test pressure in excess of normal operating pressures. The testing procedure involves filling the pipeline with test water, performing the pressure test, and discharging the test water. Alternately the water may be hauled offsite. A Hydrostatic Discharge Permit will be obtained from the PADEP prior to hydrostatic testing. PennEast anticipates withdrawing water for the hydrostatic testing from publicly and privately available water sources.

1. The EI shall notify the agencies of the intent to use specific test water sources at least 48 hours before testing activities.
2. Pumps used for hydrostatic testing within 100 feet of any watercourse or wetland shall be operated and refueled in accordance with the PPC Plan.
3. Use only the approved water sources identified in the Clearance Package/Permit Book.
4. Locate hydrostatic test manifolds outside wetlands and riparian areas to the greatest extent practical.
5. For an overland discharge of test water, dewater into an energy dissipation device constructed of straw bales and absorbent booms.
6. Dewater only at the locations shown on the construction drawings or locations identified in the Hydrostatic Test Package.
7. Locate all dewatering structures in a well-vegetated and stabilized area, if practical, and attempt to maintain at least a 50-foot vegetated buffer from adjacent watercourse/wetland areas. If an adequate buffer is not available, BMPs or similar erosion control measure must be installed.
8. Regulate discharge rate, use energy dissipation device(s), and install BMPs, as necessary, to prevent erosion, streambed scour to aquatic resources, suspension of sediments, flooding or excessive stream flow.
9. The EI shall sample and test the source water and discharge water in accordance with the permit requirements.

9.6 CWA Restoration and Final Cleanup

Restoration of the CWA will begin after pipeline construction activities have been completed. Restoration measures include the re-establishment of final grades and drainage patterns as well as the installation of permanent erosion and BMPs to minimize post-construction erosion. Residential areas will be restored in accordance with Section 10.3.3. Property shall be restored as close to its original condition as practical unless otherwise specified by the landowner.

1. The Contractor shall make every reasonable effort to complete final cleanup of an area (including final grading and installation of permanent erosion control structures) within 20 days after backfilling the trench in that area (within 10 days in residential areas). If seasonal or other weather conditions prevent compliance with these time frames, maintain temporary erosion controls (temporary waterbars, BMPs, and mulch) until conditions allow completion of cleanup.
2. The disturbed CWA will be seeded within 4 working days of final grading, weather and soil conditions permitting.
3. If final cleanup and seeding cannot be completed and is delayed until the next recommended growing season, the winter stabilization measures in Section 9.6.4 shall be followed.
4. Grade the CWA to pre-construction contours.
5. Spread segregated topsoil back across the graded CWA to its original profile.
6. Remove excess rock from at least the top 12 inches of soil to the extent practical in all rotated and cultivated cropland, hayfields, managed pastures, residential areas, and other areas at the landowner's request. The size, density, and distribution of rock on the CWA should be similar to adjacent areas not disturbed by construction. The landowner or land management agency may approve other provisions in writing.
7. A travel lane may be left open temporarily to allow access by construction traffic if the temporary erosion control structures are installed, regularly inspected and maintained. When access is no longer required, the travel lane must be removed and the CWA restored.
8. Remove all construction debris from all construction work areas unless the landowner or land managing agency approves leaving materials onsite for beneficial reuse, stabilization, or habitat restoration.
9. Remove temporary BMPs when replaced by permanent erosion control measures or when revegetation is successful per permit requirements.

9.6.1 Permanent Erosion Control

9.6.1.1 Permanent Waterbars

Permanent waterbars are intended to reduce runoff velocity, divert water off the CWA, and prevent sediment deposition into sensitive resources. Permanent waterbars will be constructed of compacted soil. Stone or some functional equivalent may be used when directed by the EI.

1. Install permanent waterbars across the entire width of the permanent ROW in all areas, except cultivated areas and lawns, at the locations shown on the construction drawings or as directed by the EI. Installation shall be in conformance with Drawing 000-03-09-003 (Figures 9 & 10).
2. Install permanent waterbars across the entire width of the permanent ROW at all watercourse and wetland crossings, and at the base of slopes adjacent to roads. When the permanent ROW parallels an existing utility ROW, permanent waterbars may be installed to match existing waterbars on the adjacent undisturbed pipeline ROW.
3. Construct waterbars with a 2 to 4 percent outslope to divert surface flow to a stable vegetative area without causing water to pool or erode behind the interceptor dike. In the absence of a stable vegetative area, install an energy-dissipating device at the end of the interceptor dike.
4. Install a rock-lined drainage swale along the ROW with restricted drainage features when directed by the EI.
5. On slopes greater than 30 percent, install waterbars with erosion control blanket on the swale side.

9.6.1.2 Erosion Control Blanket

1. Install erosion control fabric at waterbar outlets and drainage swales as necessary or as directed by the EI.
2. Install erosion control blanket or matting on slopes greater than 30 percent, on disturbed areas within 50 feet of streams, and within 100 feet of streams in HQ and EV watersheds. Anchor the erosion control blanket or matting with staples or other appropriate devices in accordance with the manufacturers' recommendations.
3. The EI will direct the installation of high-velocity erosion control blanket on the swale side of permanent waterbars.

9.6.2 Revegetation and Seeding

Successful revegetation of soils disturbed by Project-related activities is essential. Seeding will be conducted using the following requirements:

1. Fertilize and add soil pH modifiers as appropriate in residential and agricultural areas. Incorporate recommended soil pH modifier and fertilizer into the top 2 inches of soil as soon as practical after application;
2. Seed all disturbed areas within 4 working days of final grading, weather and soil conditions permitting;
3. Prepare seedbed in disturbed areas to a depth of 3 to 4 inches to provide a firm seedbed. When hydroseeding, scarify the seedbed to facilitate lodging and germination of seed;
4. Seed disturbed areas in accordance with the seed mixes, rates, and dates presented on Drawing 000-01-01-003C, except in upland areas where landowners or a land management agency may request alternative seed mixes. Seeding is not required in cultivated croplands unless requested by the landowner.
5. Perform seeding of permanent vegetation within the recommended seeding dates as outlined in the E&SCP. If seeding cannot be done within those dates, use appropriate temporary erosion control measures discussed in Section 9.5.2 and perform seeding of permanent vegetation at the beginning of the next recommended seeding season. Dormant seeding or temporary seeding of annual species may also be used, if necessary, to establish cover, as approved by the Environmental Inspector. Mulch in accordance with Section 9.6.3. Lawns may be seeded on a schedule established with the landowner;
6. Base seeding rates on Pure Live Seed (PLS). Use seed within 12 months of seed testing;
7. Treat legume seed with an inoculant specific to the species using the manufacturer's recommended rate of inoculant appropriate for the seeding method (broadcast, drill, or hydroseeding); and
8. Uniformly apply and cover seed in accordance with the E&SCP. In the absence of any recommendations from the local soil conservation authorities, landowner, or land managing agency to the contrary. A seed drill equipped with a cultipacker is preferred for application, but broadcast or hydroseeding can be used at double the recommended seeding rates. Where seed is broadcast, firm the seedbed with a cultipacker or roller after seeding. In rocky soils, or where site conditions may limit the effectiveness of this equipment, other alternatives may be appropriate (e.g., use of a chain drag) to lightly cover seed after application, as approved by the EI.

9.6.3 Mulch

Mulch is intended to stabilize the soil surface and shall consist of weed-free straw or hay, wood fiber hydromulch, erosion control blanket, or some functional equivalent as approved by the EI and Chief Inspector. Hay shall not be used for mulch.

1. Mulch all disturbed upland areas (except cultivated cropland) **before** seeding if:
    a) Final cleanup, including final grading and installation of permanent erosion control measures, is not completed in an area within 20 days after the trench in that area is backfilled (10 days in residential areas); or
    b) Construction or restoration activity is interrupted for extended periods, such as when seeding cannot be completed due to seeding period restrictions.

NOTE: When mulching before seeding, increase mulch application on all slopes within 100 feet of watercourses and wetlands to a rate of 3 tons/acre of straw or equivalent.

1. Apply mulch on all slopes (except in cultivated cropland) concurrent with or immediately after seeding, where necessary, to stabilize the soil surface and to reduce wind and water erosion. Spread mulch uniformly over the disturbed areas at a rate of 3 tons/acre of straw or equivalent.
2. Mulch with woodchips only under the following conditions with prior approval from PennEast and the EI:
    a) Do not use more than 1 ton/acre; and
    b) Add the equivalent of 11 lbs/acre available nitrogen (at least 50 % of which is slow release).
3. Verify that mulch is anchored to minimize loss by wind and water. Anchoring may be achieved by wet soil conditions (when approved by the EI), mechanical means, or with liquid mulch binders.
4. When anchoring with liquid mulch binders, use rates recommended by the manufacturer. **Do not use liquid mulch binders within 100 feet of wetlands and watercourses,** except where product is certified environmentally non-toxic by the appropriate state or federal agency or independent standards-setting organization**.**
5. Do not use synthetic monofilament mesh/netted erosion control materials in areas designated as sensitive wildlife habitat, unless the product is specifically designed to minimize harm to wildlife. Biodegradable or photodegradable backed erosion control blankets will be used in these areas as needed. Anchor the erosion control blanket with staples or other appropriate devices.

9.6.4 Winter Stabilization

In the event that restoration occurs too late in the year for cleanup activities to adequately proceed, the following procedures will be implemented along the disturbed CWA at those locations until final restoration measures can be completed.

1. Install permanent interceptor dikes at specified intervals on all slopes, or as directed by the EI;
2. Install temporary BMPs adjacent to stream and wetland crossings, as well as other critical areas;
3. Seed and mulch the disturbed areas and seed segregated topsoil piles in accordance with the E&SCP; and Remove flumes from watercourse crossings to reestablish natural stream flow.

9.7 Unauthorized Vehicle Access to ROW

PennEast will offer to install and maintain measures to control unauthorized vehicle access to the ROW based on requests by the manager or owner of forested lands. These measures may include:

- Signs;
- Fences with locking gates;
- Slash and timber barriers, pipe barriers, or a line of boulders across the permanent ROW; or
- Conifers or other appropriate shrubs with a mature height of 4 feet or less across the permanent ROW.

10.0 SPECIAL CONSTRUCTION METHODS

PennEast will utilize the following specialized construction procedures for agricultural areas, road crossings, and residential areas along the Project. The Project construction drawings, Line Lists, and Construction Contract will indicate the locations where specialized construction methods will be used.

10.1 Agricultural Areas

10.1.1 Drain Tiles

1. Attempt to locate existing drain tiles and irrigation systems and also determine (via landowner) future drain tiles that are likely to be installed within 3 years of the authorized construction.
2. Develop procedures for constructing through drain tiled areas, maintaining irrigation systems during construction, and repairing drain tiles and irrigation systems after construction.
3. Engage qualified drain tile specialists, as needed, to conduct or monitor repairs to drain tile systems affected by construction. Use drain tile specialist from the Project area, if available.
4. Repair damaged drain tiles to their original condition. Filter-covered drain tiles may not be used unless the local soil conservation authorities and the landowner agrees in writing prior to construction.
5. Verify that the depth of cover over the new pipeline is sufficient to avoid interference with drain tile systems (existing or proposed). For adjacent pipeline loops in agricultural areas, install the new pipeline with at least the same depth of cover as the existing pipeline(s).

10.1.2 Irrigation

1. Maintain water flow in crop irrigation systems, unless shutoff is coordinated with affected parties.
2. Repair any damage to the systems as soon as practical.

10.1.3 Soil Compaction Mitigation

1. Test topsoil and subsoil for compaction at regular intervals in agricultural areas disturbed by construction activities. Conduct tests on the same soil type under similar moisture conditions in undisturbed areas to identify approximate preconstruction conditions. Use penetrometers or other appropriate devices to conduct tests.
2. Plow severely compacted agricultural areas with a paraplow or other deep tillage implement. In areas where topsoil has been segregated, plow the subsoil before replacing the segregated topsoil. If subsequent construction and cleanup activities result in further compaction, conduct additional tilling.

10.2 Road Crossings

Unpaved private and public roads supporting minimal traffic volumes are usually crossed by boring or by means of an open cut, if this method is approved by the owner or appropriate road management agency. An open cut

crossing may involve closing the road to all traffic and constructing an adequate detour around the crossing area or excavating one-half of the roadway at a time allowing through traffic to be maintained.

The trench for an open cut crossing is excavated with a backhoe or similar equipment, all backfill is compacted, and the road resurfaced. All state, national, and interstate highways as well as all railroads must be crossed by boring, unless the crossing permit allows an open cut crossing. Access roads shall be used in accordance with Section 9.2.

10.3 Residential Areas

10.3.1 Construction Procedures

Specialized construction procedures will be utilized in areas of heavy residential or commercial/ industrial congestion where residences or business establishments are located within 50 feet of construction work areas.

1. Install safety fence at the edge of the CWA for a distance of 100 feet on either side of the residence or business establishment.
2. Attempt to maintain a minimum distance of 25 feet between any residence/business establishment and the edge of the construction work area for a distance of 100 feet on either side of the residence/business establishment.
3. Avoid removal of mature trees and landscaping within the construction work area unless necessary for safe operation of construction equipment, or as specified in landowner agreements.
4. Restore all lawn areas and landscaping immediately following cleanup operations, or as specified in landowner agreements.
5. If seasonal or other weather conditions prevent compliance with these time frames, maintain and monitor temporary erosion controls (BMPs and mulch) until conditions allow completion of restoration.

10.3.2 Construction Techniques

In addition to the previously identified specialized procedures, smaller "spreads" of labor and equipment, operating independent of the mainline work force, will utilize either the stove pipe or drag section pipeline construction techniques in those areas of congestion where a minimum distance of 25 feet cannot be maintained between the residence (or business establishment) and the edge of the construction work area. In no case shall the temporary work area be located within 10 feet of a residence unless the landowner agrees in writing, or the area is within the existing maintained ROW. The following techniques shall be utilized for a distance of 100 feet on either side of the residence or business establishment at the locations identified in the Construction Contract and/or Line List.

1. The stove pipe construction technique is a less efficient alternative to the mainline method of construction, typically used when the pipeline is to be installed in very close proximity to an existing structure or when an open trench would adversely impact a commercial/industrial establishment. The technique involves installing one joint of pipe at a time whereby the welding, weld inspection, and coating activities are all performed in the open trench. At the end of each day after the pipe is lowered-in, the trench is backfilled and/or covered with steel plates or timber mats. The length of excavation performed each day cannot exceed the amount of pipe installed.
2. The drag section construction technique, while less efficient than the mainline method, is normally preferred over the stove pipe alternative. This technique involves the trenching, installation, and backfill of a prefabricated length of pipe containing several segments all in one day. At the end of each

day after the pipe is lowered-in, the trench is backfilled and/or covered with steel plates or timber mats. Use of the drag section technique will typically require adequate staging areas outside of the residential and/or commercial/industrial congestion for assembly of the prefabricated sections.

10.3.3 Cleanup and Restoration

1. Reseed all disturbed lawns with a seed mixture acceptable to landowner or comparable to the adjoining lawn.
2. Landowners shall be compensated for damages to ornamental shrubs and other landscape plantings.
3. Landowners shall be compensated for damages in a fair and reasonable manner, and as specified in the damage provision within the controlling easement on each property.

11.0 WATERCOURSE CROSSINGS

The following section describes the construction procedures and mitigation measures that will be used for pipeline installations at watercourses. The intent of these procedures is to minimize the extent and duration of Project related disturbances within watercourses.

11.1 Watercourse Definitions

The term "**watercourse"** as used in this E&SCP includes any natural or artificial stream, river, or drainage with perceptible flow at the time of crossing, and other permanent watercourses such as ponds and lakes. In this E&SCP, watercourses are characterized into three main categories depending on the width of the watercourse. The categories are as follows:

- A **"minor watercourse"** includes all watercourses less than or equal to 10 feet wide at the water's edge at the time of construction.
- An "**intermediate watercourse"** includes all watercourses greater than 10 feet wide but less than or equal to 100 feet wide at the water's edge at the time of construction.
- A "**major watercourse"** includes all watercourses greater than 100 feet wide at the water's edge at the time of construction.

11.2 General Watercourse Procedures

11.2.1 Time Window for Construction

Construction restriction time windows for fisheries of special concern at watercourse crossings must be followed unless written approval is obtained from the PFBC Division of Environmental Services or National Marine Fisheries Service (NMFS).

11.2.2 Temporary Equipment Bridges

A temporary equipment bridge is a structure that may be installed across a watercourse to provide a means for construction equipment to cross the stream while minimizing impacts to the channel bottom or banks.

1. Until the equipment bridge is installed, only clearing equipment and equipment necessary for installation of equipment bridges may cross the watercourse and the number of crossings shall be limited to one crossing per piece of equipment, unless otherwise authorized by the appropriate permitting agency.

2. Construct equipment bridges to maintain unrestricted flow and to prevent soil from entering the watercourse. Examples of such bridges include:
    a) Equipment pads and culverts
    b) Clean crushed stone and culverts
    c) Flexi-float or portable bridges
    d) Equipment pads or railroad car bridges without culverts
3. Construct crossings as close to perpendicular to the axis of the watercourse channel.
4. Maintain each equipment bridge to withstand typical flows that would occur in the watercourse. Align culverts/flumes to prevent bank erosion or streambed scour. If necessary, install energy dissipating devices downstream of the culverts.
5. Do not use soil to construct or stabilize equipment bridges.
6. Design and maintain equipment bridges to prevent soil from entering the watercourse.
7. Remove temporary equipment bridges as soon as practicable after permanent seeding.
8. If there will be more than 1 month between final cleanup and the beginning of permanent seeding and reasonable alternative access to the ROW is available, remove equipment bridges as soon as practical after final cleanup.
9. Obtain any necessary permits from the USACE or the PADEP for temporary and permanent bridges.

11.2.3 Clearing and Grading

1. Confine construction activities and ground disturbance to within the limit of disturbance boundaries shown on the construction drawings.
2. Restrict extra work areas (such as staging areas and additional spoil storage areas) to those shown only on the construction drawings. All extra work areas must be located at least 50 feet away from the water's edge, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land. If site-specific conditions do not permit a 50-foot setback, PennEast can receive written approval from the FERC to locate these extra work areas closer than 50 feet from the water's edge.
3. If the pipeline parallels a watercourse, PennEast will typically maintain at least 15 feet of undisturbed vegetation between the watercourse (and any adjacent wetland) and the permanent ROW.
4. Clear the CWA adjacent to all watercourses up to the high-water bank (where discernible).
5. Immediately remove all cut trees and branches that inadvertently fall into a watercourse and stockpile in an upland area on CWA for disposal.
6. Grade the CWA adjacent to watercourses up to within 10 feet of the high-water bank, leaving an ungrubbed vegetative strip intact.
7. Clearing and grading operations may proceed through the 10-foot vegetative strip **only on the working side of the CWA** in order to install the equipment bridge and travel lane. Use temporary BMPs to prevent the flow of bank spoil into the watercourse.
8. Maintain adequate flow rates to protect aquatic life and prevent the interruption of existing downstream uses.

11.2.4 Installing Temporary Erosion and Sediment Control

1. Install BMPs immediately after initial disturbance of the watercourse or adjacent upland. BMPs must be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench), until replacement by permanent erosion controls or restoration of adjacent upland areas is complete.
2. Install BMPs across the entire CWA at all watercourse crossings, where necessary to prevent the flow of sediments into the watercourse. Temporary or removable BMPs such as interceptor dikes or drivable berms may be used in lieu of BMPs in front of equipment bridges or timber mats across the travel lane.

These temporary BMPs can be removed during the construction day but must be reinstalled after construction has stopped for the day and/or when heavy precipitation is imminent.

1. Install BMPs as necessary along the edge of the CWA to contain spoil within the CWA and prevent sediment flow into the watercourse where watercourses are adjacent or parallel to the CWA and the CWA slopes toward the watercourse.
2. Use temporary trench plugs at all watercourse crossings to prevent diversion of water into upland portions of the pipeline trench and to keep any accumulated trench water out of the watercourse. Trench plugs shall be of sufficient size to withstand upslope water pressure.

11.2.5 Various Types of Crossings

Pipeline construction across watercourse channels may result in short term water quality impacts. Decisions regarding watercourse crossing techniques will be based on agency consultations and permit conditions. Mobilization of construction equipment, trench excavation, and backfilling will be performed in a manner that will minimize the potential for erosion and sedimentation within the watercourse channel. Erosion control measures will be implemented to confine water quality impacts within the immediate construction area and to minimize impacts to downstream areas. The length of the crossing, the sensitivity of the area, existing conditions at the time of the crossing, and permit requirements will determine the most appropriate measures to be used.

PennEast proposes to cross watercourses with flow at the time of construction using a combination of horizontal directional drilling (HDD), conventional bore, coffer dam, and dry-crossing methods, as described below. The watercourse crossing method band on the alignment sheets indicates the primary, secondary, and tertiary crossing methods selected for each watercourse. If the primary crossing method listed is not feasible at the time of construction due to field conditions or other site-specific constraints, the contractor may contact the PADEP for approval to utilize the secondary crossing method. If both the primary and secondary crossing methods listed are not feasible for similar reasons, the contractor may contact the PADEP for approval to utilize the tertiary crossing method.

Generally during crossings, the full width of the CWA will be used on either side of the watercourse for construction staging and pipeline fabrication. Extra temporary construction workspace may be required in some situations and will be located in upland areas a minimum of 50 feet from the watercourse, whenever possible; certain crossings may require extra workspace in closer proximity to the watercourse.

11.2.5.1 General Crossing Procedures

1. Dewater trench in accordance with the procedures described in Section 9.5.6.
2. For minor watercourses:

a) Place all spoil from the watercourse within the CWA at least 10 feet from the water's edge or in the extra work areas shown on the construction drawings. Use BMPs to prevent flow of spoil or heavily silt-laden water into the watercourse.

3. For intermediate watercourses:
   a) Less than 30 feet in width, place all spoil from the watercourse within the CWA at least 10 feet from the water's edge or in the extra work areas shown on the construction drawings. Use BMPs to prevent flow of spoil or heavily silt-laden water into the watercourse.
   b) Greater than 30 feet in width, spoil may be temporarily sidecast into the watercourse provided that site specific approval is received from the PADEP.
4. For major watercourses:
   a) Place all upland bank spoil from the watercourse within the CWA at least 10 feet from the water's edge or in the extra work areas shown on the construction drawings. Use BMPs to prevent flow of spoil or heavily silt laden water into the watercourse.
5. Restore and stabilize the banks and channel in accordance with Section 11.2.6.

11.2.5.2 Dry Crossing If No Flow

Crossing of watercourses when they are dry or frozen and not flowing may proceed using standard upland construction techniques, provided that the EI verifies that water is unlikely to flow between initial disturbance and final stabilization of the feature. This typically applies to ephemeral and intermittent watercourses that may not have flow during dry periods (i.e. summertime construction). In the event of perceptible flow, PennEast will utilize the secondary or tertiary crossing method and comply with all necessary Procedure requirements.

11.2.5.3 Flumed Crossing

The flumed crossing method utilizes a flume pipe(s) to transport stream flow across the disturbed area and allows trenching to be done in drier conditions. The flume pipe(s) installed across the trench will be sized to accommodate anticipated stream flows. This method is utilized for perennial watercourses (minor and intermediate) up to 30 feet wide that are state designated fisheries including coldwater fisheries and warmwater fisheries considered significant by the state. Flumes are generally not recommended for use on a watercourse with a broad unconfined channel, unstable banks, a permeable substrate, excessive stream flow, or where the installation and construction of the flume crossing will adversely affect the bed or banks of the stream.

1. The flumed crossing shall be installed as follows:
   a) Install flume pipe(s) after blasting and other rock breaking measures (if required), but before trenching;
   b) Properly align flume pipe(s) to prevent bank erosion and streambed scour;
   c) Use sand bags or equivalent dam diversion structure to provide a seal at either end of the flume to channel water flow (some modifications to the stream bottom may be required to achieve an effective seal);
   d) **Do not remove flume pipe during trenching**, pipe laying (thread pipe underneath the flume pipe(s)), or backfilling activities, or initial streambed restoration efforts unless authorized by agency permits; and
   e) Remove all flume pipes and dams that are not also part of the equipment bridge as soon as final cleanup of the stream bed and bank is complete.

11.2.5.4 Dam and Pump Crossing

The dam and pump method is presented as an alternative dry crossing procedure to the flumed crossing. The dam and pump crossing is accomplished by utilizing pumps to transport stream flow across the disturbed area. This method involves placing sandbags across the existing stream channel upstream from the proposed crossing to stop water flow and downstream from the crossing to isolate the work area. Pumps are used to pump the water across the disturbed area and back into the stream further downstream. The dam and pump procedure allows for more space and flexibility during trenching and pipe installation, which shortens the duration of time spent at the watercourse.

1. The dam and pump method may be used for crossings of watercourses where pumps can adequately transfer stream flow volumes around the work area, and where there are no concerns about sensitive species passage.
2. Implementation of the dam and pump crossing method will meet the following performance criteria:
    a) Use sufficient pumps, including onsite backup pumps, to maintain downstream flows;
    b) Construct dams with materials that prevent sediment and other pollutants from entering the watercourse (e.g., sandbags or clean gravel with plastic liner);
    c) Screen pump intakes to minimize entrainment of fish;
    d) Prevent streambed scour at pump discharge; and
    e) Continuously monitor the dam and pumps to maintain proper operation throughout the watercourse crossing.
3. The dam and pump crossing shall be installed as follows:
    a) Install and properly seal sandbags at the upstream and downstream location of the crossing;
    b) Create an in-stream sump using sandbags if a natural sump is unavailable for the intake hose;
    c) Initiate pumping of the stream around the work area prior to excavating the trench;
    d) Screen all intake hoses to prevent the entrainment of fish and other aquatic life;
    e) Direct all discharges from the pumps through energy dissipaters to minimize scour and siltation;
    f) Monitor pumps at all times until construction of the crossing is completed; and
    g) Following construction, remove the equipment crossing and sandbag dams.
    h) Construct the crossing in accordance with the measures contained in this E&SCP to the maximum extent practical.

11.2.5.5 Cofferdam Crossing

A cofferdam is a temporary structure built into a watercourse to contain, or divert movement of water and to provide a reasonably dry waterbody crossing construction area. Cofferdams are commonly made of steel sheet pile, rock, gabions, concrete jersey barriers, vinyl tubes filled with water, or wood and may be lined with geotextile, plastic sheeting, or other materials to prevent water from entering the construction area. The advantages of the use of cofferdams include, maintain flow of the watercourse with phased construction approaches, minimal subsurface impacts, and short installation and breakdown times.

A typical cofferdam crossing will have two phases. Each of the phases will be conducted from opposite stream banks. Each phase will consist of placing sand bags or other equivalent cofferdam materials such that a portion of the watercourse to be crossed can be blocked from upstream and downstream water flow while at least one third of the total crossing width remains open to water flow. The area within the cofferdam area will be dewatered and pipeline work construction will be carried out in the dry. After completion of one bank

(phase) the same configuration will be used from the other bank to complete a continuous pipeline crossing through the watercourse.

1. Cofferdams shall be constructed with materials that prevent sediment and other pollutants from entering the watercourse (e.g. sandbags or clean gravel with plastic liner);
2. Cofferdam and dewatering pumps shall be monitored to maintain proper operation throughout the watercourse crossing.

11.2.5.6 Conventional Bore Crossing

Watercourse crossings in close proximity to a conventional bore road crossing will be included as part of the bored crossing. The conventional bore method is used in place of traditional trenching methods to reduce disturbance and environmental impacts. The approximate location of bore pits for all conventional bore crossings are identified on the alignment sheet plan view drawings.

1. The conventional bore crossings shall be installed as follows:
    a) Conventional bores will be conducted along with mainline installation to limit time of disturbance to those areas.
    b) Install compost filter socks downgradient of the bore and receiving pits.
    c) Excavate pits.
    d) Bore beneath streams where indicated on the construction drawings.
    e) Water from the bore pits and work areas shall be pumped to a pumped water filter bag.
    f) Upon completion, backfill all pits.

11.2.5.7 Horizontal Directional Drill

For each watercourse or wetland that would be crossed using the HDD method, a site-specific plan will be implemented that includes:

1. Site-specific construction diagrams that show the location of mud pits, pipe assembly areas, and all areas to be disturbed or cleared for construction;
2. Justification that disturbed areas are limited to the minimum needed to construct the crossing;
3. Identification of any aboveground disturbance or clearing between the HDD entry and exit workspaces during construction;
4. A description of how an inadvertent release of drilling mud would be contained and cleaned up; and
5. A contingency plan for crossing the watercourse or wetland in the event the HDD is unsuccessful and how the abandoned drill hole would be sealed, if necessary.

11.2.6 Restoration

For minor watercourse crossings, the preferred restoration method is to achieve final grade and restore the watercourse, its banks, and 50-foot buffers (100-foot in HQ/EV watersheds) within 24 hours of backfilling. For intermediate watercourse crossings, the preferred restoration method is to achieve final grade and restore the watercourse, its banks, and 50-foot buffers (100-foot in HQ/EV watersheds) within 48 hours of backfilling. If conditions do not permit the preferred method, the construction work area not in use for access will be promptly rough graded and stabilized with a temporary seed mix. **Do not use liquid mulch binders within 100 feet of wetlands and watercourses,** except where product is certified environmentally non-toxic by the appropriate state or federal agency or independent standards-setting organization**.**

1. For each watercourse crossing, a permanent waterbar/slope breaker and a trench plug will be installed at the base of slopes near the watercourse. Permanent waterbars may not be installed in agricultural or residential areas.
2. Return all watercourse banks to preconstruction contours or to stable angle of repose as approved by the EI.
3. Install erosion control fabric or a functional equivalent on watercourse banks at the time of final bank recontouring. Do not use synthetic monofilament mesh/netted erosion control materials in areas designated as sensitive wildlife habitat unless the product is specifically designed to minimize harm to wildlife. Anchor erosion control fabric with staples or other appropriate devices.
4. Use clean gravel or native cobbles for the upper 12 inches of trench backfill in all watercourses identified in the Clearance Package/Permit Book.
5. Limit the placement of riprap to the slopes along the disturbed watercourse crossing.
6. Install erosion control fabric anchored with staples or other appropriate devices along watercourses with low flow conditions as presented on Drawing 000-03-09-005 (Figure 21).
7. Revegetate disturbed riparian areas with the Riparian Buffer Mix presented on Drawing 000-01-01-003C. In the event that final cleanup is deferred more than 20 days after the trench is backfilled, all slopes within 100 feet of watercourses shall be mulched with 3 tons/acre of straw. Liquid mulch binders will not be used within 100 feet of watercourses.
8. Remove all temporary BMPs when replaced by permanent erosion controls or when restoration of adjacent upland areas is successful as specified in Section 14.1.

12.0 WETLAND CROSSINGS

The term "**Wetland**" as used in this E&SCP includes any area that satisfies the requirements of the current Federal methodology for identifying and delineating wetlands. Wetland areas have been delineated prior to construction and are identified on the construction drawings.

The wetland crossing procedures described in this Plan will comply with USACE and PADEP permit terms and conditions. The requirements outlined below do not apply to wetlands in cultivated or rotated cropland. Standard upland protective measures including workspace and topsoiling requirements, will apply to these agricultural wetlands.

12.1 General Procedures

12.1.1 Clearing and Grading

1. Limit construction activity and ground disturbance in wetland areas to a CWA width of 75 feet or as shown on the construction drawings. With written approval from the FERC for site-specific conditions, CWA width within the boundaries of delineated wetlands may be expanded beyond 75 feet.
2. Wetland boundaries and buffers must be clearly marked in the field with signs and /or highly visible flagging until construction-related ground disturbing activities are complete.
3. Restrict extra work areas (such as staging areas and additional spoil storage areas) to those shown only on the construction drawings. All extra work areas must be located at least 50 feet away from wetland boundaries, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land. If site-specific conditions do not permit a 50-foot setback, PennEast can receive written approval from the FERC to locate these extra work areas closer than 50 feet from the wetland.

4. If standing water or saturated soils are present, or if construction equipment causes ruts or mixing of the topsoil and subsoil in wetlands, use low-ground-weight construction equipment or operate normal equipment on timber, prefabricated equipment mats or terra mats on the working side of the ROW during clearing operations. Do not use more than two layers of timber mats to stabilize the ROW.
5. Cut vegetation just above ground level and grind stumps to ground level, leaving existing root systems in place. Immediately remove all cut trees and branches from the wetland and stockpile in an upland area on CWA for disposal.
6. Limit pulling of tree stumps and grading activities to directly over the trenchline. Do not grade or remove stumps or root systems from the rest of the CWA in wetlands unless the Chief Inspector and EI determine that safety-related construction constraints require removal of tree stumps from under the working side of the CWA.
7. Do not cut trees outside of the CWA to obtain timber for riprap or equipment mats.
8. Cleared materials (slash, logs, brush, wood chips) shall not be permanently placed within wetland areas.

12.1.2 Temporary Erosion and Sediment Control

1. Install BMPs immediately after initial ground disturbance at the following locations:
   a) Within the CWA at the edge of the boundary between wetland and upland;
   b) Across the entire CWA immediately upslope of the wetland boundary to contain spoil within the CWA and prevent sediment flow into the wetland;
   c) Along the edge of the CWA, where the CWA slopes toward the wetland, to protect adjacent, off CWA wetland; and
   d) Along the edge of the CWA as necessary to contain spoil and sediment within the ROW through wetlands.
2. Maintain all BMPs throughout the construction period and reinstall as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls or restoration of adjacent upland areas is complete.

12.1.3 Crossing Procedure

1. Minimize the length of time that topsoil is segregated, and the trench is open. Do not trench the wetland until the pipeline is assembled and ready for lowering in.
2. Do not use rock, soil imported from outside the wetland, tree stumps, or brush riprap to stabilize the CWA.
3. Perform topsoil segregation in accordance with Section 9.5.3.1 and trench dewatering in accordance with Section 9.5.6.
4. Assemble the pipeline in an upland area unless the wetland is dry enough to adequately support skids and pipe.
5. Install trench plugs at wetland boundaries and every 100’ throughout wetland crossings, and/or seal the trench bottom as necessary to maintain the original wetland hydrology at locations where the pipeline trench may drain a wetland.
6. Restore pre-construction wetland contours to maintain the original wetland hydrology.

7. Install a permanent waterbars and a trench plug at the base of slopes near the boundary between the wetland and adjacent upland areas. In addition, install BMPs as outlined in Section 9.5.2. Permanent waterbars shall not be installed in agricultural or residential areas.
8. Restore segregated topsoil to its original position after backfilling is complete. When required, additional fill material imported from off the CWA must be approved by the EI. The original wetland contours and flow regimes will be restored to the extent practical.

12.1.4 Cleanup and Restoration

1. Revegetate the disturbed wetland areas with the Wetland Seed Mix presented on Drawing 000-01-01-003C, unless standing water is present.
2. **Do not use mulch, lime or fertilizer in wetland areas unless required in writing by the appropriate federal or state agency.**
3. Mulch the disturbed CWA only when required by the appropriate land management or state agency, as identified in the Clearance Package/Permit Book.
4. In the event that final cleanup is deferred more than 20 days after the trench is backfilled, all slopes adjacent to wetlands shall be mulched with 3 tons/acre of straw for a minimum of 100 feet on each side of the crossing. Liquid mulch binders will not be used within 100 feet of wetlands or watercourses.
5. Remove all timber mats and prefabricated equipment mats upon completion of construction.
6. Develop specific procedures in coordination with the appropriate federal or state agencies, where necessary, to prevent the invasion or spread of invasive species and noxious weeds (such as purple loose strife and common reed).
7. Verify that all disturbed areas permanently revegetate in accordance with Section 14.1.
8. Remove temporary BMPs located at the boundary between wetland and adjacent upland areas after upland revegetation and stabilization of adjacent upland areas are successful as specified in Section 14.1.

13.0 PREPAREDNESS, PREVENTION, AND CONTINGENCY (PPC) PLAN

The Contractor shall adhere to PennEast's PPC Plan at all times.

1. Do not store hazardous materials, chemicals, fuels, or lubricating oils within 100 feet of any wetland, watercourse or within any designated municipal watershed area where feasible. If the 100-foot setback cannot be met, this activity can be performed within the 100-foot setback, with EI approval, if done in accordance with the PPC Plan.
2. Refuel all construction equipment at least 100 feet from any wetland or watercourse, where feasible. If the 100-foot setback cannot be met, this activity can be performed within the 100-foot setback, with EI approval, if done in accordance with the PPC Plan.
3. Do not perform fiber bonded epoxy (FBE) or concrete coating activities within 100 feet of any wetland or watercourse, unless the location is an existing industrial site designated for such use. If the 100-foot setback cannot be met, these activities can be performed within the 100-foot setback, with EI approval, if done in accordance with the PPC Plan. These activities can occur closer only if the EI determines that there is no reasonable alternative, and the Project sponsor and its contractors have taken appropriate steps (including secondary containment structures) to prevent spills and provide for prompt cleanup in the event of a spill;

4. Pumps operating within 100 feet of a watercourse or wetland boundary utilize appropriate secondary containment systems to prevent spills; and
5. Bulk storage of hazardous materials, including chemicals, fuels, and lubricating oils have appropriate secondary containment systems to prevent spills.

14.0 POST CONSTRUCTION ACTIVITIES

14.1 Post-Construction Monitoring

The Project, conducted under this E&SCP, shall meet the monitoring requirements set forth in this section. Company personnel shall perform the following:

1. Establish and implement a program to monitor the success of restoration upon completion of construction and restoration activities;
2. Conduct follow-up inspections of all disturbed areas, as necessary to determine the success of revegetation and address landowner concerns. At a minimum, conduct inspections after the first and second growing seasons;
3. Revegetation in nonagricultural areas shall be considered successful if the vegetative cover is sufficient to prevent the erosion of soils on the disturbed CWA and density and cover are similar to that in adjacent undisturbed area. Sufficient coverage in upland areas is defined when vegetation has a uniform 70 percent vegetative coverage. In agricultural areas, revegetation shall be considered successful when upon visual survey, crop growth and vigor are similar to adjacent undisturbed portions of the same field, unless the easement agreement specifies otherwise. Revegetation efforts (such as fertilizing or reseeding) will continue until revegetation is successful;
4. Restoration shall be considered successful if the CWA surface condition is similar to adjacent undisturbed lands, construction debris is removed (unless otherwise approved by the land owner or land managing agency), revegetation is successful, and proper drainage has been restored;
5. Monitor and correct problems with drainage and irrigation systems resulting from pipeline construction in active agricultural areas until restoration is successful;
6. Make efforts to control unauthorized off-road vehicle use, in cooperation with the landowner, throughout the life of the Project. Maintain signs, gates, and permanent access roads as necessary;
7. Monitor and record the success of wetland revegetation annually until wetland revegetation is successful. Wetland revegetation will be considered successful if all of the following criteria are satisfied: the affected wetland satisfies the current federal definition for a wetland (i.e., soils, hydrology, and vegetation); Vegetation is at least 80 percent of either the cover documented for the wetland prior to construction, or at least 80 percent of the cover in adjacent wetland areas that were not disturbed by construction; if natural rather than active revegetation was used, the plant species composition is consistent with early successional wetland plant communities in the affected ecoregion; and invasive species and noxious weeds are absent, unless they are abundant in adjacent areas that were not disturbed by construction.
8. For any wetland where vegetation is not successful at the end of 3 years after construction, PennEast shall develop and implement (in consultation with a professional wetland ecologist) a plan to actively revegetate the wetland with native wetland herbaceous and woody plant species; and

9. Inspect all temporary remaining erosion and sedimentation controls during routine patrols to maintain proper functioning. Any deficiencies found will be reported and corrected as needed. Once the area has revegetated and stabilized, the erosion controls will be removed.

14.2 Post-Construction Maintenance

All activities conducted under this E&SCP, shall meet the maintenance requirements set forth in this section. The following requirements restrict the amount of routine vegetation mowing or clearing that can occur on new pipeline facilities. Where the newly established pipeline ROW is located on other existing ROWs not affiliated with PennEast, the easement holder or owner will continue to maintain their ROWs using procedures specified in their vegetative management programs.

14.2.1 Uplands

Routine maintenance of the ROW is required to allow continued access for routine pipeline patrols, maintaining access in the event of emergency repairs, and visibility during aerial patrols. In upland areas, maintenance of the ROW will involve clearing the entire ROW of woody vegetation.

1. Routine vegetation mowing or clearing over a 30-foot wide corridor centered on the pipeline of the permanent ROW in uplands shall be conducted no more frequently than once every 3 years. However, to facilitate periodic corrosion and leak surveys, a 10-foot wide corridor centered on the pipeline may be cleared at a frequency necessary to maintain the 10-foot wide corridor in a herbaceous state.
2. In no case shall routine vegetation mowing or clearing occur during the migratory bird nesting season between April 15 and August 1 of any year unless specifically approved in writing by the responsible land management agency or the USFWS.

14.2.2 Watercourses and Wetlands

1. Routine vegetation mowing or clearing practices on the CWA adjacent to watercourses will consist of maintaining a riparian strip that measures 25 feet back from the mean high water mark. This riparian area will be allowed to permanently revegetate with native plant species across the entire ROW.
2. Routine vegetation mowing or clearing over the full width of the CWA in wetlands is prohibited.
3. To facilitate periodic corrosion and leak surveys at wetlands and watercourses, a 10-foot wide corridor centered on the pipeline may be cleared at a frequency necessary to maintain the 10-foot corridor in an herbaceous state. Trees and shrubs that are located within 15 feet of the pipeline that have roots that could compromise the integrity of the pipeline coating may be cut and removed from the ROW. Do not conduct any routine vegetation mowing or clearing in riparian areas that are between HDD entry and exit points.
4. Herbicides or pesticides will not be sprayed anywhere along the maintained permanent ROW.
5. Time of year restrictions (April 15 – August 1 of any year) apply to routine mowing and clearing of riparian areas.

14.3 Reporting

PennEast shall maintain records that identify by milepost:

1. Method of application, application rate, and type of fertilizer, pH modifying agent, seed, and mulch used;
2. Acreage treated;
3. Dates of backfilling and seeding; and
4. Names of landowners requesting special seeding treatment and a description of the follow-up actions.
5. The location of any subsurface drainage repairs or improvements made during restoration; and
6. Any problem areas and how they were addressed.

For the authorized projects, PennEast will file quarterly activity reports with FERC documenting the results of follow-up inspections and any problem areas, including those identified by the landowner, and corrective actions taken for at least 2 years following construction.

A wetland revegetation monitoring report identifying the status of the wetland revegetation efforts will be filed with FERC at the end of 3 years following construction, and annually thereafter documenting progress in these wetlands until revegetation is successful.