Professional Review & Comment of the

Draft Environmental Impact Statement

and Supporting Documents

Related to Surface Water Impacts of the Proposed

PennEast Pipeline Project

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TABLE OF CONTENTS

PROJECT OVERVIEW

The PennEast Pipeline Company, LLC proposes to construct 118.8 miles of 36-inch diameter pipeline from Luzerne County, in northeast Pennsylvania to Mercer County, New Jersey, including three laterals as well as an associated compressor station, 121 access roads, work spaces, meter stations, and other related facilities. On July 22, 2016, the Federal Energy Regulation Commission (FERC) issued a Draft Environmental Impact Statement (DEIS) that "determined that construction and operation of the Project would result in some adverse environmental impacts, but impacts would be reduced to less-than-significant levels with the implementation of PennEast's proposed and FERC staff's recommended mitigation measures."[1] FERC based their findings on "information provided by PennEast and further developed from data requests; field investigations; scoping; literature research; alternatives analysis; and contacts with federal, state, and local agencies"[2].

PennEast filed an application with the Federal Energy Regulatory Commission (FERC) on September 24, 2015 for a Certificate of Public Convenience and Necessity. PennEast subsequently provided additional information to FERC in response to Environmental Information Requests. PennEast also submitted information to Pennsylvania Department of Environmental Protection (PaDEP) approvals in each county related to Title 25 Chapter 102 Erosion and Sediment Control General Permit (ESCGP2), 401 Water Quality Certification, and Joint Clean Water Act Section 404/PaDEP Title 25 Chapter 105 Water Obstruction and Encroachment Permits.

On behalf of the Delaware Riverkeeper Network, Meliora Design water resource engineers Michele Adams, P.E. and Marc Henderson, P.E. reviewed the available documents, most notably the Draft Environmental Impact Statement (DEIS) and supporting documents prepared by PennEast, including the supporting Resource Reports prepared under Section 7(c) of the Natural Gas Act, additional information provided at FERC's request, and information and plans associated with the ESCGP2 and applications to PaDEP.

Specifically, these documents were reviewed with regards to surface water quality issues. This includes potential water quality impacts from:

- Surface water crossings (streams, waterbodies, and wetlands)
- Increased stormwater runoff and erosion as a result of permanent land use changes and soil compaction.

[1] https://www.ferc.gov/industries/gas/enviro/eis/2016/07-22-16-eis.asp
[2] https://www.ferc.gov/industries/gas/enviro/eis/2016/07-22-16-eis.asp

Both short- and long-term water quality impacts are anticipated as a result of pipeline construction and long-term operation. We also visited a number of proposed pipeline construction locations as discussed later in this memo.

GENERAL FINDINGS

With regards to surface water quality issues, FERC's conclusion that the environmental impacts from the pipeline can be reduced to "less than significant levels" cannot be supported. Specifically, in regards to stream crossings:

- The DEIS and supporting materials provided by PennEast fail to consider the unique, site specific conditions at each individual proposed stream and wetland crossing, and the corresponding potential adverse water quality impacts associated with stream crossings, including open cut crossings. The DEIS fails to comprehensively evaluate each stream crossing with regards to conditions such as water quality, erosive soils, existing land use and forested areas, existing slopes, riparian buffers, and the potential need for in-stream blasting. Lacking consideration of the site specific conditions at each crossing, the DEIS fails to require adequate location and construction recommendations to protect water quality, as well as construction techniques specific to conditions at each crossing. The proposed stream and wetland crossing locations, methods of construction, and long-term land use conditions appear to be based on the needs and preferences of PennEast and not informed by site specific conditions.

- Importantly, the supporting documentation provided by PennEast fails to provide stream and wetland crossing information in a manner that allows FERC and other reviewing agencies to evaluate the site specific conditions at each stream crossing, including information discussed further in this memo. Important site specific information is located in different Resource Report volumes and other documents, and not easily correlated or evaluated. Much of the information discussed in this memo was compiled from multiple volumes, documents, and updates and is not readily reviewed by FERC or other reviewing agencies in a comprehensive manner. The project selection of stream and wetland crossing locations and construction methods cannot be clearly evaluated in the form in which it is presented in the DEIS and supporting documents.

With regards to stormwater management:

- The DEIS fails to consider or even acknowledge stormwater impacts from pipeline construction, as no stormwater management is proposed or required by FERC for the pipeline area. Due to land use changes and soil alteration, there will be permanent long-term water quality impacts related to stormwater runoff, including increases in the rate, volume, and frequency of stormwater runoff. Fifty-seven percent of the pipeline right-

of-way area, or approximately 446 acres, is currently forested and will permanently be altered from forest during pipeline operation. An additional 139 acres of forest will be removed for construction. The current forested conditions generate little surface runoff and facilitate groundwater recharge to support baseflow to streams and wetlands. The proposed pipeline conditions will significantly reduce the land surface's ability to retain rainfall and facilitate infiltration, and will increase runoff frequency, volumes, and flow rates, including increased surface erosion and sediment transport to Special Protection or C1 water bodies.

- Similar to stream crossing information, the DEIS fails to consider the site specific conditions that will impact stormwater and erosion, including existing land cover, steep slopes, soil erosion potential, revegetation potential, and proximity to waterbodies, as well as pipeline maintenance practices. There is no correlation of site specific data and information related to the factors that impact stormwater runoff and erosion in the DEIS or supporting materials. The DEIS fails to evaluate the varying conditions that will impact stormwater and erosion, and correspondingly fails to require site specific construction techniques and stormwater management practices.

GENERAL PROJECT DESCRIPTION

The main pipeline project includes 77.7 miles in Pennsylvania and 36.3 miles in New Jersey, not including laterals. Additional project areas include access roads, work spaces, a compressor station, and other related facilities. The total estimated Workspace for Construction is 1,613.6 acres (Table 2.2-1 of the DEIS), including 784 acres for Permanent Easement and Operation. These values and others are not always consistent with information presented in more detailed tables throughout the DEIS and supporting documents.

The pipeline land disturbance includes a permanent 50-foot wide right-of-way, with an additional 50-foot wide temporary construction space, for a 100-foot wide construction corridor. The project also proposes numerous "Additional Temporary Work Spaces" (ATWS) beyond the 100-foot wide corridor. In agricultural areas where topsoil will be segregated, an additional 25 feet of corridor will be required for a total construction width of 125-feet (which seems contrary to any effort to minimize impacts to agricultural areas). In wetland areas, the construction right-of-way will be 75 feet unless a variance is requested (which includes 18 of the 173 wetlands to be crossed, and some of these are quite wide – over 200 feet – and often related to construction areas for roadway borings).

Approximately 43.9 miles of pipeline will be co-located with existing linear facilities, however, this generally means that the new pipeline construction and permanent right-of-way is located outside of and adjacent to the existing linear facilities right-of-way, resulting in an even larger area of disturbance and land use alteration.

STREAM AND WETLAND CROSSINGS AND IMPACTS TO WATER QUALITY

The pipeline project will cross 251 FERC classified waterbodies in Pennsylvania (165) and New Jersey (86). The DEIS does not provide a tally of the number of individual wetlands crossed by the pipeline project, however DEIS Tables G-11 and G-12 list 211 wetlands, 106 in Pennsylvania and 105 in New Jersey (when manually counted).

The DEIS indicates that the cumulative impacts of a variety of conditions were considered, including the following conditions that impact surface water quality:

- Geology
- Soils
- Groundwater
- Surface Water
- Wetlands
- Vegetation
- Fisheries and aquatic resources
- Land use

While the DEIS and the various Resource Reports and updates included in the PennEast application include information and statistics related to each of these (and other conditions), the DEIS utterly fails to examine these conditions as they relate to each other and potentially impact project conditions at stream and wetland crossings. For example, it is impossible, from the information presented in the DEIS and the PennEast application materials to directly determine how many stream crossings of Exceptional Value streams in Pennsylvania will involve open cuts in areas that are currently forested conditions, on public lands, on steep slopes or erosive soils, or any combination of the above conditions that can impact water quality and that should inform pipeline location and construction decisions. It is impossible to easily determine if these crossings also include Additional Temporary Work Space (ATWS) areas within 50 feet of the waterbody that further increase disturbance and the potential for water quality impacts, or are located in geologic formations that may require blasting within the stream channel.

While the DEIS and PennEast application materials provide considerable data and tables in multiple locations and formats, neither the DEIS nor the PennEast application materials include any comprehensive compilation and evaluation of the data at stream and wetland crossings, or any indication that site specific conditions and their impact on water quality (or other environmental impacts) have informed decisions related to project location and project construction methods.

In an attempt to better understand the potential water quality impacts of the PennEast pipeline, this memo includes a table and information compiled from the data in the DEIS and PennEast application materials, but compiled in a format that allows some understanding and interpretation of the project's water quality impacts at each stream crossing. We attempted to compile site specific information in a format that would allow us to evaluate each stream crossing for the potential water quality impacts due to site conditions. The DEIS is deficient in that it fails to evaluate this information comprehensively. This comprehensive table is included as Attachment A.

We compiled stream crossing data into a single spreadsheet that includes information on the following site specific conditions at stream crossings, from the sources as noted:

1. Stream Crossings (from DEIS Tables G-5 and G-7 in Pa, G-6, G-8, and G-9 in NJ, as well as Updated Table 2A-1 from Resource Report 2), including:
    - State
    - Facility Stream Crossing Milepost
    - County
    - Pa Code Chapter 93 Designated Use or Existing Use or NJDEP Water Quality Class
    - Wild Trout Waters (Pa)
    - Approved Trout Waters (ATW, Pa)
    - Crossing Method – Dry Crossing, Boring, or HDD

To this table, we added the following information at each stream crossing using the data sources referenced:

2. Soils that have Severe Erosion Potential (Updated Resource Report Table 7.1-2)
3. Soils that have Poor Revegetation Potential (Updated Resource Report Table 7.1-2)
4. Rugged Terrain crossings (with slopes greater than 30%), including site specific slope (Updated Resource Report Table 8.2-2)
5. Potential Blasting Areas at stream crossings (Updated Resource Report Table 1.5-8)
6. Riparian Regulation Zones for C1 and EV waters
7. Forest areas (Resource Report Table 7.1-2 and ESCGP2 documentation)
8. Areas subject to NJ No Net Loss Reforestation Act (updated Resource Report Table 3.3-6)
9. Proximity to roadways (ESCGP2 documentation)
10. ATWS areas within 50 feet of waterbody, including number of ATWS areas and reasons (Tables G-10 and G-15 in DEIS)
11. Stream crossings on public lands or conservation areas (DEIS G-14)
12. Stream crossings on Private Recreational Areas (DEIS G-18) or within Private Conservation Easements (DEIS G-17)

We also included in the spreadsheet any stream crossings shown on the ESCGP2 Plans but not listed in the DEIS or Resource Report Tables, with information as available within the documents. Additionally, we compiled site specific information at each stream crossing from both the Resource Reports and the ESCGP2 Plans. For example, a Resource Table might list a minor stream crossing as having a very large width, where review of the ESCGP2 plans would indicate that the pipeline project was located on top of or parallel to a small stream (and hence the wide "crossing" width). We also noted if the stream crossing was in proximity to a road.

There are a number of conflicts and discrepancies between data in different sources, and we did not try to resolve these discrepancies, that is the responsibility of PennEast and FERC. But by summarizing and evaluating the stream crossing data comprehensively, a number of observations can be made.

- The vast majority of stream crossings 87%) will be dry crossings with the greatest potential for adverse water quality impacts and long-term alteration of the channel substrate and riparian buffer.
- By comparison, only 26% of the 189 road crossings will be dry crossings, and 74% will be constructed by boring under the roadway or horizontal directional drilling. This implies that for PennEast, avoiding disturbance of roadways is of higher priority than protecting streams, even streams of the highest quality in Pennsylvania and New Jersey.

- Where stream crossings are proposed to be constructed by boring or high-density directional drilling below the water body, this is often related to a nearby road crossing and does not reflect an effort to protect water quality. Of the seventeen HDD stream crossing locations proposed, only four are not associated with a road crossing.
- Similarly, most stream crossings that propose boring beneath the water body (28) are associated with a nearby road crossing. Only seven water body boring crossings are <u>not</u> associated with a road.
- Many of the 186 dry crossings (101 or 54% of the dry crossings) involve the highest quality waters in Pennsylvania[3] (Special Protection, wild trout and New Jersey C1 waters). Only 23 involve boring.
- Many of these dry crossings of streams are in areas of severely erodible soils (103 dry crossings), rugged terrain with slopes greater than 30% (34 dry crossings), and other (often multiple) site specific constraints that increase the likelihood and potential for adverse water quality impacts. Thirty (30) dry stream crossings are located at sites with both severely erodible soils and rugged terrain. This information must be gleaned from multiple sources within the PennEast application and is not presented comprehensively in either the PennEast application materials or the DEIS. The DEIS fails to consider these site specific conditions in determining pipeline location and suitability of construction methods to minimize impacts or protect water quality.
- Approximately 55% of the dry stream crossings are in areas of Potential Blasting, indicating that instream blasting is likely.
- The single largest land use to be disturbed in Pennsylvania is forest (59% of the pipeline length in Pennsylvania), including many publicly owned lands. Many of the proposed stream and wetland crossings will alter the forest and riparian buffer conditions that currently support high water quality, or will disturb and alter land that is currently in conservation easement. It is not possible to determine the number of forested stream crossings in New Jersey at this time.
- The fact that forest is the single largest land use to be disturbed indicates both a lack of recognition of the hydrologic and water quality benefits of forested landscapes, and a preference on PennEast's part to locate the pipeline in areas where topsoil separation and soil restoration is not required by FERC.
- The pipeline route proposes 98 forested dry stream crossings in Pennsylvania that are crossing EV/HQ waters or wild trout or trout supporting waters. Again, this must be gleaned from multiple sources and is not presented comprehensively in the PennEast application.
- Of these 98 forested dry stream crossings in Pennsylvania <u>EV/HQ or wild trout waters</u>, 47 are also in areas of severely erodible soils, 13 are in areas of Rugged Terrain, and 34 are in areas of potential in channel blasting for pipeline construction. 24 forested

[3] Defines highest quality for purposes of this memo

stream crossings in Pa have two of these additional constraints, and 5 have all three (severely erosive soils, rugged terrain, and potential blasting).

- In the Pennsylvania segment of the pipeline, there is inconsistency between the stream crossing information in the Resource Reports, the stream crossings identified in the DEIS, and the site specific information in the Erosion and Sediment Control Plan sheets submitted under the requirements of Pennsylvania Title 25 Chapter 102 (ESCGP2 application). There are stream crossing locations mapped on the Pennsylvania Erosion and Sediment Control plan sheets that are missing entirely from the DEIS or have different information related to stream and wetland locations and conditions. There are 24 stream crossings identified in the DEIS that are not indicated on the Pennsylvania Erosion and Sediment Control Plans.
- It is not possible at this time to estimate the number of New Jersey stream crossings that are not included in the DEIS.
- The DEIS identifies 40 Additional Temporary Work Space Areas located within 50 feet of a waterbody, including 32 that will be located near high value waters and 24 that will be located in areas that are currently forested.
- 44 dry stream crossings will impact Conservation Areas and Public Lands, and 14 dry stream crossings will impact areas held in private conservation easement.

The detailed data regarding the various site specific conditions that could impact water quality is compiled in Attachment A.

In Resource Report 1, it states that "PennEast will assess environmental conditions and evaluate the need to reduce the nominal 100-foot corridor in certain environmentally sensitive areas such as wetlands" (page 1-18, Section 1.3.1). However, as can be seen from information in Attachment A, PennEast fails to consider this information and there is no indication that construction methods are altered or site specific conditions are considered in the approval of stream crossings in the DEIS. Regardless of site specific conditions, the DEIS accepts PennEast's general construction methods and requested areas of disturbance, including general language regarding standard construction methods and future approvals to be obtained.

Other reviewing agencies are also constrained in their project analysis by PennEast's lack of comprehensive information on site specific conditions at stream crossings. Regulations administered by the Pennsylvania Department of Environmental Protection (PaDEP) under 25 Pa Code Chapter 105 are intended to "*Protect the natural resources, environmental rights and values secured by PA.CONST. art. I, § 27 and conserve and protect the water quality, natural regime, and carrying capacity of watercourses*" (105.2(4)). However, PaDEP is constrained in its ability to evaluate the water quality impacts of PennEast's proposed pipeline location and construction due the lack of comprehensive consideration of site specific conditions.

The DEIS fails to comprehensively evaluate the following site specific conditions that can impact water quality:

Crossing Methods

Different crossing methods, including conventional dry ditch, conventional bore, and Horizontal Directional Drilling (HDD), are proposed depending upon the sensitivity and environmental characteristics of the resource that would be affected at each individual crossing.

While the HDD method is a proven technology, there are certain impacts that could occur as a result of the drilling such as the inadvertent release of drilling mud, which is a non-hazardous fluid comprised primarily of water, inert solids, and bentonite, a naturally occurring clay mineral. Drilling fluids that are released typically contain a lower concentration of bentonite when they surface because the bentonite is filtered out as it passes through sandy soils.

Severely Erodible Soils

Clearing activities could expose the soil to erosive elements such as precipitation and wind. The pipeline route is predominantly characterized by hills and narrow valleys, with some areas of medium to high relief. Therefore, it would be expected that the Project would affect some soils with a relatively high erosion potential.

The Project's effect on geology and soils would be highly localized and primarily limited to the construction period. Cumulative impacts would only occur if other projects are constructed during the PennEast Pipeline Project's construction period in a shared location. Construction of the Northeast Pocono Reliability Project adjacent to the PennEast Pipeline Project, an electric transmission line, could impacts soils. Compaction due to construction activity could contribute to cumulative erosion impacts on soils. Also, the US 209 Interchange Road and Freemansburg Ave interchange project could also lead soil exposure, compaction, and erosion. Large residential developments like Blue Ridge Real Estate Properties could have similar impacts.

Rugged Terrain

Steep slopes are also found along the length of the pipeline on the PennEast pipeline. The pipeline both transverses steep slopes and is located along steep slopes (requiring significant earth movement for construction). When combined with erodible soils, the ability for construction crews to manage runoff and sediment discharge from the construction site becomes more difficult. Several of these steep slope and erodible soil areas are directly adjacent to wetland or stream crossings, increasing the potential for sediment and runoff discharge to waterbodies.

Temporary erosion controls can help to slow down runoff and limit downstream sedimentation during construction, however, these measures do not address the Post-construction increases in runoff rates, volumes, and frequencies of discharge. Post-construction stormwater

management measures are required to prevent impacts to water quality, especially in HQ-CWF tributaries.

Riparian Zones

PennEast identified approximately 163 areas along the proposed pipeline, totaling 5.9 miles in length, of slopes greater than 30 percent within 200 feet of waterbody crossings, some of which are located adjacent to waterbodies. The clearing and grading of streambanks would reduce riparian vegetation and expose soil to erosional forces. The use of heavy equipment for construction could cause compaction of near surface soils, an effect that could result in increased runoff into surface waters in the immediate vicinity of the construction right-of-way. Increased surface runoff could transport sediment from uplands into surface waters, resulting in increased turbidity levels and increased sedimentation rates in the receiving waterbody. Disturbances to stream channels and streambanks could also increase the likelihood of scour after construction.

Refueling of vehicles and storage of fuel, oil, or other hazardous materials near surface waters could create a potential for contamination. If a spill were to occur, immediate downstream users of the water could experience degradation in water quality. Acute and chronic toxic effects on aquatic organisms could also result from such a spill.

Land Use and Forested Areas

The vegetation/cover types that would be crossed by the proposed Project include agricultural, forest/woodland, open land, residential, industrial/commercial, and open water. About 1,613.5 acres would be affected during the construction of the Project (consisting of about 633 acres of forested areas and 981 acres of non-forested areas). About 784 acres of this area would also be permanently affected during operation of the Project (i.e., these areas would be encompassed by the permanent right-of-way or permanent Project features); of this, about 452 acres of permanent operational impacts would occur to forested areas and 332 acres to non-forested areas.

Impacts are expected to be “short-term” in non-forested areas that are allowed to restore to preconstruction conditions, as it is expected that these non-forested areas would be successfully restored within 3 years following construction (with implementation of PennEast’s E&SCP and FERC’s Plan and Procedures). However, all impacts on forested habitats would be considered long-term because of the time (i.e., more than 30 years) required to restore woody vegetation to preconstruction conditions. About 452 acres of forest would be permanently converted to an herbaceous state (i.e., not allowed to restore to preconstruction conditions) and would be reseeded in accordance with PennEast’s E&SCP and FERC’s Plan and Procedures within the maintained portion of the permanent right-of-way and compressor station.

Impacts on forest habitat could include fragmentation and edge effects. Construction in forest lands would remove mature trees from the construction right-of-way. The loss of forest habitat and resulting edge effects could decrease the quality of habitat for forest dependent species, including alteration of habitat resulting from increased light levels and a subsequent loss of soil moisture as a result of the new forest edge.

Roadways

Roadway crossings involve potential roadway pavement impacts, potential traffic impacts and potential buried utility impacts. These impacts carry greater significance than water quality impacts to stream and wetland crossings, as

Blasting and Excavation in Streams and Wetlands

Blasting and excavation in streams and wetlands for pipeline construction has the potential for short-and long-term impacts to water quality due to erosion and disturbance during construction, permanent alterations and increased instability in the channel substrate, and long-term alterations and instability in the channel configuration and riparian buffer conditions. The DEIS notes that "If blasting in waterbodies is required, there is a potential for permanent alterations of stream channels".

PennEast proposes to develop site-specific blasting plans for each waterbody crossing where blasting is determined to be necessary. Specifically, the DEIS states that "If blasting is required, all blasting activity would be performed according to federal and state safety standards and in accordance with PennEast's comprehensive Blasting Plan to be implemented by a certified blasting contractor". This reflects the PennEast application that states (under Section 6.3.8.1 Blasting) that "PennEast will apply for and will receive a permit for the use of explosives for each perennial waterway that is proposed to be impacted by the Project…PennEast will also apply for and receive a State of New Jersey Explosives Permit Application Blasters Use Permit for areas along the alignment in New Jersey where blasting will occur".

However, information on sites that will potentially require blasting in streams and wetlands should be developed as part of the DEIS application. The PennEast application should evaluate the potential need for blasting and excavation at all proposed stream and wetland crossings, and this information should inform decisions related to stream crossing locations and construction methods, including decisions for dry crossing methods or boring or HDD. Resource Report 6, Section 6.3.8.1 Blasting (page 38) describes the general methods to be used for rock removal, ranging from ripping with a backhoe to blasting with explosives, depending on conditions, but this is general discussion language. The DEIS fails to require sufficient information to determine the potential extent of blasting at each stream or wetland crossing.

Unfortunately, the extent of potential blasting in waterways is not addressed in the DEIS. The DEIS fails to consider site specific conditions to determine whether blasting in stream channels may be required. Given the potential that blasting will be required in many stream crossings

through the length of the pipeline, the PennEast application is deficient in providing adequate information to FERC and other reviewing agencies.

Information on stream crossings where blasting may be required, with corresponding information on other site specific constraints, in provided in Attachment A.

Insert statistics Number of PennEast Stream Crossings in Potential Areas Blasting

LAND COVER CHANGES AND INCREASED STORMWATER RUNOFF AND EROSION

The DEIS and supporting application materials fail to address the permanent, long-term changes to land use cover and soil conditions, and the corresponding increase in stormwater runoff and erosion. As a result of pipeline construction, there will be permanent long-term water quality impacts related to stormwater runoff, including increases in the rate, volume, and frequency of stormwater runoff.

The DEIS indicates that about 1,613.5 acres of land will be disturbed as a result of the pipeline itself, and that 784 acres will be permanently disturbed, although comprehensive detailed land use statistic tables are not provided within the DEIS itself. In the PennEast Resource Report 8, Land Use, Recreation and Aesthetics, information in Table 8.2-2 "Land Use Affected by Construction and Operation of Pipeline Facilities" indicates that:

- 1,081.7 acres will be impacted by pipeline construction
- 711.5 acres will be permanent right-of-way
- 572.5 acres are currently forest/woodland (52.9%)
- 408.3 acres of permanent right-of-way is currently forest/woodland (57.3%)

Presumably, this is pipeline construction only and does not include other related facilities associated with pipeline construction (access roads, work spaces, etc.)

In the PennEast response to Environmental Information Request, Data Request 1, FERC notes that there are discrepancies in the overall construction impacts, and in response in Table 1.3-1 "Land Use Requirements for Pipeline Facilities" PennEast indicates that:

- 2,246.9 acres is the Total Workspace for Construction
- 777.5 acres will remain in permanent easement

It is not clear (from the PennEast response document to FERC or the DEIS) the final permanent forest/woodland area that will be converted to non-forested conditions, but based on the information in PennEast Resource Report 8, approximately 408 acres, or 57% of the <u>pipeline</u> right-of-way, is currently forested and will be permanently converted to non-forested conditions. The DEIS states that "The maintained right-of-way would be mowed no more than

once every three years, but a 10-foot-wide strip centered over the pipeline might be mowed annually to facilitate corrosion and other operational surveys. The planting of trees would be prohibited within the permanent right-of-way."[4]

Neither the DEIS nor the PennEast application materials discuss stormwater impacts on the proposed pipeline right-of-way in a meaningful manner. Rather, it is assumed that the land use conversion from forest to permanent right-of-way (with sparse vegetation, compacted soils, and little organic material) will have nominal impacts on stormwater runoff and erosion, and that these impacts will be addressed by measures such as permanent waterbars to direct runoff off of the pipeline right-of-way.

The DEIS states that:

"*Direct discharges of stormwater to surface waters would be minimized by thorough establishment of vegetative cover and implementation of PennEast's E&SCP*". [5] The DEIS goes on to conclude that "*No long-term effects on aquatic resources are anticipated as a result of construction and operation of the Project. PennEast would also implement its E&SCP to further reduce the potential for impacts related to …sedimentation and stormwater runoff*". [6] Much of this language in the DEIS is taken directly verbatim from PennEast application narrative.

However, the PennEast application Appendix E, Draft Erosion and Sedimentation Control Plan states that[7]:

> *"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 earth disturbance activities necessary for the proposed project. Permanent removal of runoff volume from the design hydrograph during earth disturbance phases was excluded from the available design alternative due to the elevated sediment loadings expected during this stage of construction".*

This statement recognizes that there will be an increase in runoff as a result of pipeline construction activities. However, the assumption is made within the DEIS that, after pipeline construction, alterations to stormwater conditions are acceptable and sufficiently addressed by limited site restoration. The application documents do not provide construction guidance to

[4] DEIS Volume 1, Page ES-9
[5] DEIS Volume 1, Page 155
[6] DEIS Volume 1, Page 162
[7] PennEast Appendix E page 20

support this assumption, as soil compaction and permanent land use cover changes will result from the pipeline construction. The soil compaction and land use cover will alter the surface hydrological response, increasing runoff and decreasing infiltration. There will be a corresponding decrease in infiltration to support stream and wetland baseflow that the DEIS fails to address.

The hydrologic response of the current forested conditions on the PennEast pipeline right-of-way is very different from the hydrologic response of the pipeline right-of-way after construction. This is a result of both soil compaction and altered surface land use conditions (from current forested conditions to sparse perennial and annual grass and weed vegetation). Natural land uses such as interior forests and wetlands rely on vegetative cover to prevent the movement of soils (and discharge of sediment) during rain events by intercepting rainfall, stabilizing soils with their roots, and protecting surface soils with leaf litter and detritus. Vegetation establishment requires soils that are uncompacted enough to allow for germination and root penetration, infiltration of rainfall, and the movement of nutrients from the surface down into the root zone.

The construction practices for pipeline installation include the use of heavy equipment with no topsoil segregation and no soil restoration unless parcels are residential or agricultural. This results in a soil profile that is highly compacted, lacking organic material, lacking macropores, and extremely reduced in its ability to retain and slow rainfall. As a result, there will be an increase in stormwater runoff, erosion, and pollutants, and a decrease in recharge to baseflow.

Previous field investigations performed by Meliora Design in temporary right-of-way (ROW) locations along the Tennessee Gas Pipeline's 300 Line Upgrade Project in Milford, Pennsylvania, demonstrated increased bulk density measurements when the ROW locations were compared to undisturbed natural areas adjacent to the pipeline ROW. Bulk density is a measure of the compaction of the soils. Severe compaction was noted within the construction ROW. Based on literature values, measured bulk densities were high enough to inhibit plant growth and infiltration.

The DEIS fails to address the fact that the proposed pipeline construction practices and long-term maintenance of the right-of-way in a non-forested condition will alter the land surface conditions and result in greater stormwater impacts. Fifty-seven percent of the pipeline route will be permanently altered from a forest canopy with varied micro-topography, absorbent soils and understory materials, to a wide, sparsely vegetated pipeline right-of-way with highly compacted soils and little organic matter. The current forested conditions generate little surface runoff and facilitate groundwater recharge to support baseflow to streams and wetlands. Forest and woodland are the highest performing land use types from a hydrologic water quality perspective, as reflected in standard engineering methodologies used to estimate

runoff. The proposed pipeline conditions will significantly reduce the land surface's ability to retain rainfall and facilitate infiltration (as also reflected in standard engineering methodologies). As a result, there will be both short- and long-term increases in stormwater runoff with associated pollutants. There will be a decrease in infiltration.

Figure 1: Existing right-of-way areas parallel to the proposed PennEast pipeline show indications of long-term erosion and lack of vegetation.

Most importantly, the fact that forest is the single largest land use to be disturbed indicates both a lack of recognition of the hydrologic and water quality benefits of forested landscapes, and a preference on PennEast's part to locate the pipeline in areas where topsoil separation and soil restoration is not required by FERC.

The Federal Energy Regulatory Commission (FERC) Guidance Manual for Environmental Report Preparation (August 2002), as well as the FERC Upland Erosion Control, Revegetation, and Maintenance Plan (May 2013) both include guidance and information for soil restoration on gas pipeline projects, and compaction mitigation requirements. However, these practices are only required for agricultural and residential areas disturbed by construction activities. These requirements include:

- segregating topsoil from other excavation materials,
- testing topsoil and subsoil for compaction at regular intervals,
- plowing severely compacted agricultural areas, including plowing the subsoil before replacing segregated topsoil, and

- performing appropriate soil compaction mitigation in severely compacted residential areas.

The fact that FERC guidance requires soil decompaction, restoration, and testing in agricultural areas confirms that pipeline construction methods adversely impact soil conditions, including the soil's ability to support vegetation. These impacts also affect forested areas, although there are no FERC requirements for soil restoration in forested areas.

FERC relies on the best management practices of other regulatory agencies to provide additional guidelines to help prevent irreversible damage to surface soils during construction, and the corresponding increase in runoff and pollutants. Specifically, regulations administered by PaDEP under 25 Pa Code Chapter 102 "*require persons proposing or conducting earth disturbance activities to develop, implement, and maintain BMPs to minimize the potential for accelerated erosion and sedimentation and to manage post-construction stormwater".*

However, PennEast does not provide additional guidelines or require soil restoration beyond FERC requirements, and assumes that reclamation regrading is sufficient for the forested portions of the pipeline. Both PennEast and FERC assumes that there is no difference between the hydrologic response of a forested woodland and the compacted, post-construction pipeline right-of-way.

Compaction in construction work spaces will not be restored by simply regrading to pre-existing contours, retilling at the surface, and reseeding the area as currently outlined in the permit application materials. Heavy equipment used in the construction of the pipeline will inherently compact work areas to depths deeper than conventional surface tilling can reach. Compaction creates conditions that inhibit the germination of plants and plant root growth. Existing topsoil will not be segregated and restored, but will be lost in the construction process. The establishment of vegetative cover within the pipeline ROW will be more difficult once surface soils are compacted, and forested woodland will not be restored.

When vegetation regrowth is limited, the likelihood of accelerated erosion is increased. When runoff cannot infiltrate, is not slowed at the surface by vegetation, and has direct contact with exposed soils, sediments are much more likely to be transported to downhill streams and wetlands. This is of specific concern on significant portions of the pipeline right-of-way in proximity to stream crossings, where soils to be disturbed by pipeline construction are classified as Severe Erosion Potential, Poor Vegetation, and Rugged Terrain with slopes greater than 30%. These areas are especially prone to erosion and sediment transport to waterbodies.

More specific information must be provided to identify areas of cumulative impact due to steep slopes, erodible soils, extent of proposed disturbance, and proximity to water resources such as wetlands or high value streams. Based on this information, site specific stormwater

management practices must be implemented to address the increase in post-construction stormwater runoff and its associated adverse water quality impacts. The DEIS fails to address stormwater and erosion impacts along the pipeline and anticipated impacts to water quality.

SITE SPECIFIC AREAS OF CONCERN

MP 40.0 TO 40.5 CARBON COUNTY

This is a forested stream valley where the pipeline and workspace will run through and along (parallel to and on top of) two small streams nestled in the valley between very steep wooded hillsides, as shown on the Erosion and Sediment Control Plan Alignment Sheet 81. This is a good example of a stream crossing area with multiple site constraints where a dry stream crossing and wide disturbance area will adversely impact water quality during and after construction. However, this information and the magnitude of the existing site constraints is not clearly communicated in the PennEast application documents, or addressed by FERC in the DEIS. The DEIS fails to comprehensively consider the site specific environmental constraints in allowing a dry cut and wide area of disturbance through this stream valley (and on top of the existing stream). This is not merely a matter of crossing a stream, the stream channel itself (for a distance of approximately 188 feet according to Table 2A-1) will need to be recreated after pipeline construction.

The extent of site constraints and stream and wetland impact can be seen on the Erosion and Sediment Control Alignment Sheet. The pipeline and its workspace are located on and immediately parallel to the small streams in this steeply sloped forested valley for over 1,200 feet. There is an existing pipeline through this valley, however, the PennEast Pipeline and right-of-way are adjacent to the existing pipeline, with the new pipeline centerline shown as 50 feet from the existing pipeline centerline. The proposed waterbars on the western portion of the pipeline right-of-way show a disturbance area of over 200 feet in width, conveying flows and discharging onto very steep slopes (greater than 30%) that discharge into the stream and wetlands. The waterbars themselves are steep for flow conveyance (4-5%).

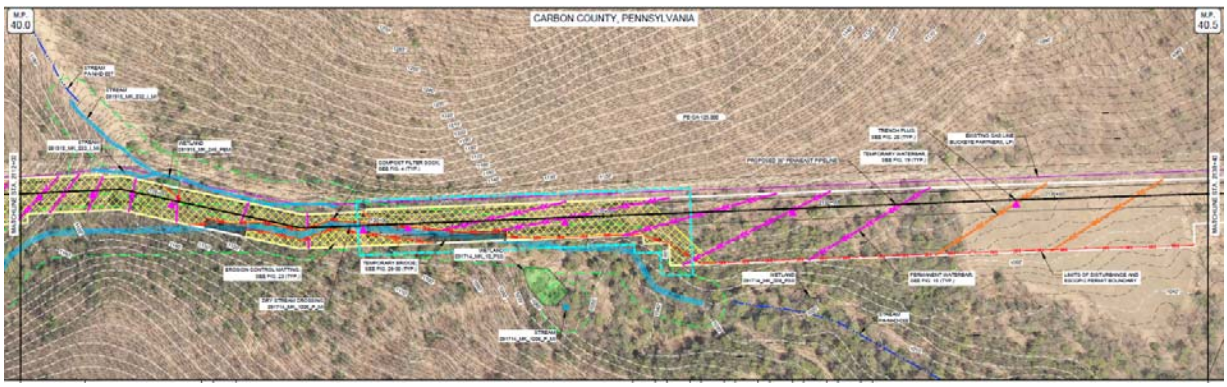

Figure 2: Erosion and Sediment Control Plan Alignment Sheet 81 MP 40.0 to MP 40.5

Resource Report 2, Table 2A-1 “Waterbodies Crossed by the Project in Pennsylvania” and updated Table 2A-1 in the PennEast application Response to (FERC) Data Request 19, only indicate a dry crossing of a minor EV wild trout stream between MP 39.9 and 40.1, although the crossing width of 188 feet for a “minor” stream is some indication of the pipeline impact along the length of this small stream. The original September 2015 Table 2A-1 in Resource Report 2 indicated an upstream drainage area of 531 acres, however, that information is missing from the updated Table 2A-1. The following important information is not conveyed in Table 2A:

- The pipeline and workspace are on top of or immediately adjacent to the parallel small streams for over 1,200 feet.
- The slopes in portions of the project area are classified as “Rugged Terrain” with slopes of 47% according to the updated Table 1.5-6 Rugged Topography in the PennEast Response to FERC Data Request 14.
- The soils are indicated as “very stony loam” and moderately erosive in Resource Report 7, Table 7.1-2 “Soil Units Crossed by the Pipeline and Important Soil Attributes.”
- The soils are indicated to have “Poor” revegetation potential.
- The area includes underlying geology with potential shallow bedrock and may require blasting according to Table 1.5-8 “Areas Where Blasting May be Required” in PennEast response to FERC Data Request 61.
- There are three wetlands in immediate proximity to the pipeline, two of which will be in the construction right-of-way.
- The pipeline construction will impact hydric soils.
- The existing conditions are forested.
- A 150-foot riparian buffer is required along EV streams in Pennsylvania, and will be removed for a distance of over 1,200 feet.

The DEIS fails to consider the multiple site specific constraints within this stream valley, and fails to consider the likelihood that these constraints will contribute to permanent reductions in in-stream water quality. The DEIS fails to consider options such as crossing this area via a boring or HDD, and reducing the workspace and pipeline right-of-way to coincide with the existing pipeline.

MP 33.0 TO 33.5 HICKORY RUN STATE PARK CARBON COUNTY

This is a forested stream valley in Hickory Run State Park where the pipeline and workspace will cross High Quality Mud Run (with a stream width of over 60 feet and a drainage area of almost 17,000 acres), as shown on the Erosion and Sediment Control Plan Alignment Sheet 67. We visited this area on July 18, 2016.

This is another example of a stream crossing area with multiple site constraints where a dry stream crossing and wide disturbance area will adversely impact water quality during and after construction, as can be seen on the Erosion and Sediment Control Alignment Sheet 67. From the north, the pipeline traverses down steep (40%) rocky slopes before crossing Mud Run and a small stream to climb the steeply sloped hillside. There is an existing pipeline through this valley, however again, the PennEast Pipeline and right-of-way are adjacent to the existing pipeline, with the new pipeline centerline shown as 50 feet from the existing pipeline centerline, creating an even wider swath of disturbance through this forested State Park. The existing waterbars from the existing pipeline show signs of erosion and sediment transport. There is easy public access to this are from State Route 903, and it appears that both pedestrians and vehicles traverse to the existing right-of-way and waterbars.

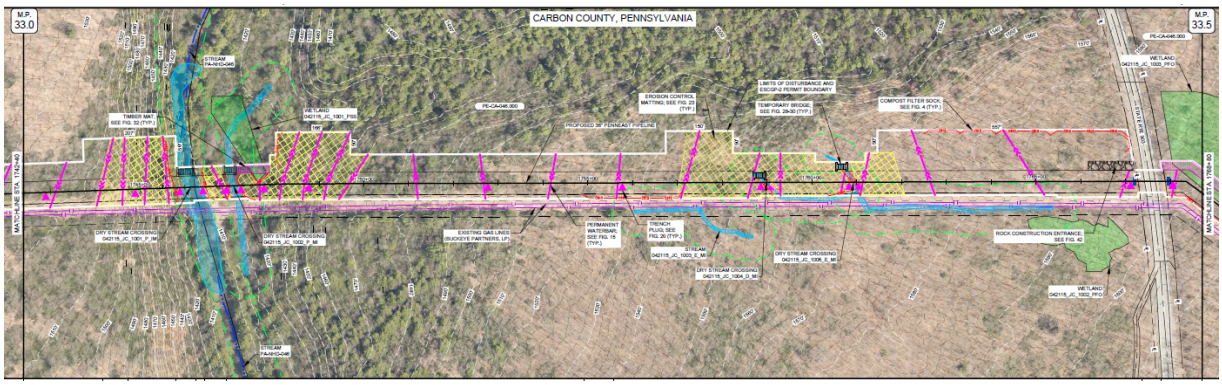

Figure 3: Erosion and Sediment Control Plan Alignment Sheet 67 MP 33.0 to MP 33.5

Figure 4: The pipeline will traverse the steep, shallow rock slopes to the north of Muddy Run. Rather than work within the existing right-of-way, the PennEast Pipeline will widen the area of disturbance by an additional 100 feet, removing existing forest on both sides of Muddy Run.

Figure 5: The existing waterbars and existing pipeline right-of-way show signs of erosion and sediment transport. The PennEast pipeline will lengthen these waterbars, increasing the flow path length and exposed soils. There is no documentation in the EIS to support assumptions that the lengthened waterbars will adequately manage stormwater and prevent erosive discharges to Mud Run.

Figure 6: The proposed pipeline will remove existing established forest on both sides of Muddy Run, widening the existing right-of-way. The ATWS area on either side of Muddy Run will result in a clearing over 150 feet wide.

Figure 7: the stone substrate in Mud Run may require blasting for construction.

Resource Report 2, Table 2A-1 "Waterbodies Crossed by the Project in Pennsylvania" and updated Table 2A-1 in the PennEast application Response to (FERC) Data Request 19, only indicate a dry crossing of a minor EV wild trout stream between MP 32.9 and 33.1, with a crossing width of 48 feet. The original September 2015 Table 2A-1 in Resource Report 2 indicated an upstream drainage area of 16,960 acres, however, that information is missing from the updated Table 2A-1. The following important information is not conveyed in Table 2A:

- The pipeline and workspace are adjacent to the existing pipeline and will create a wider swath of disturbance through Hickory Run State Park.
- The slopes in portions of the project area are classified as "Rugged Terrain" with slopes of 40% according to the updated Table 1.5-6 Rugged Topography in the PennEast Response to FERC Data Request 14.
- The soils are indicated as "Meckesville very stony loam" and severely erosive.in Resource Report 7, Table 7.1-2 "Soil Units Crossed by the Pipeline and Important Soil Attributes."
- The soils are indicated to have "Poor" revegetation potential. This can be seen along the existing pipeline.
- The area includes underlying geology with potential shallow bedrock and may require blasting according to Table 1.5-8 "Areas Where Blasting May be Required" in PennEast response to FERC Data Request 61. Observed stream conditions indicate a rock substrate.

- There is a forested wetland in immediate proximity to the pipeline, a portion of which will be cleared.
- The pipeline construction will impact hydric soils.
- The existing conditions are forested.
- The existing forested riparian buffer along Mud Run will be removed for a distance of approximately 200 feet on each side.

The DEIS fails to consider the multiple site specific constraints within this stream valley, and fails to consider the likelihood that these constraints will contribute to permanent reductions in in-stream water quality. The DEIS fails to consider options such as crossing this area via a boring or HDD, and reducing the workspace and pipeline right-of-way to coincide with the existing pipeline.

MP 34.5 TO 35. MOUNTAIN VIEW ESTATES CARBON COUNTY

This is a heavily forested stream and wetland area in Mountain View Estates where the pipeline and workspace will include three stream crossings and run parallel to the stream, as shown on the Erosion and Sediment Control Plan Alignment Sheet 70. With property owner permission, we visited this area on August 4, 2016. Despite a dry summer with low rainfall, conditions were wet when we visited the site.

In this area, an access road will cross and be constructed on top of a small stream. The access road will be perpendicular to the pipeline, which runs adjacent to the stream for approximately 200 feet. The pipeline then crosses two additional streams and a wetland. Only two streams are listed in Resource Report 2, Table 2A-1 "Waterbodies Crossed by the Project in Pennsylvania" and updated Table 2A-1 in the PennEast application Response to (FERC) Data Request 19. The steams are listed as EV Wild Trout Waters. All crossings are proposed as dry crossings.

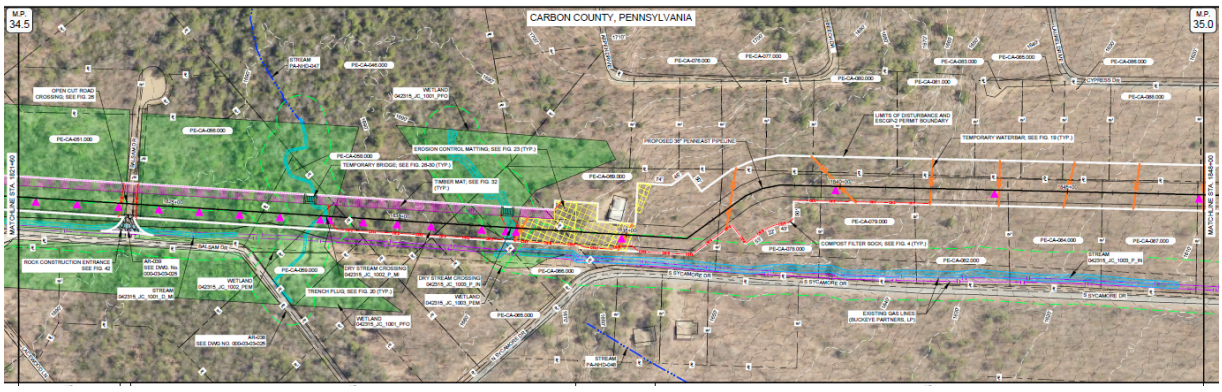

Figure 8: Erosion and Sediment Control Plan Alignment Sheet 70 MP 34.5 to MP 35.0

Figure 9: Stream designated as "dry stream," in Mountain View Estates. Stream is wet after dry weather.

The following important site specific information is not conveyed in Table 2A or addressed in the DEIS:

- The pipeline and workspace are adjacent to existing pipelines but will create a wider swath of disturbance as the PennEast pipeline is adjacent to and outside the right-of-way of the existing pipelines.
- The soils are indicated as "Papakating silty clay loam".in Resource Report 7, Table 7.1-2 "Soil Units Crossed by the Pipeline and Important Soil Attributes." This soil is moderately erosive.
- The soils are indicated to have "Poor" revegetation potential. This can be seen along the existing pipeline.

- There is a forested wetland in immediate proximity to the pipeline, a portion of which will be cleared.
- The pipeline construction will impact hydric soils.
- The existing conditions are forested.
- The existing forested riparian buffer will be removed for significant distances (approximately 200 feet) as the pipeline is parallel to the stream.

Again, the DEIS fails to consider the multiple site specific constraints within wooded wetland stream area, and fails to consider the likelihood that these constraints will contribute to permanent reductions in in-stream water quality. The DEIS fails to consider options such as crossing this area via a boring or HDD, and reducing the workspace and pipeline right-of-way to coincide with the existing pipeline.

ATTACHMENT A