



PennEast Pipeline Company, LLC

## **PENNEAST PIPELINE PROJECT**

*Project Description*

**February 2016**



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## **Acronyms and Abbreviations**

Algonquin	Algonquin Gas Transmission, LLC
ANSI	American National Standards Institute
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
ATWS	additional temporary workspace
BMPs	best management practices
CFR	Code of Federal Regulations
CWA	Clean Water Act
CWS	construction work space
Dth/Day	dekatherms per day
E&SCP	Erosion and Sediment Control Plan
ETG	Elizabethtown Gas
FERC	Federal Energy Regulatory Commission
HDD	horizontal directional drill
hp	horsepower
ISO	International Organization for Standardization
JPA	Joint Permit Application
MP	milepost
NEPA	National Environmental Policy Act
NJDEP	New Jersey Department of Environmental Protection
NPS	National Park Service
NRCS	Natural Resources Conservation Service
O&M	operation and maintenance
PADEP	Pennsylvania Department of Environmental Protection
PennEast	PennEast Pipeline Company, LLC
PFBC	Pennsylvania Fish and Boat Commission
PGC	Pennsylvania Game Commission



PHMC	Pennsylvania Historical and Museum Commission
PSEG	Public Service Enterprise Group
ROW	right-of-way
RTE	Rare, Threatened, and Endangered
SPCC	Spill Prevention, Control, and Countermeasures
T&E	Threatened and Endangered
Tcf	trillion cubic feet
TCO	Columbia Gas Transmission
Texas Eastern	Texas Eastern Transmission, LP
Transco	Transcontinental Gas Pipe Line Company, LLC
TWS	temporary workspace
UGI Utilities, Inc.	UGI-LEH
UGIES	UGI Energy Services
USACE	U.S. Army Corps of Engineers
USDOT	U.S. Department of Transportation



## **1.0 GENERAL PROJECT DESCRIPTION**

PennEast Pipeline Company, LLC (PennEast) is proposing the PennEast Pipeline Project (Project). The Project will entail the construction of approximately 114.6-miles of 36-inch diameter pipeline from Luzerne County, Pennsylvania to Mercer County, New Jersey. The Hellertown Lateral, an approximately 2.1-mile lateral of 24-inch diameter pipe, will be constructed in Northampton County, Pennsylvania. This lateral will serve as an Interconnect with Columbia Gas Transmission (TCO) and UGI Utilities, Inc. (UGI-LEH). The Lambertville Lateral, an approximately 1.4-mile lateral of 36-inch diameter pipe, will be constructed in Hunterdon County, New Jersey. This lateral will serve as an Interconnect with Algonquin Gas Transmission, LLC (Algonquin) and Texas Eastern Transmission, LP (Texas Eastern). The associated aboveground infrastructure for the Project will consist of interconnect meter stations, mainline block valves, and a single compressor station and their appurtenant facilities and equipment (e.g., pig launchers/receivers, milepost markers, cathodic protection test posts, etc.). Construction of the Project is expected to commence during the first quarter of 2017 to meet the in-service date of October 2017.

The Federal Energy Regulatory Commission (FERC) is the designated lead agency for the Project. On September 24, 2015, PennEast filed an application with the FERC for a Certificate of Public Convenience and Necessity. FERC, through its National Environmental Policy Act (NEPA) guidelines, will consult with appropriate agencies on endangered species, historic properties, essential fish habitat and migratory birds. FERC will also evaluate alternatives for the Project, including the No Action alternative, system alternatives, and route alternatives. A certificate will be issued when FERC has determined that the Project meets the requirements of their guidelines.

This application is being submitted jointly to the Pennsylvania Department of Environmental Protection (PADEP) for review and coordination of the Title 25 Chapter 105 Dam Safety and Waterway Management and authorization of Section 401 Water Quality Certification of the Clean Water Act (CWA), and to the U.S. Army Corps of Engineers (USACE) Philadelphia District for compliance of CWA Section 404 through an Individual Permit. This Project Description details the components of the Project located within the state of Pennsylvania. Impacts associated with the New Jersey portion of the Project will be reviewed by the New Jersey Department of Environmental Protection (NJDEP).

### **1.1 PROPOSED FACILITIES**

#### **1.1.1 Purpose and Need (for the entire Project as defined for FERC)**

PennEast proposes to construct, install and operate the Project facilities to provide approximately 1.1 million dekatherms per day of year-round transportation service from northern Pennsylvania to markets in New Jersey, eastern and southeastern Pennsylvania, and surrounding states.

The Project is designed to provide a long-term solution to bring the lowest cost natural gas available in the country, produced in the Marcellus Shale region in northern Pennsylvania, to homes and businesses in New Jersey, Pennsylvania and surrounding states. The Project facilities include a 36-inch diameter, 114.6-mile mainline pipeline, extending from Luzerne County, Pennsylvania, to Mercer County, New Jersey. The Project will extend from various receipt point interconnections in the eastern Marcellus



region including interconnections with: Transcontinental Gas Pipe Line Company, LLC (Transco) and gathering systems operated by Williams Partners L.P., Energy Transfer Partners, L.P. (formerly Regency Energy Partners, LP), and UGI Energy Services, LLC (UGIES), all in Luzerne County, Pennsylvania, to various delivery point interconnections in the heart of major northeastern natural gas-consuming markets, including; interconnections with UGI Central Penn Gas, Inc. (Blue Mountain) in Carbon County, Pennsylvania, UGI-LEH, and TCO in Northampton County, Pennsylvania, and ETG, NRG REMA, LLC, Texas Eastern, and Algonquin in Hunterdon County, New Jersey. The terminus of the proposed PennEast system will be located at a delivery point with Transco in Mercer County, New Jersey.

The Project was developed in response to market demands in New Jersey and Pennsylvania, and interest from shippers that require transportation capacity to accommodate increased demand and greater reliability of on natural gas in the region. The Project will include a new pipeline and aboveground facilities that will provide a new source of natural gas supply from the Marcellus Shale producing region to New Jersey, Pennsylvania and surrounding states, enhancing the region's supply diversity. The Project is designed to provide a new pipeline to serve markets in the region with firm, reliable access to the Marcellus supplies versus the traditional, more costly Gulf Coast regional supplies and pipeline pathways. An additional supply of natural gas to the region will provide a benefit to consumers, utilities, and electric generators by providing enhanced competition among suppliers and pipeline transportation providers. The Project will satisfy the needs of shippers seeking (i) additional supply flexibility, diversity and reliability; (ii) liquid points for trading in locally produced gas from the Marcellus Shale and the Utica Shale; (iii) direct access to premium markets in the northeast and mid-Atlantic regions; (iv) the ability to capture pricing differentials between the various interconnected market pipelines; (iv) enhanced natural gas transportation system reliability to the region with modern, state-of-the art facilities and (v) firm access to currently the most affordable long-lived dry gas reserves. The Project will provide shippers additional opportunities to buy and sell supplies and to transport natural gas to where it is needed and valued most. The Project also offers shippers a reliable, short-haul transportation option for direct access to Marcellus Shale natural gas supplies absent several risks associated with long-haul pipelines originating and traversing other regions of the country.

PennEast held an Open Season for the Project from August 11, 2014 to August 29, 2014, and has executed long-term binding precedent agreements with 12 shippers for approximately 90 percent of the firm transportation capacity to be created by the Project. A complete list of these shippers is identified in Table 1.1-1. As such, the Project is fully consistent with the FERC's Statement of Policy on the Certification of New Interstate Natural Gas Pipeline Facilities. PennEast continues to negotiate with other potential shippers, the combination of which could fully subscribe the capacity of the proposed Project facilities. Notably, a majority of the Project shippers are regional electricity generators and local natural gas distribution companies.



**Table 1.1-1  
 PennEast Customers and Transportation Capacity Subscribed to the Project**

Shipper	Transportation Contract Quantity (Dth/Day)
New Jersey Natural Gas Company	180,000
PSEG Power, LLC	125,000
Texas Eastern Transmission	125,000
South Jersey Gas Company	105,000
Consolidated Edison Company	100,000
Pivotal Utility Holdings, Inc. (d/b/a Elizabethtown Gas)	100,000
UGI Energy Services, LLC	100,000
Cabot Oil & Gas Corporation	50,000
Talen Energy Marketing, LLC	50,000
Enerplus Resources (USA) Corporation	30,000
Warren Resources, Inc.	15,000
NRG REMA, LLC	10,000
<b>Total</b>	<b>990,000</b>

Dth/Day = dekatherms per day

### 1.1.1.1 Project Shippers

As is demonstrated by the make-up of the Project shippers, the Project is primarily driven by the demand markets. Several of the Project shippers have provided information regarding their rationale for committing to Project capacity so that PennEast could provide that information to the FERC and other federal and state agencies. PennEast provides this information below.

#### New Jersey Natural Gas

Following Superstorm Sandy, New Jersey Natural Gas undertook a comprehensive initiative to increase the reliability of its distribution system. As a result, New Jersey Natural Gas intends to receive natural gas from additional supply points to eliminate single points of failure. PennEast will provide stable, low-cost natural gas that will provide supply and pipeline diversity to New Jersey Natural Gas for Monmouth and Ocean counties. PennEast also provides an opportunity for New Jersey Natural Gas to restructure its gas supply portfolio.

#### Pivotal Utility Holdings, Inc. (d/b/a Elizabethtown Gas)





ETG has both a current need and a long-term planning need for new capacity in New Jersey. The Project provides a unique option to economically increase the reliability of firm pipeline transportation in a market area where the availability of new pipeline and peak shaving capacity is constrained. More direct-connected interstate supply options allow for less reliance on the continued addition of supplemental on-system peak shaving facilities or the use of third-party, delivered peaking supplies to meet growing firm customer demand. Additionally, service from PennEast will increase ETG's system reliability. Existing interstate natural gas pipelines to the northwest portion of ETG's territory are fully subscribed and recent expansions have been costly. PennEast will deliver to the northwestern portion of ETG's system, thereby significantly reducing, if not eliminating, the need to rely on third-parties for bundled, city-gate delivered supplies.

ETG has subscribed to service from PennEast to increase supply diversification for ETG's current customers, and to provide capacity from new sources to serve the immediate and long-term growth in ETG's service territory. Service from PennEast will provide an important new source of firm gas supply that can also help ETG extend service to more communities as significant opportunities develop. In an effort to extend gas service to more customers, over the next three years, ETG intends to work with local municipal and county officials, local and state economic development authorities, community leaders, and the New Jersey Board of Public Utilities to find affordable solutions that will allow ETG to extend additional service within communities near the Project.

#### PSEG Power LLC

Public Service Enterprise Group (PSEG), as the largest utility in New Jersey and one of the largest buyers of Marcellus Shale supplies in the northeast, intends to utilize the supplies of gas from the proposed Project to displace more expensive supplies of gas from the Gulf of Mexico. PSEG has utilized supply from the shale region over the last several years to lower retail gas rates to its residential gas customers resulting in these customers having the lowest retail rates in New Jersey. The Project will provide additional lower cost, reliable supplies from Pennsylvania that will support these lower rates. In addition, the Project will be utilized to meet the needs of the PSEG gas-fired generation fleet during times of the year when the capacity is surplus to the residential customer. Finally, the physical layout of the Project, with direct connections to Transco and Texas Eastern systems in New Jersey, will provide additional operational flexibility for the PSEG distribution system, allowing multiple downstream deliveries based on need and economics.

#### South Jersey Gas Company

The Project will provide a new natural gas supply from a stable low cost source, displacing supplies which have been subject to extreme price volatility. This became very apparent during the 2013-14 and 2014-15 winter seasons when the Northeast market experienced unprecedented price spikes. Unparalleled high commodity costs were ultimately passed on to consumers. The Project looks to leverage South Jersey Gas Company's (South Jersey) close proximity to Marcellus production and create a lower, more stable price environment, which will benefit all South Jersey customers.

South Jersey's capacity portfolio is uniquely positioned to take advantage of the Project because the Company currently has interstate pipeline capacity with a receipt point very close to the terminus of the Project. These conditions will allow for the displacement of supplies that could be very expensive with much lower, secure supply prices. Acquisition of PennEast capacity will allow South Jersey to



restructure its capacity portfolio to further lower overall costs to its Basic Gas Supply Service customers. PennEast will also provide additional operational flexibility and reliability for South Jersey by connecting South Jersey's distribution system to an additional upstream pipeline. The available capacity will provide lower commodity costs, which will feed new load into the South Jersey distribution system, including several natural gas-fired power plants. The project also falls completely in line with the goals of New Jersey's Energy Master Plan.

#### Texas Eastern Transmission, LP

The Project provides Texas Eastern with direct access to the eastern Marcellus, which allows Texas Eastern to increase supply diversity and optionality for its shippers and for markets that it serves in the region.

#### UGI Energy Services, LLC

UGIES is one of the largest gas marketers in the Mid-Atlantic providing retail natural gas, liquid fuels, and electricity to approximately 19,000 residential, commercial and industrial customers at more than 43,000 locations. UGIES serves these customers through the distribution systems of 39 local utilities across Pennsylvania, New Jersey, Delaware, New York, Ohio, Maryland, Massachusetts, Virginia, North Carolina, South Carolina and the District of Columbia. In addition, UGIES directly provides firm wholesale supply services to utilities in support of their obligations to provide reliable natural gas to their customers, including essential needs such as residential heating, nursing homes, etc. In order for UGIES to provide firm service to both its retail and wholesale customers, UGIES owns and operates physical supply assets including; liquefied natural gas facilities, electric generation plants, and propane storage facilities, and directly contracts for interstate storage and pipeline capacity.

Based on the growing demand for natural gas in Pennsylvania and New Jersey, UGIES has determined the Project would be a safe, reliable and valuable source of additional supply for meeting the needs of retail and wholesale customers in these states. By including capacity from the Project as part of UGIES' natural gas portfolio, UGIES will be able to provide an abundant supply of natural gas produced from the low cost, local Marcellus Shale region to its customers. The anticipated benefits of the PennEast infrastructure will be increased reliability and the potential for decreased energy pricing for all users.

### **1.1.1.2 Energy Market Outlook**

A review of the Annual Energy Outlook 2014 (Energy Information Administration 2014) reference case indicates that natural gas consumption will rise from 25.6 trillion cubic feet (Tcf) in 2012 to 31.6 Tcf in 2040.

The pipeline capacity that PennEast will create will not simply provide additional supply to the nearby markets; it will provide new supply sources as well. The winter of 2013-14 demonstrated that there were significant constraints in the natural gas supply system created by a combination of increased demand from residential, commercial and industrial conversions; cold weather affecting traditional demand; and new natural-gas fired power generation. While natural gas prices have steeply declined over the last several years, constraints between supply and demand areas due to lack of sufficient pipeline capacity, particularly on days where demand is highest, led to unprecedented spikes in the cost of natural gas and electricity for the market region as illustrated in Figure 1.1-1. Figure 1.1-2 highlights the high price



increases experienced during the 2013-2014 winter. In fact, Concentric Energy Advisors performed a study titled “Estimated Energy Market Savings from Additional Pipeline Infrastructure Serving Eastern Pennsylvania and New Jersey” that conservatively estimates the energy consumers in New Jersey and Pennsylvania could save approximately \$893.4 million annually if 1 billion cubic feet per day of additional capacity, such as that offered by PennEast, had been available to deliver additional natural gas supplies to the region. These savings would take form by way of increased disposable income to families and businesses.

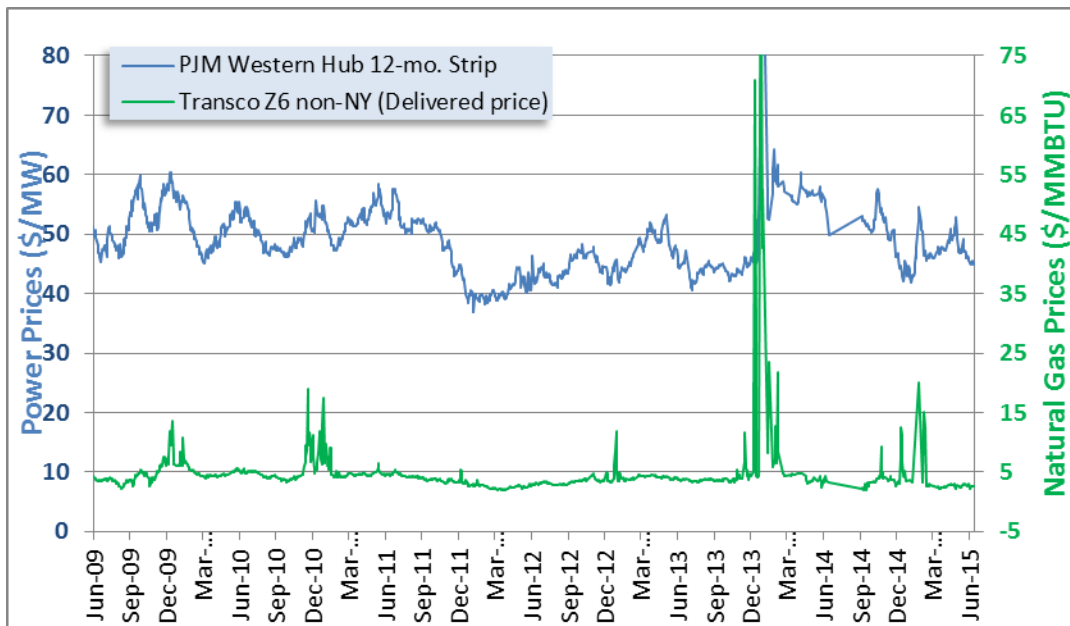
While the extreme pricing events of the 2013-2014 winter were not as significant in the 2014-2015 winter for a number of external factors, (such as lower oil prices, relative timing of the colder weather during the winter, etc.) the sustained difference between natural gas prices in the northeast Pennsylvania production region and the market regions served by the Project were significant and lasted longer. This is shown in Figure 1.1-3. The blue line represents basis pricing in the production region relative to Henry Hub, and the red line shows basis pricing in the market region. The green line shows the difference or the opportunity for savings for consumers if the inexpensive supply could be efficiently accessed. The line of best fit demonstrates the trend of increasing opportunity for savings. It should be noted that some of the external factors, such as lower oil prices, experienced during the 2014-15 winter were temporary conditions that resulted in a lower disincentive to switch from natural gas when prices climbed, providing a sort of external cap on prices. If these conditions reversed, without new infrastructure, it could have a devastating impact on energy supply to the markets served by the Project.

The lack of a new pipeline with access to supply sources in Pennsylvania combined with increasing demand throughout the region will continue to create dramatic seasonal price fluctuations in New Jersey, Pennsylvania, and surrounding states with higher gas and electric rates and an increased potential for energy shortages during peak demand, resulting in threats to business continuity, public safety and national security. Failure to add critical new infrastructure will also prevent these markets from fully realizing the economic benefit of lower-cost energy supply. Continued increases in demand for natural gas across all market sectors, particularly for natural gas-fired power generation, conversions from other fossil fuels and increased usage in the transportation markets will further exacerbate this problem or otherwise not be met if new infrastructure is not constructed. Higher energy prices reduce disposable income for residents, increase operating costs thereby decreasing competitiveness for businesses and upward pressure on personal income tax rates resulting from lower business income tax base. Accordingly, the Project is designed to bring the lowest cost natural gas available in the country to homes and businesses and to provide low-cost fuel to power generation that supplies New Jersey, Pennsylvania and surrounding states well beyond the Project footprint. Figures 1.1-4 and 1.1-5 illustrate the growing importance of natural gas fired generation expected on the electric system between 2012 and 2040 that will significantly contribute to an increased demand for natural gas. Figure 1.1-6 shows the PJM capacity fuel mix as of December 1, 2014. Further, the proposed Project will help to spur economic growth in New Jersey, Pennsylvania and surrounding states by providing an abundant supply of low-cost energy, making the region more competitive.

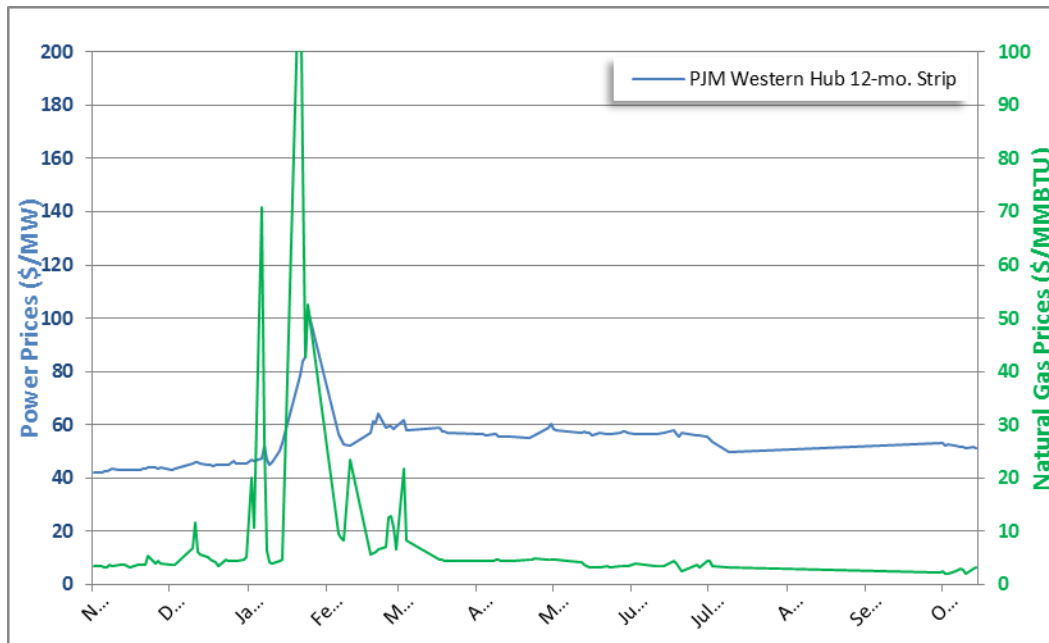
In addition to the long term benefits offered by the Project, such as enhanced system reliability, supply diversity, modernization of the natural gas infrastructure system, and significant consumer savings, there are also significant short term benefits provided by the Project. The design, construction, and engineering phases of the project are expected to produce a significant economic benefit/boom to the region. Drexel University’s highly renowned School of Economics and Econsult Solutions constructed a standard input-output model of the Project’s expenditures. The study titled “PennEast Pipeline Project Economic Impact

Analysis” estimates over \$1.6 billion in economic benefits, 12,160 jobs supported from the investment and \$740 million in labor income generated from Project’s design and construction. Importantly, Drexel and Econsult also estimated for every \$10 million in increased disposable income resulting from reduced energy costs, this would generate a total economic impact of \$13.5 million and support 90 jobs. Therefore, combined with the \$893 million of potential annual energy savings estimated by Concentric as described earlier, PennEast represents a potential ongoing annual economic benefit of \$1.21 billion and 8,041 jobs to the region.

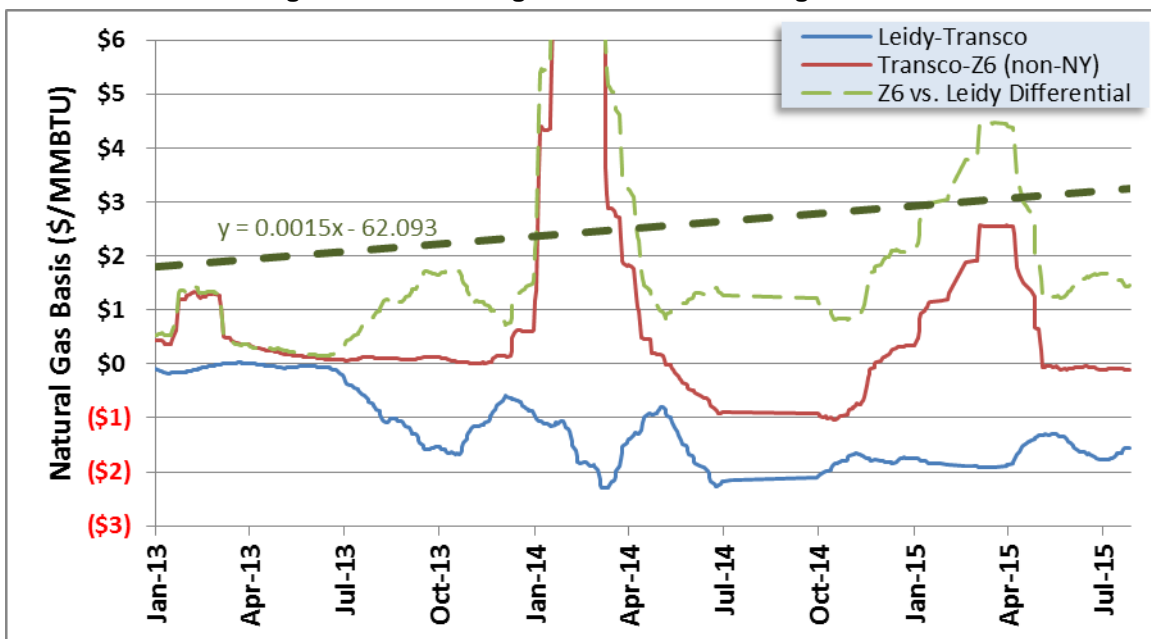
**Figure 1.1-1  
 Historic Regional Power and Natural Gas Prices**



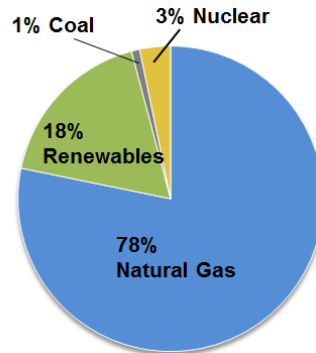
**Figure 1.1-2**  
**Regional Power and Natural Gas Prices – November 2013 through October 2014**



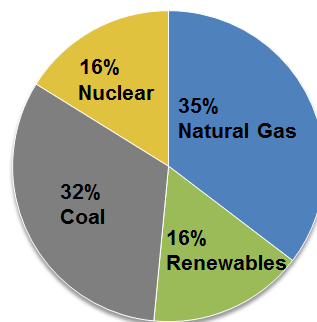
**Figure 1.1-3**  
**Production Region vs. Market Region Natural Gas Pricing in Winter 2014-2015**



**Figure 1.1-4<sup>1</sup>  
Capacity Additions by Fuel – 2012-2020**



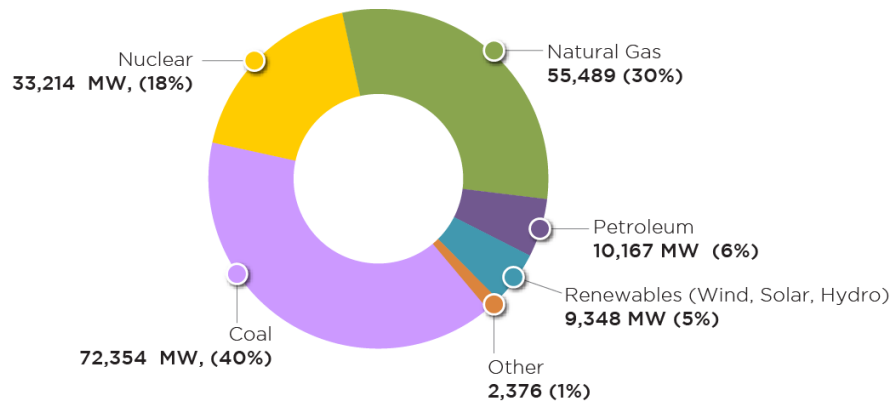
**Figure 1.1-5<sup>2</sup>  
Projected Capacity Fuel Mix – By 2020**



<sup>1</sup> Energy Information Administration Annual Energy Outlook 2014

<sup>2</sup> Energy Information Administration Annual Energy Outlook 2014

**Figure 1.1-6  
PJM Capacity Fuel Mix – December 1, 2014**



## **1.1.2 Location and Description of Facilities**

### **1.1.2.1 Pipeline Facilities in Pennsylvania**

The Project’s pipeline facilities in Pennsylvania include more than half of the PennEast mainline route pipeline and the 24-inch Hellertown Lateral. These pipeline facilities are summarized on Table 1.1-2, which provides the proposed Project’s pipeline installations, pipeline diameter, approximate length, milepost (MP), and county. Table 1.1-3 provides the proposed Project’s mainline installations by municipality and county. Table 1.1-4 identifies the latitude / longitude at each point where the pipeline crosses a county boundary. The Project location map in Section 11 of the Joint Permit Application (JPA) shows the regional location of the Project.

- The PennEast mainline route pipeline will be an approximately 114.6-mile long new pipeline starting in Luzerne County, Pennsylvania and extending to Mercer County, New Jersey. Approximately 77.4 miles of the mainline route pipeline is located in Pennsylvania. Pennsylvania counties traversed include Luzerne, Carbon, Northampton, and Bucks.
- The 24-inch Hellertown Lateral will be an approximately 2.1-mile new pipeline in Northampton County, Pennsylvania.



**Table 1.1-2  
 Pipeline Facilities in Pennsylvania**

Facility	Pipeline Diameter and Type	Approx. Length* (miles)	Begin MP	End MP*	State	County
PennEast Mainline Route Pipeline	36-inch new pipeline	77.4	0.0	77.6	PA	Luzerne, Carbon, Northampton, Bucks
Hellertown Lateral	24-inch new pipeline	2.1	71.5	HL-2.1	PA	Northampton

\*MP = milepost; MPs shown are based on alignment sheet information. Approximate mileage may be slightly off due to rounding and station equations.

**Table 1.1-3  
 Mainline Pipeline by Pennsylvania Municipality**

Township	Approximate Mileage <sup>1</sup>	County
<b><i>PennEast Mainline</i></b>		
Dallas Twp	1.3	Luzerne
Kingston Twp	2.9	Luzerne
West Wyoming Boro	1.8	Luzerne
Wyoming Boro	1.1	Luzerne
Jenkins Twp	1	Luzerne
Plains Twp	4.2	Luzerne
Lafin Boro	0.0 <sup>2</sup>	Luzerne
Bear Creek Twp	10.4	Luzerne
Kidder Twp	10	Carbon
Penn Forest Twp	7.6	Carbon
Towamensing Twp	6.4	Carbon
Lower Towamensing Twp	4.1	Carbon
Lehigh Twp	2.4	Northampton
Moore Twp	6.9	Northampton
East Allen Twp	0.8	Northampton
Upper Nazareth Twp	2.8	Northampton
Lower Nazareth Twp	3.1	Northampton
Bethlehem Twp	3.8	Northampton
Easton City	0.1	Northampton





Township	Approximate Mileage <sup>1</sup>	County
Lower Saucon Twp	1.3	Northampton
Williams Twp	3.5	Northampton
Durham Twp	1.5	Bucks
Riegelsville Boro	0.2	Bucks

<sup>1</sup> MPs are shown are based on alignment sheet information. Approximate mileage may be slightly off due to rounding.  
<sup>2</sup> Less than 0.05 miles of the proposed PennEast mainline pipeline crosses Laflin Boro.

**Table 1.1-4  
 Mainline Pipeline Latitude/Longitude County Crossings in Pennsylvania**

County Crossings	Approximate Coordinates Associated with the County Crossings	Approximate MP Range within each Pennsylvania County
Exit Luzerne / Enter Carbon	N 41° 07' 53.18" W 75° 41' 17.61"	Luzerne 0.0-23.0
Exit Carbon / Enter Northampton	N 40° 48' 24.21" W 75° 31' 45.68"	Carbon 23.0-51.2
Exit Northampton / Enter Bucks	N 40° 36' 00.12" W 75° 12' 57.71"	Northampton 51.2-75.9
Exit Bucks / Enter New Jersey	N 40° 35' 02.28" W 75° 11' 35.43"	Bucks 75.9-77.6

<sup>a</sup> MPs are shown are based on alignment sheet information. Approximate mileage may be slightly off due to rounding and station equations.

### 1.1.2.2 Aboveground Facilities in Pennsylvania

The Project will make use of a single compressor station that will serve the entire line, providing sufficient throughput with an aggregate of approximately 47,700 International Organization for Standardization (ISO) horsepower (hp) of compression. PennEast has identified a proposed compressor station site at approximate milepost 26.6 in Kidder Township, Carbon County, Pennsylvania. Additional aboveground facilities include meter stations, mainline valves, and pig launcher/receivers. The latitude/longitude location coordinates for the facility locations are listed in Table 1.1-5 below.

### 1.1.2.3 Compressor Station

The PennEast Kidder Compressor Station will be a new facility. PennEast has identified a proposed location on an approximately 60-acre undeveloped, forested site in Carbon County, Pennsylvania. The proposed facility components include three gas turbine-driven Solar Mars 100 units rated at 15,900 hp each under ISO conditions (47,700 total ISO hp).



#### **1.1.2.4 Other Facilities**

Various associated aboveground facilities including interconnects, launchers, receivers, and mainline block valves will be constructed to support the pipeline system. Table 1.1-5 provides a list of the associated facilities.



**Table 1.1-5  
 Aboveground Facilities in Pennsylvania**

Facility Location	Type	New/Modified	MP <sup>a</sup>	State	Municipality	County	Coordinates
PennEast Mainline	<b>Upper Susquehanna River Basin</b>						
	Wyoming Interconnect (Energy Transfer Partners, L.P.)	New	0.0	PA	Dallas Twp	Luzerne	N 41°20'48.42"W 75°56'43.03"
	Springville Interconnect (Williams Partners LP)	New	0.3	PA	Dallas Twp	Luzerne	N 41° 20' 45.48" W 75° 56' 27.14"
	Auburn (UGI Energy Services, LLC) and Leidy Interconnects (Transcontinental Gas Pipe Line Company, LLC)	New	4.5	PA	West Wyoming Boro	Luzerne	N 41° 19' 10.50" W 75° 52' 39.58"
	Mainline Block Valve 1	New	8.2	PA	Plains Twp	Luzerne	N 41° 17' 28.84" W 75° 49' 49.69"
	<b>Upper Delaware River Basin</b>						
	Mainline Block Valve 2	New	19.6	PA	Bear Creek Twp	Luzerne	N 41° 10' 50.39" W 75° 41' 48.57"
	Kidder Compressor Station	New	26.6	PA	Kidder Twp	Carbon	N 41° 04' 54.98" W 75° 39' 53.47"
	Mainline Block Valve 3	New	32.2	PA	Kidder Twp	Carbon	N 41° 00' 56.04" W 75° 37' 02.73"
	Mainline Block Valve 4	New	46.1	PA	Towamensing Twp	Carbon	N 40° 51' 40.41" W 75° 31' 49.92"
Blue Mountain Interconnect (UGI Central Penn Gas, Inc.)/Mainline Block Valve 5	New	51.0	PA	Lower Towamensing Twp	Carbon	N 40° 48' 32.99" W 75° 31' 44.89"	



Facility Location	Type	New/Modified	MP <sup>a</sup>	State	Municipality	County	Coordinates
	Mainline Block Valve 6	New	56.0	PA	Moore Twp	Northampton	N 40° 46' 46.64" W 75° 27' 24.94"
	Mainline Block Valve 7	New	62.2	PA	Upper Nazareth Twp	Northampton	N 40° 43' 49.58" W 75° 21' 58.76"
	Hellertown Launcher & Mainline Launcher/Receiver/Mainline Block Valve 8	New	71.6	PA	Lower Saucon Twp	Northampton	N 40° 38' 00.91" W 75° 16' 44.99"
<b>Upper Delaware River Basin</b>							
Hellertown Lateral	TCO (Columbia Gas Transmission, LLC) and UGI-LEH (UGI Utilities, Inc.) Interconnects	New	HL-2.1	PA	Lower Saucon Twp	Northampton	N 40° 36' 29.94" W 75° 18' 00.50"
<sup>a</sup> MPs shown are based on alignment sheet information and are based on pipeline centerline. Approximate mileage may be slightly off due to rounding and station equations.							

## 1.2 LAND REQUIREMENTS

The construction workspace for the Project will include temporary workspace (TWS), additional temporary workspace (ATWS), permanent right-of-way (ROW), access roads, and contractor yards. Table 1.2-1 includes a summary of all land requirements for construction (temporary impacts) and operation (permanent impacts) of the Project within Pennsylvania, including temporary access roads and staging areas. Additional details regarding the Project’s land requirements follow the table.

The aerial photo-based alignment sheets are included in JPA Section 8 and depict the location and configuration of temporary and permanent construction workspace required for the Project. The U.S. Geological Survey figure included in JPA Section 11 depicts the location of all proposed temporary and permanent access roads in their entirety. Typical construction workspace configurations have been provided in the Project-specific Erosion and Sediment Control Plan (E&SCP), which is located in JPA Section 8.

**Table 1.2-1  
 Land Requirements for Project Facilities in Pennsylvania**

Facility <sup>1</sup>	Approximate Length/ No. of Sites	Temporary Workspace for Construction (acres)	Additional Temporary Workspace for Construction (acres)	Permanent Easement for Construction and Operation (acres) <sup>2</sup>	Total Workspace for Construction (acres)
PennEast Mainline	77.5 (mi)/1	425.1	279.5	467.0	1171.6
Hellertown Lateral	2.1 (mi)/1	9.8	7.8	12.5	30.1
<b>Total Pipeline</b>	<b>79.6 (mi)/2</b>	<b>434.9</b>	<b>287.3</b>	<b>479.4</b>	<b>1201.6</b>
Aboveground Facilities	57.8 (ac)/13	3.3	0.9	53.6	57.8
Access Roads <sup>3</sup>	24.0 (mi)/84	82.3	0.0	6.9	89.1
Staging Areas	29.8 (ac)/8	0.0	29.8	0.0	29.8
Pipeyards	195.9 (ac)/6	0.0	195.9	0.0	195.9
<b>Total Project</b>		<b>520.5</b>	<b>513.9</b>	<b>539.8</b>	<b>1574.2</b>

1. This table does not specify valves and launcher/receivers that will be constructed on the pipeline segments since the land requirements for these facilities are within the land requirements for the pipeline segments.

2. Only includes existing permanent 50 foot ROW within limits of construction.

3. Estimated Temporary Workspace for Construction includes access roads (new and existing).

4. All units in acres and rounded to the nearest 0.1. The totals shown in this table may not equal the sum of addends due to rounding.

### 1.2.1 Pipeline Facilities

The Project requires a 50-foot-wide permanent ROW and, on average, an approximately 50-foot-wide temporary construction workspace for a nominal 100-foot-wide construction corridor. This corridor width is based on construction conditions of similar projects in the Northeast U.S. From the center of the

ditch, the spoil side of the construction ROW is proposed to be 35 feet. This footprint will accommodate segregated topsoil and serve as the primary spoil storage area. Thus, the working side of the construction ROW will typically be 65 feet wide from the center of the ditch and will serve to accommodate trench excavation, bank sloping, topsoil segregation and safe construction and restoration activities. Agricultural areas where full topsoil segregation of 12 inches deep will require an additional 25 feet of ATWS; in these areas the construction corridor will be a total of 125 feet wide. During project review, conditions evaluated include topography, soils, geologic conditions, steep slopes, bedrock, rock formations, boulders, abandoned mines, wetlands, and waterbodies, as well as proximity to existing roads, railroads, and residences. PennEast has considered these conditions along with machinery requirements needed for safe pipeline installation and future operation and maintenance (O&M) activities. As additional field surveys, landowner negotiations, agency consultations, and engineering are performed, PennEast will evaluate whether additional workspace beyond the nominal 100-foot wide corridor is necessary to safely construct the pipeline in specific locations. Conversely, PennEast will assess environmental conditions and evaluate the need to reduce the nominal 100-foot corridor in certain environmentally sensitive areas such as wetlands. The current workspace requirements are included on the aerial alignment sheets in JPA Section 8 and the estimated land requirements for pipeline construction and O&M requirements are presented in Table 1.2-1. During the final design phase of the Project, any additional staging areas and work spaces not previously identified will be included as part of the Project study area and incorporated into agency consultations, environmental permitting and resource surveys.

#### **1.2.1.1 New Pipeline ROW**

Typical construction and operation ROW widths for new pipeline along the PennEast mainline pipeline and the 24-inch diameter Hellertown Lateral are shown in Figure 1 in the E&SCP (JPA Section 8). As noted, the typical construction ROW will be 100 feet wide consisting of new 50-foot permanent easement plus an average temporary workspace of 50 feet.

Where practicable, the construction ROW has been co-located and sited adjacent to, or in proximity with existing linear facilities (pipeline or electric transmission). Where necessary, the new ROW has been sited away from existing linear facilities when there are unacceptable integrity risks, such as steep slope areas or building encroachment within the proposed ROW. Land requirements for temporary workspace is included as part of the pipeline assessment.

#### **1.2.1.2 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 are necessary beyond those available by use of existing public roads. Preliminarily, PennEast has identified 84 access roads for use during construction of the Pennsylvania portions of the Project, which are listed in Table 1.2-2. These access roads include a total length of approximately 24 miles. These access roads include use of 49 existing roads and construction or enhancement of 27 partially existing access roads. The following access roads are identified by County:

- 33 access roads – Luzerne County, Pennsylvania
- 19 access roads – Carbon County, Pennsylvania
- 30 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). Any ATWS required for access roads not identified at this time, but identified during field design, will be included in agency consultations, environmental permitting and resource surveys.

### **1.2.1.3 Pipeyards**

Table 1.2-3 identifies the Project pipeyards including applicable locations, current land use and modification, and size. Six pipeyards are proposed for use in Pennsylvania. Impacts for these temporary and other associated facilities were presented above in Table 1.2-1.

### **1.2.1.4 Staging Areas**

The Project requires eight staging areas to construct the pipeline in a safe and environmentally responsible manner. Staging areas would be sited at the beginnings and ends of construction spreads and near river crossings. Temporary impacts for these staging areas are presented in Table 1.2-1 above.

**Table 1.2-2  
 Access Roads for the Project**

Road No.	Milepost	County	Length (ft)	New/ Existing	Width	Condition	Improvement Needed	Improvement Distance (ft)	Temporary/ Permanent	Justification
AR-001	0.0	Luzerne	1398	Existing	30	Matted and dirt road	Yes	1367	Permanent	Wyoming Interconnect access
AR-002A	0.5	Luzerne	1691	Existing	30	Paved	No	0	Permanent	Springville Interconnect access
AR-002B	0.3	Luzerne	1359	Existing	30	Paved	No	0	Permanent	Springville Interconnect access
AR-003	4.4	Luzerne	1202	Existing	30	Paved and dirt road	No	0	Permanent	Leidy, Auburn Interconnect access
AR-004	5.4	Luzerne	821	New	30	Grass and forest	Yes	821	Temporary	Clearing crew access for light traffic
AR-005	6.4	Luzerne	444	Existing	30	Paved	No	0	Temporary	Light vehicle access prior to clearing and construction
AR-006	6.9	Luzerne	1000	New	30	Field	Yes	1000	Temporary	Access for open cut of Susquehanna River
AR-006A	7.1	Luzerne	1066	New	30	Grass and forest	Yes	1066	Temporary	Access for open cut of Susquehanna River
AR-007	7.3	Luzerne	869	Existing	30	Paved and dirt road	No	0	Temporary	Access to south side of Susquehanna River crossing
AR-008	8.1	Luzerne	513	Partially Existing	30	Paved and forest	Yes	97	Temporary	Access for major equipment North of Lakewood Drive
AR-009	8.1	Luzerne	134	New	30	Grass and trees	Yes	134	Temporary	Access around guard rails on N Main street
AR-010	8.5	Luzerne	185	New	30	Grass and trees	Yes	185	Temporary	Access for light equipment to support construction to the north up to North Main Street
AR-011	8.6	Luzerne	237	Partially Existing	30	Gravel and dirt road	Yes	237	Temporary	Access for light equipment to support construction to the north and south while avoiding steep terrain
AR-013	8.8	Luzerne	220	Existing	30	Gravel	No	0	Temporary	Access for heavy construction equipment
AR-014	9.1	Luzerne	507	Partially Existing	30	Gravel and forest	Yes	183	Temporary	Access for light and major equipment for construction to the north of the existing quarry
AR-014A	9.1	Luzerne	77	Existing	30	Gravel	No	0	Temporary	Access for light and major equipment for construction to the north of the existing quarry
AR-015	9.5	Luzerne	3230	Partially Existing	30	Paved and gravel	Yes	370	Temporary	Access to ROW for materials and major equipment. Access to west side of railroad.
AR-016	9.1	Luzerne	2313	Existing	30	Paved	No	0	Temporary	Access for light and major equipment for construction through the existing quarry
AR-016B	9.1	Luzerne	76	Existing	30	Paved	No	0	Temporary	Access for light and major equipment for construction through the existing quarry
AR-017A	9.1	Luzerne	1350	Existing	30	Paved and gravel	No	0	Temporary	Access for light and major equipment to the pipeyard
AR-017B	9.1	Luzerne	516	Existing	30	Paved and gravel	No	0	Temporary	Access for light and major equipment to the pipeyard and for construction through the existing quarry





AR-017C	9.1	Luzerne	57	Existing	30	Paved and gravel	No	0	Temporary	Access for light and major equipment to the pipeyard and for construction through the existing quarry
AR-021	10.0	Luzerne	400	Existing	30	Gravel	No	0	Temporary	Access to the pipeyard for light and major equipment
AR-022	10.5	Luzerne	1977	Existing	30	Gravel and forest	No	0	Temporary	Access to south side of Hwy 315 and Interstate 81 HDD
AR-022A	10.5	Luzerne	95	Partially Existing	30	Gravel and forest	Yes	50	Temporary	Access to south side of Hwy 315 and Interstate 81 HDD
AR-023	10.6	Luzerne	935	Existing	30	Gravel and dirt road	No	0	Temporary	Access to south side of Hwy 315 and Interstate 81 HDD
AR-025	12.7	Luzerne	1988	Existing	30	Gravel	No	0	Temporary	Clearing crew access for light traffic
AR-028	12.8	Luzerne	1056	Partially Existing	30	Paved and Grass	Yes	702	Temporary	Access for light and major equipment from the east for construction of the crossing of highway 476 while avoiding a major wetland
AR-029	13.0	Luzerne	2525	Partially Existing	30	Gravel and jeep trail	Yes	2525	Temporary	Access to south side of Interstate 476 crossing
AR-030	13.8	Luzerne	10994	Partially Existing	30	Gravel and forest	Yes	3314	Temporary	Access to ROW in remote area. Would minimize clearing.
AR-031	16.4	Luzerne	14122	Partially Existing	30	Forest and jeep trail	Yes	14122	Temporary	Access to ROW in remote area. Would minimize impact to and crossing of parallel creek.
AR-032	20.0	Luzerne	3387	Existing	30	Gravel	No	0	Temporary	Access to ROW and clearing in remote area.
AR-033	21.6	Luzerne	11900	Existing	30	Gravel and dirt road	No	0	Temporary	Access to ROW in remote area. Access to north side of Lehigh River crossing
AR-034	24.8	Carbon	8995	Partially Existing	30	Paved, gravel, and forest	Yes	2343	Temporary	Access to ROW in remote area. Access to south side of Lehigh River crossing
AR-035	26.7	Carbon	6186	Existing	30	Gravel	No	0	Temporary	Access to south side of Interstate 80 crossing
AR-036	28.4	Carbon	3159	Existing	30	Paved and gravel	No	0	Temporary	Access to ROW south of large wetland complex
AR-037	31.7	Carbon	420	Existing	30	Paved and gravel	No	0	Temporary	Access to Spread 2 Preferred Contractor Yard
AR-037A	31.7	Carbon	452	Existing	30	Paved and gravel	No	0	Temporary	Access to Spread 2 Preferred Contractor Yard
AR-038	31.9	Carbon	3216	Existing	30	Paved and gravel	No	0	Temporary	Access to ROW north of Mud Run during pre-clearing activities, i.e. survey
AR-039	34.3	Carbon	39	Existing	30	Gravel	No	0	Temporary	Construction access across adjacent line from Balsam Drive
AR-040	35.4	Carbon	1189	Partially Existing	30	Paved and Grass	Yes	497	Temporary	Access for light and major equipment from the north for construction to the south
AR-041	36.9	Carbon	1106	Partially Existing	30	Gravel and forest	Yes	969	Temporary	Access for light and major equipment from the south for construction to the north and construction through the wetland
AR-042	37.0	Carbon	2658	Existing	30	Gravel and forest	No	0	Temporary	Access for light and major equipment from the south for construction to the south and construction through the wetland
AR-043	42.3	Carbon	86	Existing	30	Gravel	No	0	Temporary	Construction access
AR-044	44.3	Carbon	197	Partially Existing	30	Gravel and forest	Yes	83	Temporary	Access for light and major equipment from the east for HDD construction support



AR-045	44.6	Carbon	135	Existing	30	Paved	No	0	Temporary	Access to west side of creek crossing at Sei Pike Ln
AR-046	44.8	Carbon	284	Partially Existing	30	Grass	Yes	284	Temporary	Access for light and major equipment for construction to the east and through the wetland to the south
AR-047	46.2	Carbon	1197	Existing	30	Gravel	No	0	Temporary	Access to ROW in remote area
AR-048	47.9	Carbon	200	New	30	Grass	Yes	200	Temporary	Access around guard rails to south side of Little Gap Rd crossing
AR-049	48.4	Carbon	2658	Existing	30	Gravel and dirt road	Yes	2658	Temporary	Access to ROW in a steep area
AR-050	49.4	Carbon	53	Existing	30	Paved	No	0	Temporary	Access for light and major equipment from the north for construction to the east and west
AR-051	50.8	Carbon	1141	Existing	30	Paved	No	0	Permanent	Access for light and major equipment from the west for construction to the north and south and for the Blue Mountain interconnect
AR-052	52.3	Northampton	1173	Partially Existing	30	Paved and forest	Yes	464	Temporary	Access for light and major equipment from the south for construction to the east and west
AR-053	53.7	Northampton	955	Partially Existing	30	Paved and grass	Yes	151	Temporary	Access for light and major equipment from the east for construction to the north and south
AR-054	55.7	Northampton	169	Partially Existing	30	Gravel	Yes	81	Temporary	Access for light and major equipment from the east for construction to the north to support crossing Mountain view drive and multiple stream crossings
AR-055	60.0	Northampton	730	Existing	30	Paved	No	0	Temporary	Access to ROW that minimizes impact to Monocacy Creek
AR-056	60.2	Northampton	1709	Existing	30	Paved and dirt road	No	0	Temporary	Access for light and major equipment from the south for construction to the east and west to support crossing Monocacy Drive and North Walnut Street
AR-057	62.4	Northampton	1378	Existing	30	Paved and gravel	No	0	Temporary	Access to south side of railroad crossing
AR-058	63.1	Northampton	1381	Existing	30	Gravel and dirt road	No	0	Temporary	Access for light and major equipment from the south for construction to the east and west
AR-059	63.7	Northampton	531	Partially Existing	30	Paved and Grass	Yes	69	Temporary	Access for light and major equipment from the east for construction to the north and south and to access the proposed ATWS
AR-060	63.9	Northampton	1026	Existing	30	Paved and Grass	Yes	390	Temporary	Access for light and major equipment from the west for construction to the north and south and to support crossing route 946
AR-061	64.1	Northampton	197	Existing	30	Paved	No	0	Temporary	Access for light and major equipment for construction to the east and south and to support crossing route 946
AR-062	64.8	Northampton	191	Partially Existing	30	Gravel and Grass	Yes	191	Temporary	Access for light and major equipment from the south for construction to the north and to support crossing route 191
AR-063	66.3	Northampton	1119	Existing	30	Paved	No	0	Temporary	Access for light and major equipment from the south for construction to the north
AR-064	66.4	Northampton	35	Existing	30	Paved	No	0	Temporary	Access for light and major equipment from the south for construction to support crossing Hecktown Road
AR-065A	66.8	Northampton	1140	Partially Existing	30	Gravel and dirt road	Yes	314	Temporary	Access for light and major equipment from the west for construction to the north
AR-065B	66.8	Northampton	384	Partially Existing	30	Gravel and dirt road	Yes	385	Temporary	Access for light and major equipment from the west for construction of Lehigh valley Thruway and construction to the south
AR-066	67.6	Northampton	544	Existing	30	Paved	No	0	Temporary	Access for light and major equipment to support crossing Green pond Road and construction to the south



AR-067	68.2	Northampton	21	Partially Existing	30	Grass	Yes	21	Temporary	Access for light and major equipment to support crossing Route 33 and construction to the south
AR-068	68.6	Northampton	234	Existing	30	Paved	No	0	Temporary	Access for light and heavy equipment to support crossing Route 2020 and construction to the north
AR-069	69.4	Northampton	269	Existing	30	Paved	No	0	Temporary	Access to North side of and berm crossing. Access for light and heavy equipment to support access ATWS and support construction through the existing shopping mall parking lots
AR-070	69.7	Northampton	985	Existing	30	Paved	No	0	Temporary	Access for light and heavy equipment to support access ATWS and support construction through the existing shopping mall parking lots
AR-070A	69.8	Northampton	179	Existing	30	Paved	No	0	Temporary	Access for light and heavy equipment to support access ATWS and support construction through the existing shopping mall parking lots
AR-071	70.1	Northampton	1957	Partially Existing	30	Paved and Dirt Path	Yes	1822	Temporary	Access for light and heavy equipment to support access from staging area and support construction to the south
AR-072A	71.1	Northampton	1827	Partially Existing	30	Gravel and grass	Yes	1827	Temporary	Access for light and heavy equipment to support access for the Lehigh River crossing and construction to the south
AR-072B	71.4	Northampton	29	Existing	30	Gravel	Yes	29	Permanent	Access for light and heavy equipment to support access for the Hellertown Lateral launcher and receiver site
AR-073	71.8	Northampton	329	Partially Existing	30	Paved and Grass	Yes	199	Temporary	Access for light and heavy equipment to support construction of the Lower Saucon Road crossing and wetland and stream crossing to the south
AR-074	72.0	Northampton	431	Partially Existing	30	Grass	Yes	44	Temporary	Access for light and heavy equipment to support construction of the wetland and stream crossing to the north as well as construction to the south
AR-075	72.7	Northampton	56	New	30	Grass and trees	Yes	56	Temporary	Access for light and heavy equipment to support construction of the large wetland crossing to the north as well as construction to the east
AR-076	73.1	Northampton	278	Existing	30	Gravel	No	0	Temporary	Access for light and heavy equipment to support construction of the wetland crossing to the east as well as construction to the east and west
AR-077	73.5	Northampton	1087	Partially Existing	30	Paved and forest	Yes	85	Permanent	TCO Interconnect access. Access for light and heavy equipment to support construction of the Hexenkopf Road crossing from the west as well as construction to the east
AR-078	74.6	Northampton	514	Existing	30	Dirt path	Yes	514	Temporary	Access for light and heavy equipment to support construction of the Durham Road crossing from the east as well as construction to the west
AR-079	76.1	Bucks	2649	Existing	30	Paved and gravel	No	0	Temporary	Access for light and heavy equipment to support construction of the Delaware Road crossing from the west as well as construction to the west
AR-080	77.1	Bucks	1145	New	30	Paved and field	Yes	1044	Temporary	Access for light and heavy equipment to support construction of the Delaware River HDD to the east as well as construction to the west



**Table 1.2-3  
 Proposed Pipeyards in Pennsylvania**

Facility Name	Municipality	County	Latitude	Longitude	Land Use	Proposed Modification	Acres
PE-A-01	Laflin Boro	Luzerne	41° 17' 18.660" N	75° 48' 45.126" W	Commercial/Industrial	Temporary Equipment Storage	1.9
PE-A-02	Laflin Boro	Luzerne	41° 17' 5.223" N	75° 47' 23.050" W	Commercial/Industrial, Forest/Woodland, Open Land	Temporary Equipment Storage	28.7
PE-B-02	Kidder Twp	Carbon	41° 1' 10.253" N	75° 37' 16.894" W	Agricultural, Forest/Woodland, Open Land, Residential	Temporary Equipment Storage	15.4
PE-C-03	Upper Nazareth Twp	Northampton	40° 43' 41.199" N	75° 21' 43.965" W	Agricultural, Commercial/Industrial, Forest/Woodland, Residential	Temporary Equipment Storage	17.9
PE-C-04	Lower Nazareth Twp	Northampton	40° 43' 40.203" N	75° 19' 12.684" W	Commercial/Industrial, Open Land	Temporary Equipment Storage	92.7
PE-D-05	Bethlehem Twp	Northampton	40° 39' 10.419" N	75° 16' 59.895" W	Open Land	Temporary Equipment Storage	39.3



## 1.2.2 Aboveground Facilities

Aboveground facilities associated with the Project will include one new compressor station, meter stations, mainline valves, and appurtenant facilities (e.g., pig launchers/receivers, milepost markers, cathodic protection test points, etc.). The proposed compressor station location is an undeveloped forested tract that will require full site development. Table 1.2-4 summarizes the land requirements for construction and operation of the aboveground facilities associated with the Project. The location of the aboveground facilities are provided on the aerial alignment sheets in JPA Section 8.

**Table 1.2-4  
 Land Requirements for Aboveground Facilities in Pennsylvania**

Facility/Location	Temporary Disturbed Acreage for Construction (acres)	Permanently Disturbed Acreage on ROW <sup>a</sup>	Permanently Disturbed Acreage off ROW	Total Permanently Disturbed Area (acres)	Total Disturbed Area (acres) <sup>b</sup>
<b>Upper Susquehanna River Basin</b>					
Wyoming Interconnect	0.0	0.1	2.1	2.2	2.2
Springville Interconnect	0.0	0.6	3.0	3.6	3.6
Auburn and Leidy Interconnects	2.6	0.4	5.0	5.4	8.0
Mainline Block Valve 1	0.0	0.1	0.0	0.1	0.1
<b>Upper Delaware River Basin</b>					
Mainline Block Valve 2	0.0	0.1	0.0	0.1	0.1
Kidder Compressor Station	0.7	0.0	34.0	34.0	34.7
Mainline Block Valve 3	0.0	0.1	0.0	0.1	0.1
Mainline Block Valve 4	0.0	0.1	0.0	0.1	0.1
Blue Mountain Interconnect/Mainline Block Valve-5	0.0	0.2	0.8	1.0	1.0
Mainline Block Valve 6	0.0	0.1	0.0	0.1	0.1
Mainline Block Valve 7	0.0	0.1	0.0	0.1	0.1
Hellertown Lateral Launcher and Mainline Launcher/Receiver/Mainline Block Valve 8	0.9	0.6	1.6	2.3	3.1
TCO & UGI-LEH Interconnects	0.0	0.4	4.4	4.8	4.8
<b>Total Project in PA</b>	<b>4.2</b>	<b>2.9</b>	<b>52.1</b>	<b>64.0</b>	<b>69.3</b>

Notes:

<sup>a</sup> Mainline valve acreage based on 50x50 operational workspace.

<sup>b</sup> Discrepancies in total acreages are due to rounding.

### **1.2.3 Non-Surveyed Areas**

PennEast has attempted to contact all landowners directly crossed by the Project alignment to obtain survey access permission. Surveys for the Project were initiated in November 2014 and extended through the 2015 field season, concluding in December. Additional surveys will continue throughout the 2016 field season as route modifications are incorporated and additional survey access permission is granted. Survey work for the Project has included, but has not been limited to, civil surveys and ROW marking, wetland and waterbody delineation surveys, rare species habitat assessments and presence/absence surveys, and cultural resources surveys. In terms of mileage, PennEast has conducted wetland and waterbody delineation surveys on approximately 78.6% of the Project pipeline routes in PA. Completion of field surveys will be dependent upon the finalization of the Project alignment as well as the acquisition of survey access permission. Field survey data shown on alignment sheets are based on field data collected through December 2015 and are included in JPA Section 8. Wetlands and waterbodies for parcels which have been surveyed are shown on the alignment sheets included with this submittal. Remote sensing modeling and National Wetlands Inventory / National Hydrography Dataset data was used to identify wetlands and waterbodies on non-surveyed/no access parcels. These data are provided as a separate table in JPA Section 15.

## **1.3 CONSTRUCTION PROCEDURES**

### **1.3.1 Standard Construction Methods**

The proposed Project will be constructed in compliance with applicable specifications, Federal regulations and guidelines, and the Project-specific permit conditions (reference Section 1.5 below). Construction of the Project will commence after ROW and applicable regulatory permits and clearances have been acquired for the Project and upon receipt of a Notice to Proceed from the FERC. In its application to FERC, PennEast seeks issuance of a Certificate of Public Convenience and Necessity for the Project by August 1, 2016. Certain aspects of construction in compliance with certain timing restrictions, including winter tree clearing to avoid Indiana bat and other threatened and endangered species breeding periods, compliance with the Migratory Bird Treaty Act, installation of horizontal directional drill (HDD) segments, the northernmost crossing of the Lehigh River, and pipeyard preparation, are planned to begin late in the third quarter of 2016. The 2017 construction activities for the mainline and facility scope of work are scheduled to commence in the spring of 2017, pending specific construction windows imposed on the Project. Winter tree clearing for the 2017 construction activities is scheduled to commence in October 2016.

It is anticipated that installation of the HDD segments and aboveground facility construction will begin prior to mobilization of the mainline construction contractors. PennEast also plans to coordinate the open cut crossing of Lehigh River with the USACE release of water from the Francis E. Walter Dam, which generally occurs after October and will reduce the width of waterbody crossing considerably. After the water levels have subsided, PennEast anticipates crossing Lehigh River (MP 22.8) between October and February and will coordinate with the FERC, USACE, PADEP, and PFBC regarding naturally-reproducing trout stream mitigation efforts.

Construction of the entire Project will require approximately six to nine months to complete. The number of construction workers assigned to the Project at any given time will vary, depending upon the





facility and spread. All Project facilities and pipelines are anticipated to be placed in-service by late November 2017.

Construction and restoration techniques to be used will be those typical for cross-country and residential construction. The E&SCP (JPA Section 9) provides detail of such techniques and mitigation measures that will be used for the Project. Additional construction techniques and measures that will be employed are described in the Project’s Spill Prevention, Control, and Countermeasures (SPCC) Plan.

The Project E&SCP will be consistent with the FERC’s Upland Erosion Control, Revegetation, and Maintenance Plan (May 2013 version) and Wetland and Waterbody Construction and Mitigation Procedures (May 2013 version), collectively described as the FERC *Plan and Procedures*.

Construction of the Project will follow standard construction practices and will typically involve numerous divisions of the pipeline (spreads) with crews progressing work along the ROW within each spread in an ordered, choreographed fashion. The Project anticipates division of the pipeline portion of the Project into four construction spreads, three of which will be in Pennsylvania. Table 1.3-1 identifies the anticipated construction spreads in Pennsylvania.

**Table 1.3-1  
 Anticipated Construction Spreads in Pennsylvania**

Spread	From MP	To MP	From	To
1	0.0	17.8	Origination	Meadow Run Road Crossing
2	17.8	48.1	Meadow Run Road Crossing	Little Gap Road Crossing
3	48.1	77.6	Little Gap Road Crossing	Delaware River (west side)

Typically, survey crews will begin the operations by demarcating the pipeline centerline and construction workspace (CWS) along the ROW. Winter tree clearing may be employed in areas with sensitive habitat. At this time, PennEast does not anticipate that construction during the winter season will be limited to construction of the northernmost Lehigh River crossing, HDDs, and aboveground facilities. Clearing, grading, trenching, and other crews would follow until a final cleanup crew initiates the restoration process. Crews most frequently progress in close sequence to facilitate orderly progress, minimize the active construction spread size, and expedite restoration efforts.

Pipeline construction generally involves the following sequential operations, which are discussed in more detail in the E&SCP (JPA Section 9). These steps are summarized in the bullets below, and additional details are provided in the following sections.

Pipeline Construction – Typical Sequential Operation Steps:

- Survey/staking the route, approved workspace, and foreign line crossings.
- Clearing – remove vegetation from CWS; installation of erosion and sediment controls.
- Grading to establish safe workspace; installation of erosion and sediment controls.
- Trenching – pipeline trench excavation.
- Stringing – placement of pipe joints along the trench line.

- Bending – bending pipe joints, as needed, for route and terrain.
- Welding.
- Pipe integrity – visual inspection, non-destructive examination of welds.
- Weld coating – corrosion protection and waterproofing.
- Lowering in – pipe placed in trench, tie-ins with previously laid sections, backfill.
- Hydrostatic testing – confirmation of pipeline integrity.
- In-line tool inspection of new pipeline segments.
- Tie-in to existing pipeline, purge, pack new section with gas.
- Regrade CWS to previous contours; clean-up, restoration, and seeding.

During construction, PennEast will apply dust mitigation measures, as necessary. Such applications will be at the direction of the Contractor Supervisor, Environmental Inspector, and/or the onsite Chief Construction Inspector. Typical measures that may be employed to minimize dust will be the use of water trucks to dampen workspace, if necessary, and use of paved roadways.

### **1.3.1.1 Surveying and Staking**

Access to the CWS will normally be obtained via public roads that intersect the ROW. Permission will be obtained from landowners for the use/upgrade of private access roads to the CWS. Prior to construction, survey crews will stake the centerline of the proposed pipeline, foreign line crossings, the limits of the CWS, and the location of approved work access roads. Wetland boundaries and other environmentally sensitive areas will also be staked at this time in such a manner as to not attract the attention of non-Project personnel.

### **1.3.1.2 Clearing**

The CWS will be cleared to remove brush, trees, roots, and other obstructions such as stumps. Non-woody vegetation may be mowed to ground level. No cleared material will be placed within wetland areas.

Clearing includes the removal of trees and brush from the CWS. With the exception of stream buffers and wetlands, tree stumps are removed from the permanent ROW. Stump grinding may be used as an alternative to removal to leave below grade root systems intact to aid in soil stabilization. PennEast anticipates disposal of trees cleared from the CWS using several different methods. Trees, if suitable, will be taken off-site by the clearing contractor and used for timber unless the landowner has made alternative arrangements for the salvageable timber. The stumps and brush may be disposed of by burning, chipping and spreading, hauling to approved disposal areas, storing along the ROW with landowner approval, or other approved methods. If burning is selected it will be conducted in accordance with local notifications, ordinances and requirements. Trees and stumps may be chipped on-site and removed. Chipped material not removed from the site may be spread across the upland areas of the CWS 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.



### 1.3.1.3 Grading and Installation of Erosion and Sediment Controls

Grading of the CWS will allow for the movement of heavy equipment and the safe passage of work crews. Grading will include removing rock outcrops, tree stumps, ridges, and topographic irregularities. Generally, machinery will operate on one side of the trench (working side) with excavated materials stockpiled on the other (non-working side). Special construction procedures to minimize the amount of vegetation removed from stream banks and slopes, prevent undue disturbance of the soil profile, restore the original contours of the natural ground, and prevent topsoil erosion will be implemented as necessary.

If Project construction activity extends beyond one construction season it will be necessary to stabilize the site for the over-winter period. The Project winter construction period is considered to be from October 15 through May 15. Maintenance measures should continue as needed throughout the over-winter period. After each significant rainfall (greater than ½ inch), snowstorm (greater than 6 inches), or extended period of thawing and runoff (temperatures over 32 degrees for over seven consecutive days), the construction contractor will conduct an inspection of all installed erosion control measures and perform repairs as needed to insure their continuing function. Areas stabilized by temporary or permanent seeding prior to the onset of the winter season will be inspected in the spring to ascertain the condition of vegetation cover, to repair any damaged areas or bare spots and reseed as necessary to establish vegetative cover.

To minimize impact to the soil profile on agricultural lands, topsoil will be segregated from subsoil and will remain segregated during construction to avoid loss due to mixing with subsoil material. PennEast will utilize either full CWS topsoil segregation or ditch plus spoil side topsoil segregation, as requested by the landowner as appropriate based upon site-specific conditions. Upon completion of backfilling operations, the topsoil will be pulled back over the graded area. Grading activities will be scheduled to minimize the time between initial clearing operations and the actual installation of pipe and in accordance with the FERC *Plan and Procedures*.

### 1.3.1.4 Trenching

In most areas characterized by normal soils, the trench for the pipeline is excavated by crawler-mounted, rotary wheel-type trenching machines, or track-mounted excavators. The trench generally will be approximately 12 inches wider than the diameter of the pipe and of sufficient depth to allow for the minimum cover requirements to the top of the pipe in accordance with U.S. Department of Transportation (USDOT) regulations pursuant to the Natural Gas Pipeline Safety Act of 1968, as amended. Landowner requests or permitting requirements may dictate greater depth.

Except as depicted on site-specific plans, the depth of cover for the proposed pipeline facilities, as well as the depth of cover for other, non-typical conditions, such as HDD, will be in accordance with PennEast's minimum specifications. Scour analysis and the potential for external damage may increase these depths. In actively cultivated agricultural lands, PennEast plans to install the pipeline with a minimum of 48 inches of cover, except where rock prevents this depth. In all other areas, the pipeline will be installed with a minimum of 36-inches depth of cover.

Crossing of foreign pipelines will generally require the pipeline to be buried at greater depths depending upon the depth of the foreign pipeline. A minimum of 12 inches of clearance will be maintained when crossing foreign pipelines, utilities, or other structures as required by USDOT. Pipeline burial depths in areas requiring special construction techniques through rock will be in accordance with USDOT requirements in Title 49 of the Code of Federal Regulations (CFR) Part 192. Before beginning

construction activities, the appropriate “Call Before You Dig” number/“811” call systems will be contacted to have underground utilities and foreign pipelines identified and marked. Trenching in the vicinity of any foreign utilities will begin only after completing the appropriate notification procedures.

Measures will be employed to minimize erosion during trenching operations and construction activities. Measures also will be taken to minimize the free flow of water into the trench and through the trench into waterbodies. Compacted earth for temporary trench breakers and sandbags for permanent trench breakers may be installed within the trench to reduce erosion.

### **1.3.1.5 Stringing**

The stringing operation involves moving the pipe into position along the prepared ROW. Pipe will be delivered to the Project area’s pipeline storage areas typically by truck and will then be moved by truck from the pipeline storage areas to the construction zone, where it will be placed along the ROW in a continuous line in preparation for subsequent lineup and welding operations. Individual joints of pipe will be strung along the ROW parallel to the centerline and arranged so they are easily accessible to construction personnel. The amount of pipe necessary for stream or road crossings will be stockpiled in pipeline storage areas in the vicinity of each crossing. Stringing activities will be coordinated with the advance of the trenching and pipe laying crews to minimize the potential impact to wetlands, waterbodies, and other sensitive resources. Steel pipe sections or joints in standard 40, 60, or 80-foot lengths will be used on the Project.

### **1.3.1.6 Bending**

The pipe will be delivered to the Project site in straight sections. However, field bending of the pipe will be required to allow the pipeline to follow natural grade changes and direction changes of the ROW. For this purpose, prior to line-up and welding, selected joints will be field-bent by track-mounted hydraulic bending machines. For larger horizontal changes of direction, manufactured induction bends may be used.

Pipe bending in the field will be utilized for turns involving slight deflections and/or large radii. For turns involving larger deflections and/or small radii, often related to spatial limitations due to easement and topographic constraints, prefabricated elbow fittings will be utilized.

### **1.3.1.7 Welding**

Following stringing and bending, the joints of pipe will be placed on temporary supports adjacent to the trench. The ends will be carefully aligned and welded together using multiple passes for a full penetration weld. Only welders qualified according to applicable American National Standards Institute (ANSI), American Society of Mechanical Engineers (ASME), and American Petroleum Institute (API) standards will be permitted to perform the welding.

### **1.3.1.8 Pipe Integrity**

To ensure that the assembled pipe meets or exceeds the design strength requirements and to ensure weld quality and integrity, the welds will be inspected visually and tested non-destructively using radiographic (x-ray) or another approved test method, in accordance with API standards. Welds displaying inclusions (void spaces) or other defects will be repaired if out of code, or they will be cut out (removed) and new welds installed and retested.

### **1.3.1.9 Coating**

Following welding, the previously uncoated ends of the pipe at the joints will be field-coated per applicable coating specifications. Prior to lowering the pipe into the trench, the coating on the entire pipe section will be visually inspected and evaluated using a holiday detector (inspection of pipe coating using electronic equipment). Damaged areas will be repaired per applicable coating repair specifications.

### **1.3.1.10 Lowering-In and Backfill**

The pipe lengths are lowered into the trench by specialty “side boom” tractors. Extreme care is taken to protect the coating during the lowering-in process. Lowered pipe is positioned within the trench on sandbag benches (or approved equivalent structures), or padding the trench with screened subsoil; topsoil will not be used for padding. Connecting ends of the pipe are welded together in the ditch followed by the above inspection and coating process. Following lowering-in, the trench and pipeline are backfilled. A bedding layer of rock-free pad dirt is placed first to protect the pipe and coatings. Final backfill makes use of material excavated from the trench; topsoil will not be used for backfill.

### **1.3.1.11 Hydrostatic Testing**

Completed sections of pipeline are further tested using water pressure. Pipes are filled with water and then pressurized to levels higher than the maximum operating pressure designated for the pipeline. The pressure test is held for a minimum of eight hours to be in compliance with USDOT 49 CFR 192 regulations.

### **1.3.1.12 Grade, Cleanup, Restoration, and Seeding**

Cleanup and restoration commence as soon as practicable following completion of backfilling and testing. These activities include replacing grade cuts to original contours, seeding fertilizer, and mulching to restore ground cover and minimize erosion. Temporary workspaces will be allowed to revert to their preconstruction land uses.

## **1.3.2 Specialized Construction Methods**

### **1.3.2.1 Streams and Rivers**

PennEast has evaluated numerous specialized methods for pipeline construction for crossing waterbodies. This evaluation includes consultations with the U.S. Fish and Wildlife Service, PADEP, and the USACE, among others. PennEast proposes to cross waterbodies using a combination of trenchless crossing methods (i.e., HDD and bores), and dry-crossing methods, as described below.

Generally during crossings, the full width of the construction ROW will be used on either side of the waterbody for construction staging and pipeline fabrication. ATWS may be required in some situations and will be located in upland areas a minimum of 50 feet from the waterbody, whenever possible; however, certain crossings may require ATWS in closer proximity to the waterbody. PennEast is requesting a variance for ATWS within 50 feet of a wetland/waterbody, and these areas will be included as part of the Project study area in agency consultations, environmental permitting and resource surveys.

PennEast will follow the timing restrictions identified by the Pennsylvania Fish and Boat Commission (PFBC) for dry crossings. There is a March 1 to June 15 timing restriction for PFBC-approved trout waters and trout stocked streams, and an October 1 to December 31 timing restriction for PFBC-designated wild trout waters, and an October 1 to April 1 timing restriction for PFBC-designated Class A trout waters. The Chapter 93 Trout Stocked Fishery designation does not carry any timing restrictions. The approved trout water timing restrictions only apply to the stocked portions of the waterbody and any unnamed tributaries within 0.5 mile of the stocked portions. These timing restrictions do not apply to unnamed tributaries outside of the 0.5 mile of the stocked streams. The timing restriction for PFBC wild trout waters applies to the entire reach of any stream within the designated watershed and the tributaries thereto. For Class A trout waters, the timing restriction applies to the stream reach defined by the PFBC.

The PFBC considers “in-stream construction” to consist of any impacts to the streambed/bank or flowing water below the top of bank, which would include the installation of a utility line dry crossing. The PFBC has confirmed that the installation of a temporary equipment bridge that spans from bank to bank, or any pre-blasting required outside of the top of banks, would not be subject to the timing restrictions.

PennEast will also continue to consult with and follow any timing restrictions requested by the Susquehanna and Delaware River Basin Commissions, USACE, PADEP, and PFBC. Any timing restrictions requested will be checked for consistency with FERC’s Wetland and Waterbody Construction and Mitigation Procedures. If inconsistencies are found, PennEast will request that they be reviewed as an alternative measure with justification for their use.

### **1.3.2.2 Equipment**

During clearing and grading activities, temporary bridges will be constructed across all waterbodies to permit construction equipment to cross. Construction equipment will be required to use the bridges, except the clearing crew who will be allowed one pass through the waterbodies before the bridges are installed. Bridges and supports will be removed after restoration is complete. If bridges are not installed at state-designated fishery streams, equipment will be required to move around the waterbodies to gain access to the other side.

In general, equipment refueling and lubricating will take place in upland areas that are more than 100 feet from the edges of streams and rivers and their associated wetlands. There may be certain instances where equipment refueling and lubrication may be necessary in or near streams and rivers. For example, stationary equipment, such as water pumps for hydrostatic test water, may need to be operated continuously on the banks of waterbodies and may require refueling in place. PennEast has prepared a SPCC Plan to address the handling of fuel and other materials in or within 100 feet of waterbodies.

### **1.3.2.3 Clearing**

Clearing will involve the removal of trees and brush from the construction ROW and temporary construction workspace. Woody vegetation will be cleared to the edge of the waterbodies, but a 10-foot-long herbaceous strip will be left on the approaches until immediately before construction to provide a natural sediment filter and minimize the potential for erosion immediately adjacent to the waterbodies. Initial grading of the herbaceous strip will be limited to the extent needed to install bridges and in areas that are needed to construct the pipeline safely where large grade cuts are necessary.

During clearing where possible and during grading, sediment barriers will be installed and maintained adjacent to waterbodies and within temporary construction workspaces, where needed, to minimize the potential for sediment runoff. Drivable berms may be installed and maintained across the ROW in lieu of silt fence or straw bales.

#### **1.3.2.4 Pre-Blasting In Streams**

PennEast is proposing that during ditching activities, all streambeds that contain solid rock be drilled and blasted. An application for a Permit for Use of Explosives in Commonwealth Waters will be filed with the PFBC. Any blasting activities will be completed in accordance with the E&SCP. The ditch crew will test bore the stream banks with a rock drill to determine if rock will be encountered. Should the test holes determine the area will need to be shot or blasted, the crew will continue to prepare the ditch line area for blasting. Upon completion of blasting, the crew will ensure that the stream bottom is restored to prevent interference with the flow. Once the mainline tie-in crews move to the area, the stream will be excavated and pipeline installed in accordance with the E&SCP. The stream pre-blasting activities will reduce the duration of stream disturbance and enable the contractor to meet the timing restrictions for in-stream disturbance.

#### **1.3.2.5 Flume Crossing Method**

PennEast may choose to cross specific waterbodies by using the flume crossing method. The flume crossing method involves diverting the flow of the stream across the construction site through one or more flume pipes placed in the stream (see E&SCP in JPA Section 9). The first step in the flume crossing method involves placing a sufficient number of adequately sized flume pipes in the stream to accommodate the highest anticipated flow during construction. After placing the pipes in the stream, sand or pea gravel bags will be placed in the stream upstream and downstream of the proposed trench. The bags serve to dam the stream and divert the stream flow through the flume pipes, thereby isolating the stream flow from the construction area.

Backhoes located on both banks of the stream will excavate a trench under the flume pipe in the isolated streambed. Spoil excavated from the stream trench will be placed or stored a minimum of 10 feet from the edge of the waterbody or in ATWS as necessary. Once the trench is excavated, a pre-fabricated segment of pipe will be installed beneath the flume pipes. The trench will then be backfilled with native spoil from the streambed. Clean gravel or native cobbles will be used to backfill the top 12 inches of the trench in coldwater fisheries.

If trench dewatering is necessary near waterbodies, the trench water will be discharged into an energy dissipation/sediment filtration device, such as geotextile filter bag or straw bale structure, away from the water's edge, preferably in a well-vegetated upland area to prevent heavily silt-laden water from flowing into the waterbody.

#### **1.3.2.6 Dam and Pump Crossing Method**

PennEast may choose to cross specific waterbodies by using the dam and pump crossing method. The dam and pump crossing method involves constructing temporary sand or pea gravel bag dams upstream and downstream of the proposed crossing site while using a high capacity pump to divert water from the upstream side around the construction area to the downstream side (see E&SCP in JPA Section 9).



Energy dissipation devices, such as steel plates will be placed on the downstream side at the discharge point to prevent streambed scour.

After installing the dams and commencing pumping, a portable pump (separate from that pumping the stream flow around the construction area) may be used to pump standing water from between the dams into a dewatering structure consisting of straw bales/silt fence or into a filter bag located away from the stream banks, thereby creating a dry construction area.

Once the area between the dams is stable, backhoes located on both banks will excavate a trench across the stream. Spoil excavated from the trench may be stored in the dry streambed adjacent to the trench if the stream crossing is major or in a straw bale/silt fence containment area located a minimum of 10 feet from the edge of the stream banks. Leakage from the dam, or subsurface flow from below the streambed, may cause water to accumulate in the trench. As water accumulates in the trench, it may be periodically pumped out and discharged into a dewatering structure located away from the stream banks.

After trenching across the streambed is completed, a prefabricated segment of pipe will be installed in the trench. The streambed portion of the trench is immediately backfilled with streambed spoil. Once restoration of the streambed is complete, the dams are removed and normal flow is re-established in the stream.

### **1.3.2.7 Restoration**

Completed stream crossings using the flume or dam and pump methods will be stabilized before returning flow to the channel. Original streambed and bank contours will be re-established, and mulch, jute thatching, or bonded fiber blankets will be installed on the stream banks. Where the flume technique is used, stream banks will be stabilized before removing the flume pipes and returning flow to the waterbody channel.

Seeding of disturbed stream approaches will be completed in accordance with FERC's *Plan and Procedures* after final grading, weather and soil conditions permitting. Where necessary, slope breakers will be installed adjacent to stream banks to minimize the potential for erosion. Sediment barriers, such as silt fence and/or straw bales will be maintained across the ROW until permanent vegetation is established. Temporary equipment bridges will be removed following construction.

### **1.3.2.8 Major Waterbody Crossings**

There are six major waterbody crossings associated with the Project: the Susquehanna River, the Lehigh River (in two locations), Pohopoco Creek and Pohopoco Stream (Beltzville Lake), and the Delaware River. PennEast's team of engineers, environmental scientists, construction personnel and land agents conducted joint field investigations and reviewed each of the major waterbody crossing areas; evaluating the different construction methods for each of the crossings. As a result of these investigations as well as consultations with state and federal regulatory agencies, PennEast is proposing to the following crossing methods for major waterbodies:

#### HDD Boring Method

- Pohopoco Creek (both Pohopoco Creek Crossing 1 [approximate MP 43.5] and Pohopoco Creek Crossing 2 [approximate MP 44.0])





- the Lehigh River at the second crossing location, north of Hellertown, Pennsylvania (Lehigh River Crossing 2 [approximate MP 71.0])
- the Delaware River (approximate MP 77.6)

#### Open Cut Method

- the Susquehanna River (approximate MP 7.0)
- Lehigh River at the first crossing location, north of Francis E. Walter Dam (Lehigh River Crossing 1 [approximate MP 22.8])

All proposed HDD locations will continue to be evaluated as the Project progresses to ensure that the work can be completed safely. Site-specific crossing plans for each of the major waterbody crossings are included in JPA Section 10. Each of these crossing methods is described in detail below.

#### **1.3.2.8.1 Open Cut Crossing**

The open cut construction method involves the excavation of the pipeline trench across the waterbody, installation of a prefabricated pipeline segment, and backfilling of the trench with excavated material. Depending upon the width of the crossing and the reach of the excavating equipment, excavation and backfilling of the trench will generally be accomplished using backhoes or other excavation equipment operating from one or both banks of the waterbody. Excavated material from the trench will be placed on the bank above the ordinary high water mark for use as backfill. The pipe segment can be weighted, as necessary to provide negative buoyancy and placed below scour depth. Typical backfill cover requirements will be met, contours will be restored within the waterbody, and the banks will be stabilized via seeding and/or the installation of erosion control matting or riprap, per applicable agency approvals. One of the goals of open cut crossings is to complete all in-stream construction (trenching, pipe installation, backfill, and streambed restoration) within 24 hours.

The Susquehanna River crossing is bordered by an airport and flood-control berm to the south and a newly constructed highway bridge to the north. The crossing area is in proximity to the historic 1959 Knox Mine disaster where the river bed collapsed into the mine. The crossing area is being carefully evaluated with PADEP's Abandoned Mine Reclamation Bureau for historic mine shafts and debris. Due to the presence of abandoned mines and the geomorphic conditions at the surface, PennEast is evaluating a potential open cut, dry crossing of the Susquehanna River. Two other pipeline crossings in the area successfully used open cut methodology with a diversion of the river channel on the other side of an island (Monocanock) during construction so that the crossing was essentially done in the dry. Preliminary engineering of this crossing would involve installing a Portadam at the upstream tip of Monocanock Island, which is located in the center of the river, to divert flow to one side of the river. Secondary coffer dams would be installed adjacent to the pipeline trench for further dewatering. After the pipe is installed under half of the river, the flow diversion, dewatering, and pipeline installation would be completed on the other half of the river. PennEast anticipates that construction of the Susquehanna River crossing would be completed within 45 days, including cofferdam construction, dewatering, pipeline construction, and restoration. Of the 45 days anticipated for construction, PennEast anticipates that it will take 6 days for trenching, pipeline construction, and backfilling (3 days for each side of the river).

The Lehigh River Crossing 2 is also proposed as an open cut, dry crossing. Historical analyses and initial discussions with the USACE have shown water levels in the area of the Lehigh River crossing to be significantly low during the fall or early winter months, making an open cut, dry crossing feasible.



PennEast is evaluating either a dam-and-pump or flumed dry crossing method for this section of the Lehigh River. PennEast will work closely with the USACE (water levels) and PFBC (trout timing restrictions) to coordinate permitting, timing, and construction methods for this crossing.

### 1.3.2.8.2 Horizontal Directional Drilling

Directional drilling is an advanced boring method that requires the drilling of a small diameter hole, or pilot hole, along a predetermined design path. The pilot hole is then gradually enlarged until it is sufficient to accommodate the pipeline being installed. The pipeline may or may not be installed concurrently with the hole enlargement depending upon the final diameter of the enlarged hole and the soil conditions encountered.

Excavation of the drill entry and exit locations will be necessary to contain drilling fluids during all phases of the installation. These fluids and cuttings must be disposed of in an approved manner periodically or at the completion of the crossing installation. The crossing length and cross-sectional geometry are dependent upon the pipeline design parameters, the obstacle to be crossed, and the subsurface conditions. Additional temporary workspace, including pipe staging areas and storage areas for drilling mud and borehole cuttings, will be located in upland areas outside of wetlands and riparian zones wherever practicable.

Although PennEast is confident in the current HDD methods and technologies available, it is recognized that such methods contain inherent risks. PennEast has developed HDD Contingency and Unanticipated Release Plans (JPA Section 22) to mitigate these risks. However, if HDD bores at these locations are not successful after two attempts, PennEast would resort to an open cut crossing. PennEast would request a variance and include justification for all open cut crossings not identified at this time, and crossing plans would be resubmitted to regulatory agencies for environmental evaluations and permitting processes.

Preliminary studies indicate that Pohopoco Creek (both crossing locations), Lehigh River Crossing 1, and the Delaware River can each be crossed using a bore or HDD. Initial discussions with the USACE indicate that they are supportive of the general location of the Pohopoco Creek (Beltzville Lake) crossings and additional coordination and studies will be necessary. These and other proposed HDD crossings in Pennsylvania are listed in Table 1.3-3 below.

**Table 1.3-2  
 Horizontal Directional Drilling in Pennsylvania**

Location/Feature	Mile Post <sup>1</sup>	Begin Mile Post <sup>1</sup>	End Mile Post <sup>1</sup>	Length (ft.)
US Hwy 81 / St. Hwy 315	10.6	10.4	10.7	1550
Wild Creek & Pohopoco Creek (Beltzville Lake)	43.5	43.0	44.1	6100
St. Lukes (Lowe's)	70.0	69.7	70.3	2900
Lehigh River	70.8	70.4	71.2	4900
Interstate 78	71.6	71.4	71.9	2400
Delaware River and Canal	77.4	77.2	77.7	2850



<sup>1</sup> Mileposts are estimated due to rounding

### **1.3.2.9 Wetlands**

In Pennsylvania, wetland construction will be done in accordance with FERC's *Procedures* as well as applicable best management practices (BMPs) required by the PADEP and County Conservation Districts. In accordance with FERC guidelines PennEast will limit the typical width of the construction ROW to 75 feet, unless a variance is requested at specific crossings, and would maintain a 10-foot-wide corridor centered on the pipeline for operational purposes. In addition, PennEast will follow the SPCC Plan and E&SCP as well as specific Pennsylvania permit conditions.

### **1.3.2.10 Other Utilities**

Publicly available utility mapping indicates that foreign pipelines and utilities are present in a number of locations. PennEast continues to have ongoing dialogue with the utility companies where the Project is proposing to collocate with respect to access, set-back distances required from their facilities, and areas of their existing ROWs that can be used for staging, laydown, stockpiling of soils and related construction activities. PennEast will utilize previously disturbed areas in existing ROWs to the extent feasible, thereby reducing greenfield impacts. In addition to any agreements with the utilities, PennEast will continue to work with, and obtain consent from the individual landowners affected by the ROW. In addition, prior to construction, PennEast will contact the national "Call Before You Dig" number (811) so that the locations can be properly marked in the field.

### **1.3.2.11 Rugged Topography**

Rugged topography is considered areas with steep slopes and side slopes greater than 30% and for pipeline length of greater than 68 feet (triple length of pipe) where recorded. In Pennsylvania, including both the mainline and the Hellerton Lateral, PennEast will cross 112 areas of rugged topography totaling approximately 4.3 miles.

### **1.3.2.12 Residential or Commercial**

At this time, approximately 376 structures have been identified within 50 feet of the CWS in Pennsylvania, which include buildings, sheds, and garages. Once the Project footprint is finalized, field surveys will be conducted at locations where structures are in close proximity to the construction work and confirm the structure types. All residential or commercial structures located within 50 feet of the edge of the construction ROW and extra work/staging areas will be identified. In cases where the workspace cannot be reduced to maintain a 25-foot separation from the residence, a site-specific construction plan will be created. As part of the FERC process, PennEast developed site-specific residential construction plans for currently identified residences within 25 feet of the CWS. PennEast land agents and contractors will coordinate with property owners throughout the construction process to minimize disruption and to maintain access to residences, commercial establishments, industrial areas and other buildings.



### **1.3.2.13 Active Croplands**

Active croplands observed during field surveys conducted to date include corn, soybeans, and hay fields. PennEast has worked with state agencies as well as advocacy groups to formulate a comprehensive Agricultural Impact Minimization Plan to be implemented during construction. The plan outlines agriculture-specific construction methods and BMPs as well as restoration methods and monitoring to ensure that crop yields are not significantly impacted as a result of construction of the Project.

### **1.3.2.14 Road Crossings**

The Project will cross 129 roadways in Pennsylvania. Of the 129 roads crossed in Pennsylvania, 100 are constructed of asphalt, 18 are dirt, and 11 are gravel. PennEast proposes to cross the majority of these with a bore (85 roadway crossings). The other proposed crossing methods for the roads are an open cut method (35 roadway crossings) or HDD (9 roadway crossings).

### **1.3.2.15 Rock Removal and Blasting**

Rock encountered during trenching will be removed using one of the available rock removal techniques:

- Conventional excavation with a backhoe;
- Ripping with a bulldozer followed by backhoe excavation;
- Pneumatic hammering followed by backhoe excavation;
- Blasting followed by backhoe excavation; and
- Blasting surface rock prior to excavation.

The technique selected is dependent on relative hardness, fracture susceptibility, expected volume, and location.

All blasting activity will 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.

Excess rock generated during the construction of the Project will be hauled to approved quarries near the pipeline route and disposed of.

## **1.3.3 Aboveground Facilities**

The proposed aboveground facilities will be constructed in accordance with ASME B31.8 standards. The duration of construction for the aboveground facilities is approximately seven and a half months. The only permanent employees will be located at the proposed compressor station.

## **1.3.4 Environmental Training for Construction**

Environmental training will be required for all land agents, construction personnel and environmental inspectors; and agency personnel will also be invited to the training. This training will include an overview of the FERC *Plan and Procedures*, and detailed sessions using the Environmental Permit Notebooks that describe the timing, notification and environmental permit conditions required to be



implemented and adhered to at each phase of construction, restoration and mitigation. PennEast will use FERC's third-party monitoring program during construction.

### **1.3.5 Construction Workforce**

It is anticipated that four construction spreads will be employed for the Project, three of which will construct the Pennsylvania portions of the Project. There will be approximately 665 personnel involved in each spread for the pipeline portion of the Project. In addition, it is planned that there will be a Chief Environmental Inspector as well as two Environmental Inspectors for each spread. FERC third-party monitors will also review construction throughout the construction time period.

## **1.4 OPERATION AND MAINTENANCE PROCEDURES**

PennEast will own, operate, and maintain the pipeline, the compressor station and other facilities associated with the Project in accordance with 49 CFR Part 192 and 199 and other applicable regulations. The proposed facilities will be operated and maintained in a manner to ensure that a safe, continuous supply of natural gas reaches each of the delivery points. Maintenance activities will include regularly scheduled ground and overflight surveys. Signs, marker posts, aerial markers, and decals will be painted or replaced to ensure that the pipeline locations will be visible from the air and ground.

The facilities will be patrolled from the air periodically. This will provide information on possible leaks, construction activities, erosion, population density, possible encroachment, and any other potential problems that may affect the safety and operation of the facility. In addition, PennEast contractors will adhere to the "Call Before You Dig" program. Under the "Call Before You Dig" program, anyone planning excavation activities may call a single number to alert all utility companies. Representatives of the utility companies that might be affected then visit the site and mark their facilities so that the excavation can proceed with relative certainty as to the location of all underground lines.

Other maintenance functions will include:

- Mowing of the ROW in accordance with the timing restrictions outlined in FERC's *Plan and Procedures*;
- Periodic inspection of Main Line Valves, water crossings and erosion control devices;
- Maintenance of a supply of emergency pipe, leak repair clamps, sleeves, and other equipment needed for repair activities;
- Periodic internal inspection with in-line inspection tools or "pigs"; and
- Calibration of equipment and transmitters.

No herbicides or pesticides will be used for the clearing or maintenance of the temporary or permanent ROW or within 100 feet of a waterbody.

A cathodic protection system for the pipeline and station will be constructed and maintained. Exact locations for both the anode bed(s) and test stations will be determined as the design progresses.

In areas where the proposed pipeline parallels high-voltage electric transmission lines, an alternating current mitigation system will be implemented as necessary to reduce stray current, prevent possible shock to personnel during post-construction activities, and prevent interference with the cathodic protection system.

### **1.4.1 Cleared Areas**

A 30-foot cleared area in the 50-foot permanent ROW, in non-wetland resource areas, will be maintained over the centerline of the pipeline. A permanent 10-foot wide cleared corridor will be maintained through wetland resource areas in accordance with FERC's *Plan* and *Procedures*. Maintaining a cleared ROW is required:

- For pipeline patrols and corrosion surveys;
- For emergency repairs of the pipeline; and
- For visibility during aerial patrols.

### **1.4.2 Erosion Control**

Erosion problems on the pipeline ROW will be identified and repaired as necessary.

### **1.4.3 Periodic Pipeline and ROW Patrols**

Erosion control devices will be regularly inspected and maintained, including:

- Stormwater outfalls;
- Water bars;
- Stream and river banks; and
- Other conditions that could affect operation of the pipeline.

## **1.5 AGENCY AND PUBLIC CONSULTATIONS AND REQUIRED AUTHORIZATIONS**

PennEast will obtain applicable permits and licenses relating to the aboveground facilities across or under roads, drainage facilities, waterbodies, wetlands, and through any other sites or places that a governmental license or permit may be required. Table 1.5-1 provides a list of permits and the applicable federal, state, and local agencies. Agency consultation letters to date are included in JPA Section 5 (Pennsylvania Historical and Museum Commission [PHMC] consultation) and JPA Section 7 (Threatened and Endangered [T&E] Species Consultation). PennEast will include copies of all relevant environmental permits and approvals in the construction bid packages and contracts. The contractor will be required to be familiar with all permits and licenses obtained by PennEast; the requirements of these permits/licenses will be reviewed during the Project Environmental Training. The contractor will be also required to comply with all the requirements related to the construction of the aboveground facilities and to the restoration of any areas disturbed by the construction of the certified facilities.



**Table 1.5-1  
 Required Environmental Permits and Approvals for the Project in Pennsylvania**

Agency	Permit/Approval	Status	Anticipated Filing/Receipt Dates
<b>FEDERAL</b>			
U.S. Army Corps of Engineers - Philadelphia and Baltimore Districts	Clean Water Act Section 404, Rivers and Harbors Act Section 10, and Title 33 Section 408 Approvals	Initial consultation letter sent 8/12/2014. Introduction and coordination meeting held 10/30/14. Updated route materials sent 7/24/15 and 10/01/15. Pre-application meetings held 7/13/2015 and 7/16/2015. Delineation Verifications commenced in Nov. 2015 and are ongoing.	Feb. 2016 Applications/ Nov.- Dec. 2016 Receipt
U.S. Fish and Wildlife Service - Pennsylvania	Endangered Species Act, Section 7 Consultation and Clearance	Initial consultation letter sent 8/12/2014. Introduction and coordination meeting held 10/29/14. Updated route materials sent 7/24/15 and 10/1/15. Rare, Threatened, and Endangered (RTE) species survey coordination meeting held 4/22/15. Species report submitted 10/7/15.	Oct. 2015 Consultation/ Nov.- Dec. 2016 Receipt
U.S. Fish and Wildlife Service - New Jersey	Endangered Species Act, Section 7 Consultation and Clearance	Initial consultation letter sent 8/12/2014. Consultation discussions ongoing. Updated route materials sent 7/24/15 and 10/1/15. RTE survey coordination meeting held 4/23/15. Species report submitted 10/7/15.	Oct. 2015 Consultation/ Nov.- Dec. 2016 Receipt
National Marine Fisheries Service (NMFS)	Endangered Species Act, Section 7 Consultation and Clearance	Initial consultation letter sent 8/12/2014. Response received stating that no threatened or endangered species under the jurisdiction of the NMFS are known to occur in the Project area, and no further consultation is necessary. Updated route materials sent 7/24/15 and 10/1/15. Follow-up consultation on 12/8/15 regarding in-work timing restriction for Delaware River. Consultations ongoing.	Aug. 2014 Consultation/ Nov.- Dec. 2016 Receipt



Agency	Permit/Approval	Status	Anticipated Filing/Receipt Dates
National Park Service (NPS)	NPS Consultation and Clearance for National Natural Landmarks, National Trails, and National Historic Sites	Initial consultation letter sent 8/12/2014. Introduction and coordination meeting with National Wild and Scenic Rivers Program managers held 10/1/14. Updated route materials sent 7/24/15 and 10/1/15. Held conference call on Appalachian Trail crossing on 8/11/15.	No Filing Necessary
National Resources Conservation Service (NRCS)	NRCS Consultation	Initial coordination meeting held 3/18/15. Joint agriculture community meeting held 6/2/15. Updated route materials sent 7/24/15.	No Filing Necessary



Agency	Permit/Approval	Status	Anticipated Filing/Receipt Dates
<b>STATE - PENNSYLVANIA</b>			
PADEP (Northeast and Southeast Regional Offices)	Water Obstruction and Encroachment Permits Submerged Lands License Agreements Section 401 Water Quality Certification Erosion and Sediment Control General Permit (ESCGP-2) Hydrostatic Testing Discharge General Permits (PAG-10) Plan Approval and Operating Permit for a Non-Major Source	Initial consultation letter sent 8/12/2014. Coordination meeting held 11/19/14. Updated route materials sent 7/24/15 and 10/1/15. Pre-application meeting held 7/13/15. Additional pre-application meeting scheduled for 12/17/15.	Jan. – Feb. 2016 Applications/ Nov.- Dec. 2016 Receipt
Pennsylvania Commission (PGC)	Game T&E Species Clearance Consultation and	Initial consultation letter sent 8/12/2014. Introduction and coordination meeting held 9/25/14. Special Use Permits for surveys on PGC lands issued 9/2014. Updated route materials sent 7/24/15 and 10/1/15. Appalachian Trail crossing meetings held 5/21/15 and 8/27/15. Species report submitted 10/7/15 and 11/10/15. Consultations ongoing.	Oct. 2015 Consultation/ Nov.- Dec. 2016 Receipt



Agency	Permit/Approval	Status	Anticipated Filing/Receipt Dates
Pennsylvania Fish and Boat Commission (PFBC)	T&E Species Consultation and Clearance	Initial consultation letter sent 8/12/2014. Introduction and coordination meetings held 11/4/14 and 11/24/14. Updated route materials sent 7/24/15 and 10/01/15. RTE species survey and land use consultations ongoing. Species reports submitted 10/7/15 and 11/10/15. PFBC T&E Consultation responses received 11/5/2015 and 12/10/15. Consultations ongoing.	Oct. 2015 Consultation and Feb. 2016 Applications/ Nov.- Dec. 2016 Receipt
	Permit for Use of Explosives in Commonwealth Waters		
	Aid to Navigation Plan Approval		
Pennsylvania Department of Conservation and Natural Resources (DCNR)	RTE Species Consultation and Clearance	Initial consultation letter sent 8/12/2014. Introduction and coordination meetings held 11/4/14 and 11/24/14. Updated route materials sent 7/24/15 and 10/1/15. Special Use Permits for surveys on state park lands issued 4/8/15. Species report submitted 10/7/15. DCNR response received 10/22/15. Consultations ongoing.	Oct. 2015 Consultation/ Nov.- Dec. 2016 Receipt
Pennsylvania Historical and Museum Commission (PHMC)	National Historic Preservation Act, Section 106 Consultation and Clearance	Initial consultation letter received 08/21/2014. Consultations ongoing. Updated route materials sent 7/24/15 and 10/1/15. Phase I Archeological Report and Historical Reconnaissance Report submitted 9/23/15. PHMC responses received 10/21/15 and 10/22/15. Consultations ongoing.	Sept. 2015 Consultation/ Nov.- Dec. 2016 Receipt
<b>COUNTY</b>			
Luzerne Conservation District	Erosion and Sediment Control General Permit (ESCGP-2) Technical Review	Initial consultation letter sent 8/21/2014. Pre-application meeting held 7/13/15. Additional pre-application meeting scheduled for 12/17/15. Updated route materials sent 7/24/15 and 10/1/15.	Feb. 2016 Application/ Nov.- Dec. 2016 Receipt





Agency	Permit/Approval	Status	Anticipated Filing/Receipt Dates
Carbon County Conservation District	Erosion and Sediment Control General Permit (ESCGP-2) Technical Review	Initial consultation letter sent 8/21/2014. Pre-application meeting held 7/13/15. Additional pre-application meeting scheduled for 12/17/15. Updated route materials sent 7/24/15 and 10/1/15.	Feb. 2016 Application/ Nov.- Dec. 2016 Receipt
Northampton Conservation District	County Erosion and Sediment Control General Permit (ESCGP-2) Technical Review	Initial consultation letter sent 8/21/2014. Pre-application meeting held 7/13/15. Additional pre-application meeting scheduled for 12/17/15. Updated route materials sent 7/24/15 and 10/1/15.	Feb. 2016 Application/ Nov.- Dec. 2016 Receipt
Bucks County Conservation District	Erosion and Sediment Control General Permit (ESCGP-2) Technical Review	Initial consultation letter sent 8/21/2014. Pre-application meeting held 7/13/15. Additional pre-application meeting scheduled for 12/17/15. Updated route materials sent 7/24/15 and 10/1/15.	Feb. 2016 Application/ Nov - Dec. 2016 Receipt
<b>WATERSHED-SPECIFIC REGULATORY AUTHORITIES</b>			
Delaware River Commission (DRBC)	Basin Water Withdrawal Approval and Project Review	Initial consultation letter sent 8/21/2014. Introduction and coordination meeting held 9/3/14. Updated route materials sent 7/24/15 and 10/1/15. Pre-application meetings held 7/13/15 and 12/2/15.	Feb. 2016 Application/ Mar. 2017 Receipt
Susquehanna River Commission (SRBC)	Basin Water Withdrawal Approval if more than 100,000 gallons per day averaged over 30 days	Initial consultation letter sent 8/21/2014. Introduction and coordination meeting held 11/6/14. Updated route materials sent 7/24/15 and 10/1/15.	Consultation Ongoing



## **1.6 REFERENCES**

Federal Energy Regulatory Commission (FERC). 2013. *Upland Erosion Control, Revegetation, and Maintenance Plan* (May 2013 version) and *Wetland and Waterbody Construction and Mitigation Procedures* (May, 2013 version). Washington, D.C.