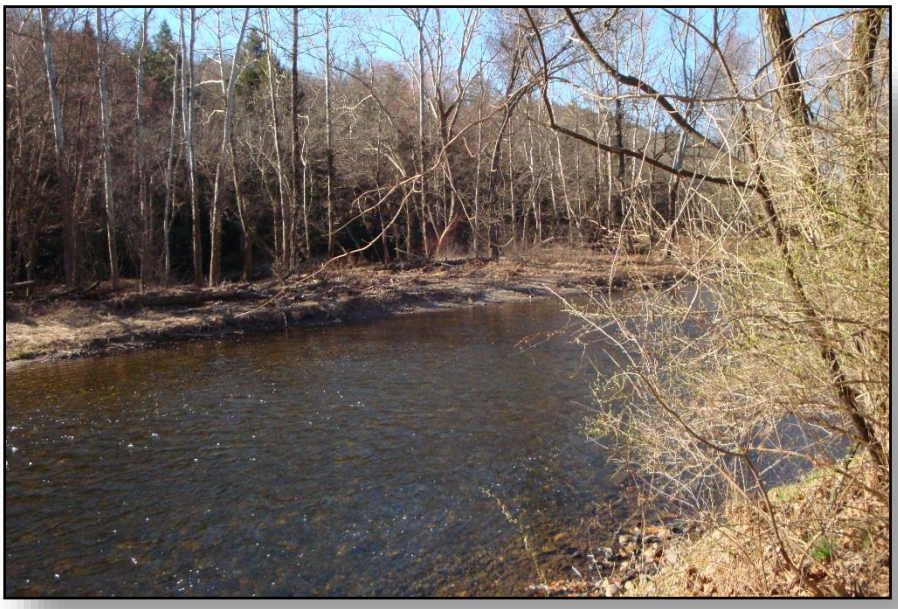
Federal Energy Regulatory Commission
Office of Energy Projects

March 2017

Millennium Pipeline Company, L.L.C. **Docket No. CP16-486-000**

Eastern System Upgrade Project

Environmental Assessment



Cooperating Agencies

NEW YORK STATE OF OPPORTUNITY. Agriculture and Markets

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

Washington, DC 20426

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply Refer To:
OEP/DG2E/Gas 2
Millennium Pipeline Company, LLC
Eastern System Upgrade Project
Docket No. CP16-486-000

TO THE PARTY ADDRESSED:

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared this Environmental Assessment (EA) of the Eastern System Upgrade Project (Project) proposed by Millennium Pipeline Company, LLC (Millennium) in the above-referenced docket. Millennium requests authorization to construct, operate, and maintain new natural gas facilities in New York consisting of (i) approximately 7.8 miles of 30- and 36-inch-diameter pipeline loop in Orange County; (ii) a new 22,400 horsepower (hp) compressor station in Sullivan County; (iii) additional 22,400 hp at the existing Hancock Compressor Station in Delaware County; (iv) modifications to the existing Ramapo Meter Station in Rockland County; (v) modifications to the Wagoner Interconnect in Orange County; (vi) additional pipeline appurtenant facilities at the Huguenot and Westtown Meter Stations in Orange County; and (vii) an alternate interconnect to the 16-inch-diameter Valley Lateral at milepost 7.6 of the Project.

The EA assesses the potential environmental effects of the construction and operation of the Project in accordance with the requirements of the National Environmental Policy Act of 1969 (NEPA). The FERC staff concludes that approval of the Project, with appropriate mitigating measures, would not constitute a major federal action significantly affecting the quality of the human environment.

The Stockbridge-Munsee Band of Mohicans, Delaware Tribe of Indians, U.S. Environmental Protection Agency and New York State Department of Agriculture and Markets participated as cooperating agencies in the preparation of the EA. Cooperating agencies have jurisdiction by law or special expertise with respect to resources potentially affected by the proposal and participate in the NEPA analysis.

The FERC staff mailed copies of the EA to federal, state, and local government representatives and agencies; elected officials; environmental and public interest groups; Native American tribes; potentially affected landowners and other interested individuals and groups; and newspapers and libraries in the Project area. In addition, the EA is available for public viewing on the FERC's website (www.ferc.gov) using the eLibrary link.

A limited number of copies of the EA are also available for distribution and public inspection at:

Federal Energy Regulatory Commission
Public Reference Room
888 First Street, NE, Room 2A
Washington, DC 20426
(202) 502-8371

Any person wishing to comment on the EA may do so. Your comments should focus on the potential environmental effects, reasonable alternatives, and measures to avoid or lessen environmental impacts. The more specific your comments, the more useful they will be. To ensure that your comments are properly recorded and considered prior to a Commission decision on the proposal, it is important that the FERC receives your comments in Washington, DC on or before **May 1, 2017.**

For your convenience, there are three methods you can use to submit your comments to the Commission. In all instances, please reference the Project docket number (CP16-486-000) with your submission. The Commission encourages electronic filing of comments and has dedicated eFiling expert staff available to assist you at 202- 502-8258 or efiling@ferc.gov.

(1) You may file your comments electronically by using the eComment feature, which is located on the Commission's website at www.ferc.gov under the link to Documents and Filings. An eComment is an easy method for interested persons to submit text-only comments on a project;

(2) You may file your comments electronically by using the eFiling feature, which is located on the Commission's website at www.ferc.gov under the link to Documents and Filings. With eFiling you can provide comments in a variety of formats by attaching them as a file with your submission. New eFiling users must first create an account by clicking on "eRegister." You will be asked to select the type of filing you are making. A comment on a particular project is considered a "Comment on a Filing"; or

(3) You may file a paper copy of your comments at the following address:

Kimberly D. Bose, Secretary
Federal Energy Regulatory Commission
888 First Street, NE, Room 1A
Washington, DC 20426

Although your comments will be considered by the Commission, simply filing comments will not serve to make the commentor a party to the proceeding. Any person seeking to become a party to the proceeding must file a motion to intervene pursuant to Rule 214 of the Commission's Rules of Practice and Procedures (Title 18 Code of Federal Regulations Part 385.214).[1] Only intervenors have the right to seek rehearing of the Commission's decision. Affected landowners and parties with environmental concerns may be granted intervenor status upon showing good cause by stating that they have a clear and direct interest in this proceeding that would not be adequately represented by any other parties. **You do not need intervenor status to have your comments considered.**

Additional information about the Project is available from the Commission's Office of External Affairs, at **1-866-208-FERC (3372)** or on the FERC website (www.ferc.gov) using the eLibrary link. Click on the eLibrary link, click on "General Search," and enter the docket number excluding the last three digits in the Docket Number field (i.e., CP16-486). Be sure you have selected an appropriate date range. For assistance, please contact FERC Online Support at FercOnlineSupport@ferc.gov or toll free at 1-866-208-3676, or for TTY, contact 1-202-502-8659. The eLibrary link also provides access to the texts of formal documents issued by the Commission, such as orders, notices, and rulemakings.

In addition, the Commission offers a free service called eSubscription, which allows you to keep track of all formal issuances and submittals in specific dockets. This can reduce the amount of time you spend researching proceedings by automatically providing you with notification of these filings, document summaries, and direct links to the documents. Go to www.ferc.gov/docs-filing/esubscription.asp.

[1] Interventions may also be filed electronically via the Internet in lieu of paper. See the previous discussion on filing comments electronically.

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TECHNICAL ABBREVIATIONS AND ACRONYMS

APE	area of potential effects
Algonquin	Algonquin Gas Transmission, LLC
ATWS	additional temporary workspace
AQCR	Air Quality Control Region
BGEPA	Bald and Golden Eagle Protection Act
CEC	Commission for Environmental Cooperation
Certificate	Certificate of Public Convenience and Necessity
CEII	Critical Energy Infrastructure Information
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
COE	U.S. Army Corps of Engineers
Columbia	Columbia Gas Transmission, LLC
Columbia Pipeline	Columbia Pipeline Group
Commission	Federal Energy Regulatory Commission
Concentric	Concentric Energy Advisors
CWA	Clean Water Act
CPV	CPV Valley, LLC
dBA	decibels on the A-weighted scale
DOT	U.S. Department of Transportation
DRN	Delaware Riverkeeper Network
Dth/d	dekatherms per day
EA	environmental assessment
ECS	Environmental Construction Standards
EI	environmental inspector
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FWS	U.S. Fish and Wildlife Service
GHG	greenhouse gas
GWP	global warming potential
HAP	hazardous air pollutant
HCA	high consequence area
HDD	horizontal directional drill
HDD Plan	Horizontal Directional Drill Contingency Plan
hp	horsepower

HUC	hydrologic unit code
IPCC	Intergovernmental Panel on Climate Change
L_{dn}	day-night sound level
L_{eq}	equivalent sound level
m^3	cubic meter
MAOP	maximum allowable operating pressure
MBTA	Migratory Bird Treaty Act
Millennium	Millennium Pipeline Company, L.L.C.
MOU	Memorandum of Understanding
MP	milepost
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NESHAP	National Emission Standards for Hazardous Air Pollutants
NGA	Natural Gas Act
NHPA	National Historic Preservation Act
NNSR	Nonattainment New Source Review
NOI	Notice of Intent
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSA	noise sensitive area
NWI	National Wetlands Inventory
NYCRR	New York Codes, Rules, and Regulations
NYNHP	New York Natural Heritage Program
NYSDAM	New York State Department of Agriculture and Markets
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Heath
NYSDOT	New York State Department of Transportation
NYSGIS	New York State Geographic Information System
NYSGS	New York State Geologic Survey
NYSOEJ	New York State Office of Environmental Justice
OEP	Office of Energy Projects
PEM	palustrine emergent
PFO	palustrine forested
PGA	peak ground acceleration
PHMSA	Pipeline and Hazardous Materials Safety Administration

Plan	FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan*
PM	particulate matter
$PM_{2.5}$	particles with an aerodynamic diameter less than or equal to 2.5 microns
PM_{10}	particles with an aerodynamic diameter less than or equal to 10 microns
Princeton Hydro	Princeton Hydro, LLC
Procedures	FERC's *Wetland and Waterbody Construction and Mitigation Procedures*
Project	Eastern System Upgrade Project
ppb	parts per billion
ppm	parts per million
psig	pounds per square inch gauge
PSD	Prevention of Significant Deterioration
PSS	palustrine scrub-shrub
Secretary	Secretary of the Federal Energy Regulatory Commission
SHPO	State Historic Preservation Officer
SIP	State Implementation Plan
SO_2	sulfur dioxide
SPRP	Spill Prevention and Response Procedures
SWAP	Source Water Assessment Program
tpy	metric tons per year
USDA	U.S. Department of Agriculture
USGCRP	U.S. Global Change Research Program
USGS	U.S. Geological Survey
VOC	volatile organic compounds
WMA	wildlife management area
µg	microgram

A. PROPOSED ACTION

1. Introduction

On July 20, 2016, Millennium Pipeline Company, L.L.C. (Millennium) filed an application with the Federal Energy Regulatory Commission (FERC or Commission) in Docket No. CP16-486-000. Millennium is seeking a Certificate of Public Convenience and Necessity (Certificate) under Section 7(c) of the Natural Gas Act (NGA) to construct and operate approximately 7.8 miles of 30- and 36-inch-diameter pipeline loop (Huguenot Loop) in Orange County, New York. This Eastern System Upgrade Project (Project) would also involve construction of a new compressor station in Sullivan County, New York on land owned by Millennium; additional compression at the Hancock Compressor Station in Delaware County, New York; modifications at the Westtown Meter Station and Wagoner Interconnect in Orange County, New York; modifications at the Ramapo Meter Station in Rockland County, New York; and other appurtenant facilities. The Project would provide approximately 223,000 dekatherms per day (Dth/d) of firm transportation service from Millennium's existing Corning Compressor Station to an interconnect with Algonquin Gas Transmission, LLC (Algonquin) in Ramapo, New York. Prior to filing its application, Millennium participated in the Commission's pre-filing review process under Docket No. PF16-3-000.

We[1] prepared this environmental assessment (EA) in compliance with the requirements of the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality regulations for implementing NEPA under Title 40 of the Code of Federal Regulations (CFR) Parts 1500-1508 (40 CFR 1500-1508), and the Commission's implementing regulations under 18 CFR 380.

The FERC is the lead federal agency for authorizing interstate natural gas transmission facilities under the NGA, and the lead federal agency for preparation of this EA. Consistent with NEPA and its respective responsibilities and regulations, the Stockbridge-Munsee Band of Mohicans, Delaware Tribe of Indians, U.S. Environmental Protection Agency (EPA), and New York State Department of Agriculture and Markets (NYSDAM) participated as cooperating agencies in the preparation of this EA. Cooperating agencies have jurisdiction by law or special expertise with respect to the environmental impacts associated with Millennium's proposal.

The assessment of environmental impacts is an integral part of FERC's decision on whether to issue Millennium a Certificate to construct and operate the proposed facilities. Our principal purposes in preparing this EA are to:

[1] "We," "us," and "our" refer to the environmental staff of the Office of Energy Projects.

- identify and assess potential impacts on the natural and human environment that would result from the proposed action;

- assess reasonable alternatives to avoid or minimize adverse effects to the environment; and

- identify and recommend mitigation measures, as necessary, to minimize environmental impacts.

Approval would be granted if, after consideration of both environmental and non-environmental issues, the Commission finds that the Project is in the public interest.

2. Purpose and Need

Millennium states that the purpose of the Project is to provide 223,000 Dth/d of firm natural gas transportation capacity from Millennium's Corning Compressor Station to an existing interconnect with Algonquin in Ramapo, New York. Millennium states that the Project facilities would also ensure that current customer demand along Millennium's system is met during the summer months and that current deliveries to interconnecting pipelines continue. A total of 202,500 Dth/d, or 91 percent of the Project capacity, is subscribed under long-term, firm contracts with local distribution companies and municipalities; as of its July 20, 2016 application, Millennium was marketing the remaining 20,500 Dth/d.

Under Section 7 (c) of the NGA, the Commission determines whether interstate natural gas transportation facilities are in the public convenience and necessity and, if so, grants a Certificate to construct and operate them. The FERC's Certificate Policy Statement[2] provides guidance as to how the Commission evaluates proposals for new construction, and establishes criteria for determining whether there is a need for a proposed project and whether it would serve the public interest. The Commission bases its decision on technical competence, financing, rates, market demand, gas supply, environmental impact, long-term feasibility, and other issues concerning a proposed project. The Commission does not direct the development of the gas industry's infrastructure regionally or on a project-by-project basis, or redefine an applicant's stated purpose.

3. Scope of the Environmental Assessment

The topics addressed in this EA include geology, soils, groundwater, surface water, wetlands, vegetation, aquatic resources, wildlife, threatened and endangered

[2] The Policy Statement can be found on our website at http://www.ferc.gov/legal/maj-ord-reg/PL99-3-000.pdf. Clarifying statements can be found by replacing "000" in the URL with "001" and "002."

species, land use, visual resources, socioeconomics, cultural resources, air quality, noise, reliability and safety, cumulative impacts, and alternatives. The EA describes the affected environment as it currently exists, discusses the environmental consequences of the Project, and compares the Project's potential impact with that of various alternatives. The EA also presents our recommended mitigation measures.

4. Public Review and Comment

On February 5, 2016, the Commission granted Millennium's request to use the FERC's pre-filing review process in Docket No. PF16-3-000. The pre-filing process was established to encourage early involvement by citizens, government entities, non-governmental organizations, and other interested parties in the development of planned natural gas transmission projects. During the pre-filing process, FERC staff worked with Millennium, cooperating agencies and interested stakeholders, including federal and state agencies, to identify and resolve Project-related issues.

Millennium hosted two open house meetings in New York to inform stakeholders about the Eastern System Upgrade Project and provide an opportunity for stakeholders to ask questions and express concerns. These meetings were held on March 30, 2016 in Orange County and on March 31, 2016 in Sullivan County. Additionally, we attended the open house meetings and conducted site visits in the Project area. Millennium also held an outreach meeting with the Town of Hancock, at the town's request, on March 29, 2016.

It should be recognized that the currently proposed route reflects modifications to the originally planned route and workspaces that Millennium incorporated during the pre-filing and application review based on discussions with landowners, land managing agencies, Project engineers, and FERC staff to avoid or minimize impacts on sensitive resources, reduce or eliminate engineering and constructability concerns, and/or avoid or minimize conflicts with existing land uses. These route variations were incorporated into the Project route and are considered part of the Project. Their associated environmental consequences were included in our environmental analysis in section B.

On May 11, 2016, the Commission issued a *Notice of Intent to Prepare an Environmental Assessment for the Planned Eastern System Upgrade Project and Request for Comments on Environmental Issues* (NOI). The NOI was published in the Federal Register[3] and was mailed to 513 interested parties, including federal, state, and local government representatives and agencies; elected officials; affected landowners; environmental and public interest groups; potentially interested Native American tribes; other interested parties; and local libraries and newspapers. The NOI also established a 30-day scoping period and requested that the public provide written comments on

[3] 81 Federal Register 31922

specific concerns about the planned Eastern System Upgrade Project or issues that should be considered during preparation of the EA.

In response to the NOI, the Commission received 452 comment letters during the public scoping period (May 11 through June 10, 2016); in addition, 66 letters were filed prior to issuance of the NOI. The environmental comments received in response to the NOI are summarized below and addressed, as applicable, in relevant sections of this EA as shown in table A-1.

Table A-1
Issues Identified During the Public Scoping Process

Issue	EA Section Addressing Issue
Air quality, GHG, climate change	section B.8.1
Alternatives (including pipeline routing alternatives)	section C
Cultural resources	section B.7
Cumulative impacts (including those associated with Millennium's existing Hancock and Minisink Compressor Stations)	section B.10
Health risks associated with air emissions from the Project	section B.8.1
Land use, recreation, and visual impacts (including impacts on the Excelsior Sportsman's Club and former Eldred Preserve)	section B.5
Millennium's ECS	sections A.7, B.2, B.3, and B.5
Project purpose and need	section A.2
Safety	section B.9
Socioeconomic impacts (including impacts on property values and environmental justice)	section B.6
Soils (including erosion and compaction)	section B.1.2
Surface water (including floodplains and the Neversink River), groundwater, and wetlands	section B.2
Vegetation and wildlife (including migratory birds and the Mongaup Valley Wildlife Management Area)	section B.3
Threatened and endangered species	section B.4

GHG = greenhouse gas; ECS = Environmental Construction Standards

Most comments received are in opposition to the Eastern System Upgrade Project, and many express opposition specific to the emissions associated with the Highland Compressor Station and asked that electric motor-driven compressor units be considered in lieu of the proposed natural gas-fired compressor units. Commentors question the need for the Project; express opposition to fossil fuels in favor of renewable energy; and

raise concerns regarding health risks associated with air emissions from Millennium's existing compressor stations, the proposed Highland Compressor Station, and natural gas sourced from hydraulic fracturing. The development of natural gas in shale plays by hydraulic fracturing is not the subject of this EA nor is the issue directly related to the Project. Commentors also raise concerns regarding cumulative impacts of the Eastern System Upgrade Project, Millennium's existing compressor stations, the Valley Lateral Project, and the CPV Valley, LLC (CPV) Valley Energy Center. These projects are discussed in more detail in section B.10, Cumulative Impacts.

Commentors raise concern for the siting of the Highland Compressor Station in proximity to schools. The closest school is about 3.9 south of the of the proposed compressor station; as such, potential impacts at this location would be associated with air emissions, which are discussed in section B.8.1.

Commentors also express concerns regarding Project impacts on surface and groundwater quality; wetlands; floodplains; wildlife and vegetation; threatened and endangered species; cultural resources and historic structures; soils; property values; land use; safety, including strains on local emergency services; pollution prevention practices; air quality; methane leaks and greenhouse gas (GHG) emissions; and climate change.

The EPA comments that Rockland County is designated as a nonattainment area and that the EA should include an evaluation of alternatives; cumulative, safety, direct and secondary impacts; greenhouse gas emissions; and climate change. The EPA also asks that the EA include an analysis of environmental justice based on the 1993 Council on Environmental Quality (CEQ) Guidance and a health impact assessment. NYSDAM comments are regarding Millennium's Environmental Construction Standards (ECS).

The Nature Conservancy provides comments raising concerns for Project impacts on the Neversink River ecosystem and floodplain, including wetland habitat and the dwarf wedgemussel. The Delaware Riverkeeper Network (DRN) provides a list of projects that should be included in the cumulative analysis and asks that the environmental assessment include an assessment of air quality impacts and associated public safety and health effect. The DRN also questions the need for a new compressor station in proximity to Millennium's existing compressor stations; and expresses concerns for Project impacts on wildlife, water resources, including the Upper Delaware River and Halfway Brook, and the local economies.

Commentors state that the Project would violate local zoning laws for certain municipalities in the Project area, and several towns passed resolutions opposing the Project. As discussed in section A.1, FERC is lead federal agency with siting authority under the NGA, which preempts local zoning laws.

Several commentors request access to Project materials that Millennium filed to the FERC docket as Critical Energy Infrastructure Information (CEII) and that the

scoping period be extended to allow adequate time for review of these materials. Materials filed as CEII contain specific engineering, vulnerability, and detailed design about a project, and are exempt from mandatory disclosure under the Freedom of Information Act. However, the Commission has established procedures for gaining access to CEII materials, which is subject to the Commission's policy regarding CEII: Order Nos. 702, 630, 630-A, 643, 649, and 683 under the CEII Regulations Section.[4] In response to these comments, we requested in our environmental data request issued on October 7, 2016, that Millennium file public versions of the figures depicting the temporary workspace and permanent facility boundaries of the proposed compressor stations; the figures were filed on October 27, 2016. Regarding the extension of the scoping period, we have reviewed all comment letters received prior to issuance of this EA, regardless of whether comments were received during the scoping period. After the scoping period, we received 235 additional comment letters. The nature of these comments was generally similar to those comments received during the scoping period, opposing the Project, with specific opposition related to impacts associated with the Highland Compressor Station.

The New York State Department of Environmental Conservation (NYSDEC) comments on the state permits that would be required for the Project and its reliance on the EA in assessing whether or not the Project complies with permit standards. Permits and approvals for the Project are summarized in table A-11.

In response to a letter sent by Millennium, the Delaware River Basin Commission filed a letter to the FERC docket that describes their examination of the Project and the determination that the Project would not require its review and approval because substantial effects on water resources would not likely occur.[5]

Audubon New York raises concerns for the siting of the Highland Compressor Station within the Mongaup Valley Wildlife Management Area (WMA), which is designated as an Important Bird Area and which provides habitat for bald eagles and other species that use forested habitat. Audubon New York recommends that bird surveys be conducted at the Highland Compressor Station site. Because Millennium has committed to avoid impacts on migratory birds through construction timing restrictions, as described in section 3.3, and would continue to consult with the FWS regarding impacts on migratory birds, we do not recommend that bird surveys be conducted.

[4] Available on FERC's website, located at https://www.ferc.gov/legal//maj-ord-reg/land-docs/ceii-rule.asp.

[5] Comment letter provided as part of the public record for Docket No. PF16-3-000 on the FERC website at http://www.ferc.gov/docs-filing/elibrary.asp, in accession 20161206-0100.

We also received comments from the Stockbridge-Munsee Tribal Historic Preservation Office pursuant to Section 106 of the National Historic Preservation Act (NHPA).

Two reports commissioned by the DRN were filed to the docket. Princeton Hydro, LLC (Princeton Hydro) provides a report on their findings of the environmental impacts of the Project and Key-Log Economics conducted an analysis of economic effects of the Project. The report by Princeton Hydro included several comments regarding erosion and sediment control, soil compaction, the potential for wetland and waterbody impacts (including stream erosion), impacts from trench dewatering, and clearing of vegetation and associated habitat fragmentation. The Princeton Hydro report also expresses concern regarding impacts from the discharge of hydrostatic test water and water used for horizontal directional drill (HDD) operation at the Neversink River crossing.

The report by Key-Log Economics includes a review of Concentric Energy Advisors' (Concentric) analysis of the economic benefits of the Project. Key-Log Economics believes that the Concentric analysis overstates the economic benefits of the Project and fails to consider the economic costs of the Project (i.e., the social cost of carbon, public health, and reduced property values). While the Concentric analysis was prepared for Millennium, this report was not filed with the formal FERC application, nor does it appear to be the source of the economic data reported in Resource Report 5 – Socioeconomics. As such, the Concentric report and the data within were not used in the preparation of this EA.

Comments were also filed by landowners in proximity to the proposed Highland Compressor Station expressing concerns for impacts on property values and the potential increased rates for homeowner's insurance. Impacts on property values and homeowner's insurance are discussed in section B.6.5. Several comments were filed identifying specific special use areas that could be impacted by the Project, including the Bethel Woods Center for the Arts, Catskills Park, a museum in Livingston Manor, and the former Eldred Preserve. These areas are discussed in section B.5.3. We also received comments related to safety concerns for residences in proximity to the new compressor station, in the event of a fire or explosion, including Chapin Estates, Ozdan Development, and Amytra Development, and members of the Excelsior Sportsman's Club. The potential impacts of the proposed Highland Compressor Station are described further throughout section B of this EA, as well as an alternatives analysis in section C.6. See section B.9 for a discussion of safety standards for the Project. Also, Chapin Estates, Ozdan Development, and Amytra Development, and the Excelsior Sportsman's Club are discussed in section B.5.2 and B.5.3, respectively.

One landowner near milepost (MP) 3.4 of the Huguenot Loop filed a comment stating that the proposed pipeline route across his property would result in the removal of 1 acre of forested land, and that removal of these trees would significantly alter the

viewshed and diminish privacy. Since this comment was filed, Millennium has incorporated an HDD for installation of the pipeline that would mitigate impacts on this and the neighboring parcels between MP 2.9 and 3.8 (see section A.8.2).

5. Proposed Facilities and Location

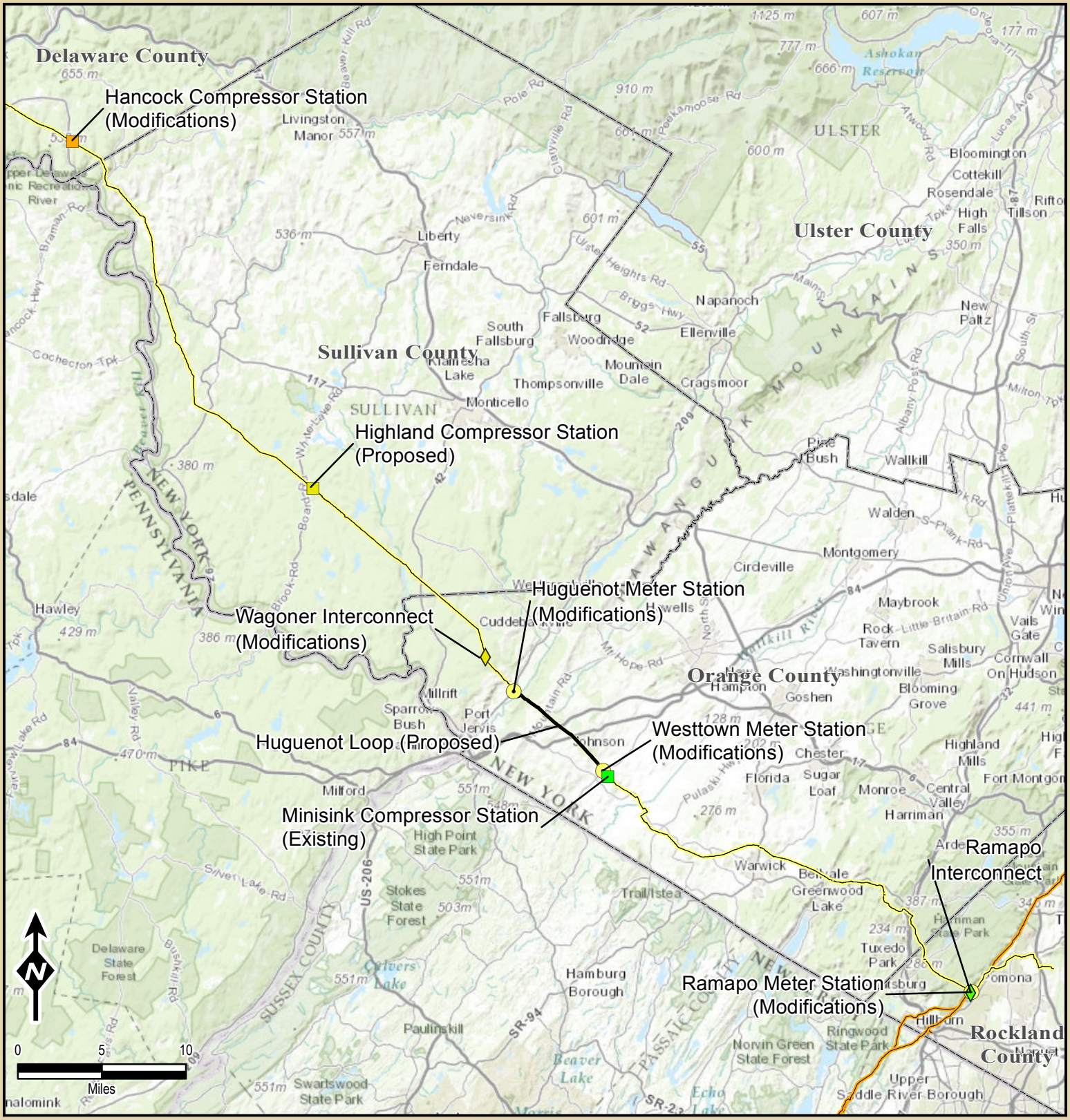
The natural gas facilities proposed for the Eastern System Upgrade Project would include the following, all located in New York:

- about 7.8 miles of new, 30- and 36-inch-diameter pipeline looping along Millennium's existing mainline right-of-way in Orange County (Huguenot Loop);
- a new 22,400 horsepower (hp) compressor station in Sullivan County (Highland Compressor Station);
- an additional 22,400 hp of compression at the existing Hancock Compressor Station in Delaware County;
- modifications to the Ramapo Meter Station in Rockland County;
- modifications to the Wagoner Interconnect in Orange County;
- an alternate interconnect to the 16-inch Valley Lateral Pipeline[6] at MP 7.6 of the Huguenot Loop (Alternate Interconnect); and
- appurtenant facilities including pig[7] launcher/receivers at MP 0.1 of the Huguenot Loop and at the Huguenot and Westtown Meter Stations in Orange County.

Additionally, 12 temporary access roads, 8 permanent access roads, 4 contractor/pipe yards, and 3 staging areas are proposed for use during the Project. The general location of the Project is shown in figure 1, and U.S. Geological Survey (USGS) 7.5-minute quadrangle topographic maps are included in appendix A.

[6] The Valley Lateral Pipeline would provide transportation capacity for 130,000 Dth/d of natural gas to serve the new 650 megawatt gas-powered CPV Valley Energy Center in Orange County, New York. The Valley Lateral Project (CP16-17-000) was issued a Certificate on November 9, 2016.

[7] A pipeline "pig" is a device to clean or inspect the pipeline. A pig launcher/receiver is an aboveground facility where pigs are inserted or retrieved from the pipeline.



Eastern System Upgrade Project Overview

Figure 1

5.1 Pipeline Facilities

Millennium proposes to construct about 0.1 mile of new 30-inch-diameter pipeline and 7.7 miles of new 36-inch-diameter pipeline looping along its existing mainline right-of-way in Orange County, New York. The Huguenot Loop would interconnect with Millennium's existing mainline at the existing Huguenot Meter Station in Deer Park, New York (MP 0.0) and the Westtown Meter Station in Minisink, New York (MP 7.8). The current maximum allowable operating pressure (MAOP) of Millennium's existing 24-inch mainline in this location is 936 pounds per square inch gauge (psig). The Huguenot Loop would be constructed to have a MAOP of 1,350 psig and a maximum operating pressure of 1,200 psig. In addition to the pipeline loop, Millennium would expand its existing cathodic protection[8] system by installing below-grade rectifiers along the Huguenot Loop that would rely on large anode beds to protect long segments of pipe from corrosion. One new cathodic protection groundbed is proposed outside of Millennium's permanent right-of-way near MP 5.0, where anodes would be installed at a depth of five feet of cover. Following construction, the groundbed would be maintained as open land. Existing power lines would be used for the groundbed, and no new power poles would be required.

5.1 Aboveground Facilities

Table A-2 summarizes the aboveground facilities that would be constructed or modified for the Project.

Compressor Stations

Highland Compressor Station

Millennium proposes to construct a new compressor station with one 22,400 hp Solar Titan 130E gas-fired compressor unit housed within a compressor building. The compressor facilities would include valves, filtering, and a fuel gas heater. The Highland Compressor Station site would also include an auxiliary building for station controls, communication equipment, a compressed air system, emergency electrical power generation, parking and access areas, and an on-site water well and sanitary sewer system. The facility would be fenced. Millennium would construct stormwater management facilities, including bioretention and detention basins, to treat runoff during frequent storm events and store runoff during major storm events, to ensure that the

[8] Cathodic protection is a technique to reduce corrosion (rust) of the natural gas pipeline through the use of an induced current or a sacrificial anode (like zinc) that corrodes at a faster rate to reduce corrosion. A rectifier is a device that converts alternating current, which periodically reverses direction, to direct current, which flows in only one direction.

operational footprint of the Highland Compressor Station would not increase stormwater discharge rates and volumes off the property.

Table A-2
Proposed Aboveground Facilities for the Eastern System Upgrade Project

Facility Type and Name	Approximate MP	Town, County	Description
Compressor Stations			
Highland Compressor Station	N/A	Highland, Sullivan	Construction of a new compressor station with one 22,400 hp Solar Titan 130E compressor unit.
Hancock Compressor Station	N/A	Hancock, Delaware	Installation of a new Solar Titan 130E compressor unit, totaling 22,400 hp, and re-staging the existing Solar Mars compressors (15,900 hp), for a total of 38,300 hp.
Meter Stations			
Wagoner Interconnect	N/A	Deerpark, Orange	Removal of an existing indirect heater.
Huguenot Meter Station	0.0	Deerpark, Orange	Removal of an existing 30-inch-diameter pig receiver and extension of a 30-inch-diameter Millennium Pipeline. Installation of new regulator facilities and a new 24-inch-diameter pig barrel for the existing 24-inch-diameter Millennium Pipeline. Installation of an indirect heater, moved from the Wagoner Interconnect.
Westtown Meter Station	7.8	Minisink, Orange	Installation of a new 36-inch-diameter pig receiver for the Huguenot Loop. Installation of a new 24-inch-diameter receiver barrel to the existing 24-inch-diameter Millennium Pipeline and a new 30-inch pig barrel for the existing 30-inch-diameter Millennium Pipeline. Addition of overpressure to protect the 24-inch-diamter, 920 pounds per square inch MAOP pipeline.
Ramapo Meter Station	N/A	Ramapo, Rockland	Installation of new filter/separators, meters, heater, and flow and pressure control regulation at the existing Ramapo Meter Station.
Other Appurtenant Facilities			
Pig launcher/receiver	0.1	Deerpark, Orange	Installation of a new 30-inch-diameter pig receiver facility and a new 36-inch-diameter pig launcher facility for the Huguenot Loop.
Alternate Interconnect	7.6	Minisink, Orange	Installation of a 12-inch-diameter side tap on the 36-inch-diameter Huguenot Loop, construction of a 12-inch-diameter lateral and tie-in to the 16-inch-diameter Valley Lateral Pipeline.

Electric power and communications utilities would be supplied by local utility companies; no new utility rights-of-way are planned to support the facility. Non-jurisdictional facilities are further addressed in section A.9.

Hancock Compressor Station

At the existing Hancock Compressor Station in Delaware County, New York, Millennium proposes to install a new 22,400 hp Solar Titan 130E gas-fired compressor unit housed within a new compressor building and re-stage its existing Solar Mars compressor units, which total 15,900 hp. The compressor facilities would include valves, filtering, gas after-coolers, an emergency generator, and a fuel gas heater. A new auxiliary building would also be constructed. Millennium would modify its existing stormwater management facilities and construct a new bioretention area to accommodate stormwater runoff at the modified Hancock Compressor Station.

Upgrades would be required on the existing electric power utility lines that supply the facility; no new utility rights-of-way are planned to support the facility. Non-jurisdictional facilities are further addressed in section A.9.

Meter Stations

Wagoner Interconnect

Modifications to the Wagoner Interconnect in Orange County, New York would involve removal of one aboveground in-line heater, which would be moved to the Huguenot Meter Station to heat gas before it enters Millennium's existing mainline. All work at the Wagoner Interconnect would occur above ground and an existing permanent access road would be used at the site, without modification.

Huguenot Meter Station

At the Huguenot Meter Station, Millennium would remove the existing 30-inch pig receiver piping assembly and would extend Millennium's 30-inch-diameter pipeline to the planned new 30-inch pig receiver facility described below. In addition, Millennium would install regulator facilities, a 24-inch pig launcher on the existing piping assembly, and install the heater moved from the Wagoner Interconnect along the existing mainline.

Westtown Meter Station

Millennium would install a new pig receiver at the terminus of the proposed new Huguenot Loop at its existing Westtown Meter Station in Orange County, New York. Millennium would also install a new 24-inch pig receiver and 30-inch launcher on existing piping assemblies associated with its existing mainline pipeline, and would add overpressure protection to the existing 24-inch-diameter mainline.

Ramapo Meter Station

The Ramapo Meter Station in Rockland County, New York is located where Millennium's existing mainline interconnects with Algonquin's pipeline. Millennium and Algonquin both independently own and operate facilities within the Ramapo Meter Station site; Millennium would modify the existing facility to install a new in-line heater, over pressure protection, filter, metering facilities, and valves. Millennium would use the existing permanent access road to the Ramapo Meter Station for construction and operation of the Project, and plans to clear trees for maintenance along the existing road and widen the access road entrance as part of the Project.

Other Appurtenant Facilities

Millennium proposes to install a 30-inch pig receiver and 36-inch pig launcher facility at MP 0.1 along the Huguenot Loop. The pigging facilities would be within a new fenced boundary within Millennium's existing permanent right-of-way.

In addition, Millennium would construct an Alternate Interconnect to its Valley Lateral Pipeline at MP 7.6. The Alternate Interconnect would consist of a 12-inch-diameter side tap and associated 300-foot-long pipeline installed on the proposed 36-inch Huguenot Loop that would supply natural gas to the Valley Lateral Pipeline if service were interrupted on Millennium's existing mainline.

6. Land Requirements

Construction of the Project would affect 209.2 acres of land, including additional temporary workspace (ATWS), staging areas, access roads, and aboveground facilities. Following construction, about 139.9 acres would revert to pre-construction conditions and uses. The remaining 69.3 acres, including the permanent pipeline easement and aboveground facility sites, would be retained for operation of the Project. Table A-3 provides acreage requirements for each of the Project facilities. Environmental surveys are complete for all workspaces proposed for construction and operation of the Project.

Table A-3
Summary of Land Requirements for the Eastern System Upgrade Project[a]

Facility	Land Affected During Construction[b] (acres)		Land Affected During Operation (acres)	
	Within Existing Right-of-Way/ Facility Boundaries	Outside Existing Right-of-Way/ Facility Boundaries	Within Existing ROW/ Facility Boundaries	Outside Existing ROW/ Facility Boundaries
Pipeline Facilities[c]				
Pipeline right-of-way	28.0	54.1	16.3	18.8
ATWS	1.3	28.4	0.0	0.0
Access roads	0.0	6.4	0.0	2.3
Contractor/pipe yards and staging areas	0.0	37.2	0.0	0.0
Cathodic protection groundbed	0.0	0.2	0.0	0.2
Aboveground Facilities				
Highland Compressor Station	0.0	17.7	0.0	5.5
Hancock Compressor Station	0.7	12.2	0.6	5.0
Wagoner Interconnect	2.2	0.0	2.2	0.0
Huguenot Meter Station	0.4	<0.1	0.4	<0.1
Westtown Meter Station	0.4	0.2	0.4	0.2
Ramapo Meter Station	1.9	4.4	1.9	1.8
Pig launcher/receiver	0.1	0.3	0.1	0.3
Alternate Interconnect[d]	0.2	0.0	0.2	0.0
Access roads[e]	2.8	10.2	2.8	10.2
Project Total	**38.0**	**171.3**	**24.9**	**44.3**
Combined Total	***209.2***		***69.3***	

[a] The numbers in this table have been rounded for presentation purposes. As a result, the totals may not reflect the sum of the addends.
[b] Land affected during construction includes both temporary and permanent work areas.
[c] The operational land requirements for the pipeline facilities include the new permanent easement for the Huguenot Loop and the existing permanent easement for the Millennium Pipeline where collocated
[d] The Alternate Interconnect would be constructed within the pig launcher/receiver facility associated with Millennium's Valley Lateral Project.
[e] Land affected during operation for the permanent access road at the Highland Compressor Station site includes areas for post-construction stormwater management.

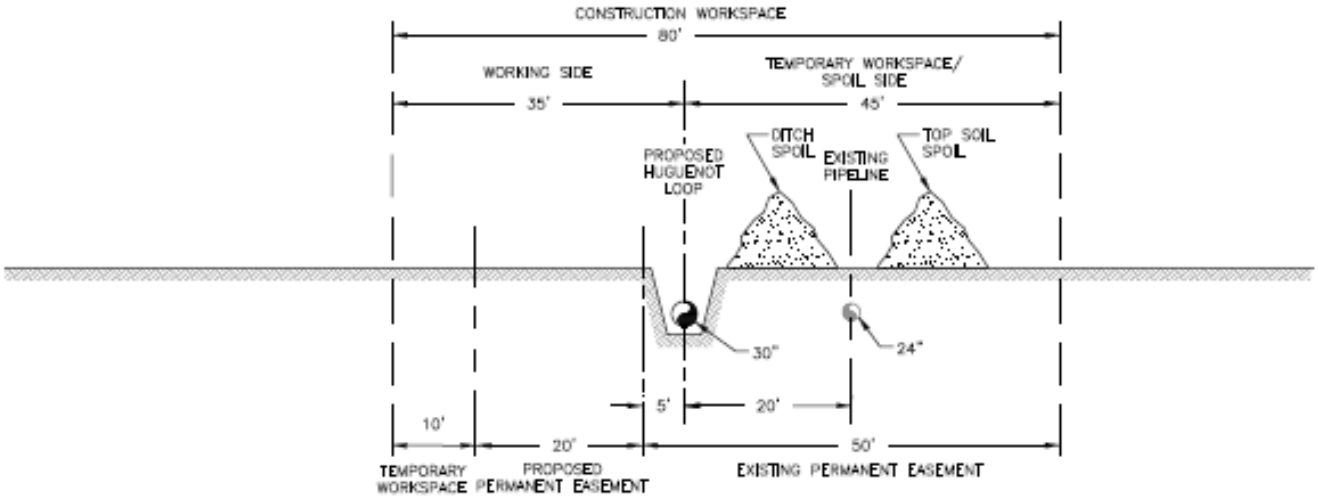
6.1 Pipeline Facilities

The construction right-of-way for the 30-inch-diameter pipeline (between MP 0.0 and 0.1) would range from 80 and 125-feet-wide. The construction right-of-way for the 36-inch-diameter pipeline would typically be 125-feet-wide in upland areas and 75-feet-wide at wetland and waterbody crossings, but would vary for site-specific conditions. In some locations, Millennium would reduce the pipeline right-of-way to avoid or minimize impacts on residences or other sensitive resources. We conducted an analysis of Millennium's proposed 125-foot-wide typical construction right-of-way and with consideration of collocation with its existing pipeline, requirements for construction in agricultural land, locations of steep side slopes, and other site-specific constraints, we conclude that the 125–foot right-of-way is justified. The land requirements for the Project are provided in table A-3 and figure 2 provides a typical construction diagram for the Project.

About 88 percent, or 6.9 miles, of the pipeline would be collocated with Millennium's existing mainline right-of-way. Where collocated, the Huguenot Loop would typically be offset 25 feet from the existing mainline, and Millennium would use 45 feet of the existing, maintained permanent easement as construction workspace for the Huguenot Loop. However, the offset would vary for site-specific conditions as depicted in the typical construction drawings included in Millennium's ECS. The ECS is more fully described in section A.8.

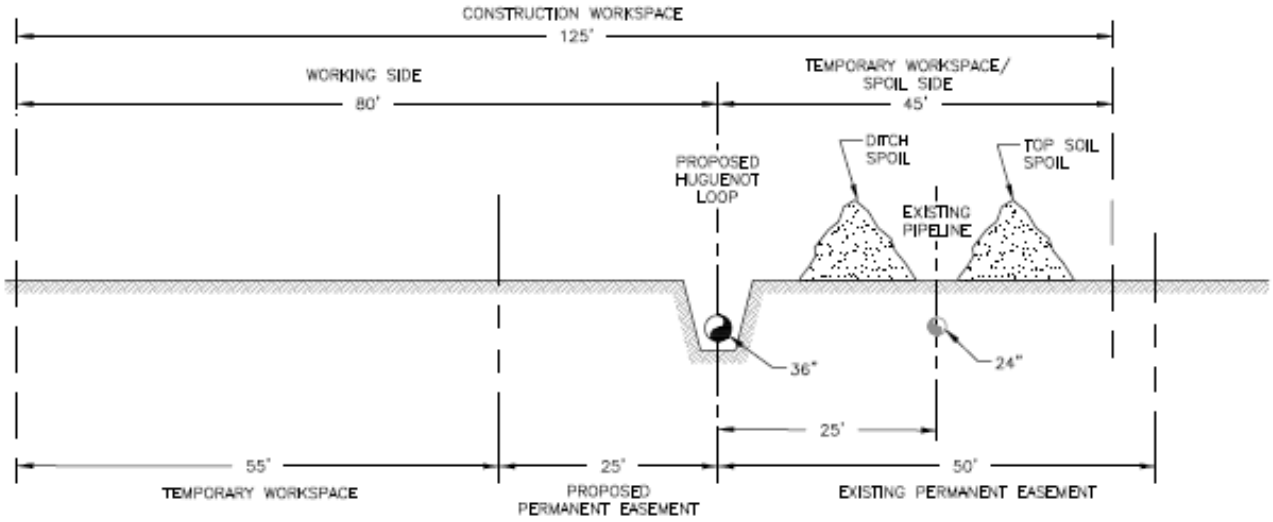
Table A-4 summarizes the right-of-way collocation along the Huguenot Loop, including the maximum distance between the Huguenot Loop and Millennium's existing mainline, and provides justification where the distance between the pipelines would be greater than 25 feet. The proposed permanent right-of-way for the Huguenot Loop would generally be 50-feet-wide. Where collocated with Millennium's existing mainline right-of-way, Millennium proposes to retain 25 feet of permanent easement in addition to its existing easement. The Huguenot Loop alignment is not proposed to be collocated with the existing mainline along the HDD crossing of the Neversink River (MP 0.2 to 1.1). HDD construction is discussed in section A.8.2.

TYPICAL CONSTRUCTION WORKSPACE



DETAIL "C" – WORKING SIDE TO THE NORTH

MP 0.05 TO 0.07



DETAIL "D" – WORKING SIDE TO THE NORTH

MP 0.11 TO 0.16	MP 1.69 TO 2.48	MP 4.66 TO 4.86	MP 5.82 TO 5.93
MP 1.08 TO 1.42	MP 2.50 TO 2.85	MP 4.94 TO 5.15	MP 5.95 TO 5.99
MP 1.46 TO 1.61	MP 3.77 TO 3.85	MP 5.25 TO 5.64	MP 6.02 TO 6.35
MP 1.63 TO 1.64	MP 3.90 TO 3.97	MP 5.65 TO 5.79	MP 6.37 TO 6.74

Eastern System Upgrade Project
Typical Pipeline Construction Diagrams

Figure 2

Table A-4
Collocation of the Huguenot Loop with Millennium's Existing Pipeline

Location (MP)	Total Length (feet)	Maximum Distance between Existing Pipeline and Loop (feet)	Collocated with Existing Pipeline	Justification for Deviation from the Existing Pipeline
0.0	158	70	Yes	Pipeline entering Huguenot Meter Station
0.0 – 0.2	792	25	Yes	N/A
0.2 – 1.1	4,752	1,513	No	Neversink River HDD
1.1 – 1.8	3,379	25	Yes	N/A
1.7 – 1.8	211	28	Yes	Slight variations
1.8 – 1.9	528	25	Yes	N/A
1.9 – 4.1	11,986	25	Yes	N/A
4.1 – 4.8	3,590	36	Yes	Interstate Highway 84 HDD
4.8 – 6.1	6,547	25	Yes	N/A
6.1 – 7.8	9,187	25	Yes	N/A

Millennium would require ATWS outside the construction right-of-way for road, wetland, and waterbody crossings; at HDD entry and exit points; for storage of segregated topsoil; in areas with steep side slopes; for storage of construction materials; for equipment movement and turn-arounds; and for other site-specific constraints (see appendix B). Millennium would generally locate ATWS a minimum of 50 feet from waterbody and wetland edges, as required by FERC's *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures), except where a reduced set-back is necessary for site-specific reasons (see appendix C). In addition, Millennium would not stockpile vegetation within 100 feet from NYSDEC-regulated or eligible wetlands. Although Millennium has identified all areas where ATWS would be currently required, additional or alternative areas could be identified in the future because of changes in construction requirements at specific sites, and Millennium would be required to file information on each of those areas for Commission review and approval prior to use in accordance with recommendation 5 in section D of this document. Millennium would restore all ATWS to pre-construction conditions, to the extent practicable, and allow these areas revert to previous uses following construction.

6.2 Aboveground Facilities

Compressor Stations

Millennium has purchased an 81-acre site for construction of the Highland Compressor Station in Sullivan County, New York; construction of this compressor station would temporarily require 17.7 acres and 5.5 acres would be permanently affected by station operations.

Millennium's existing Hancock Compressor Station is within a 76-acre site owned by Millennium in Delaware County, New York; expansion of the compressor station would require 12.9 acres of construction workspace. Operation of new facilities would require a 5.0-acre permanent facility expansion. To accommodate the facility expansion, Millennium is negotiating the purchase of an additional 15 acres of land adjacent to its existing facility site, most of which would not be affected by construction and operation.

Meter Stations

Modification of the Ramapo Meter Station would require 6.3 acres for construction and a 1.8-acre permanent facility expansion. The expansion would be on land owned by Rockland County within Kakiat County Park (see section B.5.3).

Installation of a new pig receiver at the existing Westtown Meter Station would require a total of 0.6 acre for construction and a permanent extension of 0.2 acre to the existing fenced facility.

Installation of the heater moved from Millennium's existing Wagoner Interconnect to the Huguenot Meter Station would require less than 0.1 acre expansion of the existing Huguenot Meter Station; the total construction and operation workspace at this site would be 0.4 acre. All work at the Wagoner Interconnect would occur within the existing fenced facility boundary.

Other Appurtenant Facilities

Millennium's proposed new pig launcher/receiver at MP 0.1 would require a 0.4-acre area for construction and operation, of which 0.1 acre is within the permanent easement for Millennium's existing pipeline. The Alternate Interconnect would be constructed within the pig launcher/receiver proposed for the Valley Lateral Project, and within property owned by Millennium that would be permanently maintained as open land.

6.3 Contractor/Pipe Yards and Staging Areas

Millennium has identified four contractor/pipe yards and three staging areas that would be used for storage of pipe and contractor materials, staging construction operations, and temporary construction offices; these areas are located off the proposed pipeline right-of-way (see table A-5). Contractor/Pipe Yards 2 and 3 are on land owned by Millennium; all other contractor/pipe yards and staging areas would be on land leased by Millennium for use during construction. Upon completion of construction, these areas would be restored to preconstruction conditions to the extent practicable and allowed to revert to previous land uses.

Table A-5
Contractor/Pipe Yards and Staging Areas along the Eastern System Upgrade Project

Name	Location (Nearest MP)	Size (acres)	Current Land Use
Contractor/Pipe Yard 4	0.7 mile northwest of MP 0.1	9.6	Open land
Contractor/Pipe Yard 1	0.1 mile southwest of MP 0.1	8.6	Open land
Staging Area 2	MP 4.7	4.5	Agricultural land
Contractor/Pipe Yard 2	MP 7.5 (northeast)	3.6	Open land
Contractor/Pipe Yard 3	MP 7.5 (southwest)	6.4	Open land, industrial/commercial, upland forest
Staging Area 3	MP 7.7 (west)	2.4	Agricultural land, open land
Staging Area 4	MP 7.7 (east)	2.0	Open land, agricultural land
Total		**37.2**	

6.4 Access Roads

Existing public and private roads would be used to the extent feasible to access the pipeline right-of-way and aboveground facilitates. Millennium has identified 20 access roads proposed for use, including 12 temporary access roads for use during construction and 8 permanent roads for use during construction and operation (see table A-6). Of those, 16 are existing roads and 4 are proposed new for the Project.

Modifications or improvements would be required for existing roads proposed for temporary use, including widening and gravelling. After construction, Millennium would remove the new temporary access roads and return them to pre-construction conditions. The existing and new roads proposed for permanent use would be paved, and would be maintained for the life of the Project to access the Project facilities.

Table A-6
Access Roads Proposed for Use on the Eastern System Upgrade Project

Access Road	Nearest MP	Construction Status	Existing or New	Modifications	Length (feet)	Area (acres)[a]
Huguenot Loop						
TAR-0012	Contractor/ Pipe Yard	Temporary	Existing	None	954	0.3
TAR-0001	0.0	Temporary	Existing	None	68	0.2
PAR-0001	0.0 to 0.1	Permanent	New	Clear, grade, and gravel.	689	0.2
PAR-0002	0.0	Permanent	New	Grade, widen, and add gravel	144	0.1
PAR-002A	0.0	Permanent	New	Grade and add gravel	248	0.1
TAR-0011	0.3	Temporary	Existing	Trim vegetation, add gravel	969	0.3
TAR-0002	0.4	Temporary	Existing	Widen, add gravel	1,252	0.4
TAR-0009	0.9	Temporary	Existing	Trim vegetation, add gravel	385	0.3
TAR-0010	0.9	Temporary	Existing	Trim vegetation, add gravel	111	0.1
TAR-0003	0.9 to 1.1	Temporary	Existing	Clear/trim, widen, add gravel	2,272	1.0
TAR-0004	2.9	Temporary	Existing	Clear, grade, gravel.	135	0.1
TAR-0005	3.9	Temporary	Existing	Widen, add gravel	1,212	0.4
TAR-0006	4.8	Temporary	Existing (extend 70-feet)	Extend, widen, add gravel	969	0.3
TAR-0007	7.2	Temporary	Existing	Grade, gravel	883	0.3
PAR-0003	7.6	Permanent	Existing	None	3,147	1.9
TAR-0008	7.8	Temporary	Existing	None	375	0.4
Highland Compressor Station						
Highland PAR	N/A	Permanent	New	Clear, cut and fill, grade, gravel, pave, install stormwater controls	3,487	10.2
Hancock Compressor Station						
Hancock PAR	N/A	Permanent	Existing	None	653	0.3
Ramapo Meter Station						
Ramapo PAR	N/A	Permanent	Existing	Tree clearing only; entrance widening	2,359	1.1
Wagoner Interconnect						
PAR- 0004	N/A	Permanent	Existing	None	4,795	1.4

TAR = temporary access road; PAR = permanent access road.

[a] Access road widths are typically 15 to 30-feet-wide but would be as narrow as 12-feet-wide (PAR-0004) and as wide as 98- feet-wide (portions of TAR-0008).

7. Construction Schedule and Workforce

Millennium anticipates that construction of the Project would commence in September 2017, pending the Commission's approval and receipt of all other necessary permits and regulatory approvals; construction of the Project would occur over a one-year period. Millennium's projected in-service date is September 2018. As discussed in sections B.3.3 and B.4, Millennium plans to clear trees between October 1 and March 31 to minimize potential impacts on nesting migratory birds and state and federally listed bats. Millennium is proposing to complete Project construction using one construction "spread" (spreads are construction areas with separate crews), as well as smaller work crews at HDD, meter station, and pig launcher/receiver locations.

A separate construction crew would be used for each compressor station. Construction of the new Highland Compressor Station is anticipated to require between 8 and 10 months; modifications at the Hancock Compressor Station and Ramapo Meter Station is expected to require between 4 and 8 months. The estimated peak construction work force required for the Project is 325 workers; in addition, two new staff would be required for operation of the Highland Compressor Station.

8. Construction, Operations, and Maintenance Procedures

The Project would be designed, constructed, operated, and maintained in accordance with applicable requirements defined by U.S. Department of Transportation (DOT) regulations in 49 CFR 192, *Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards*; the Commission's Siting and Maintenance Requirements with 18 CFR 380.15; and other applicable federal and state safety regulations. Among other design standards, Part 192 specifies pipeline material and qualification, minimum design requirements, and protection from internal, external, and atmospheric corrosion.

Generally, the pipeline would be installed using conventional overland pipeline construction techniques, during which the construction spread proceeds along the pipeline right-of-way in one continuous operation, with the entire process coordinated to minimize the total time a tract of land is disturbed. Millennium would implement its ECS, which meets or exceeds FERC's guidelines in the *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan) and Procedures. The FERC's Plan[9] and Procedures[10] are a set of baseline construction and mitigation measures developed in collaboration with other federal and state agencies and the natural gas pipeline industry to

[9] A copy of the FERC Plan is available at www.ferc.gov/industries/gas/enviro/plan.pdf.

[10] A copy of the FERC Procedures is available online at: www.ferc.gov/industries/gas/enviro/procedures.pdf.

minimize the potential environmental impacts of the construction of pipeline projects in general.

Millennium has requested alternative measures from FERC's Procedures, including deviations from ATWS setback requirements from wetlands and waterbodies (see appendix C); we have reviewed these measures and find them acceptable. Millennium's ECS includes its Spill Prevention and Response Procedures (SPRP), Unanticipated Discovery of Contamination Plan, and Winter Construction Plan. Millennium's ECS also incorporates provisions of the NYSDAM pipeline construction guidance document on agricultural land (NYSDAM 2011).

Millennium would also implement additional construction, restoration, and mitigation plans prepared for the Project, including its Horizontal Directional Drill Contingency Plan (HDD Plan), Procedures Guiding the Discovery of Unanticipated Cultural Resources and Human Remains, Bedrock Blasting Plan, and Fugitive Dust Control Plan. These plans are available for review on our website (eLibrary under Docket No. CP16-486-000). We have reviewed these construction and mitigation plans and find them acceptable.

8.1 General Pipeline Construction Procedures

Figure 3 depicts the typical pipeline construction sequence. Prior to construction, Millennium's survey crew would stake the pipeline centerline and limits of the construction right-of-way, ATWS, highway and railroad crossings, and access roads. Millennium would also mark wetland boundaries and other environmentally sensitive areas. Millennium would contact the State One-Call system to identify and mark existing underground utilities within the construction workspace to minimize the potential for accidental damage during pipeline construction.

After marking the construction areas, clearing crews would clear workspaces of vegetation and obstructions including trees, rocks, brush, and logs. Cleared vegetation and stumps would be burned, chipped for use as mulch (except in wetlands), or otherwise handled per individual landowner agreements and applicable regulations and ordinances. Millennium would install temporary soil erosion and sedimentation control devices as needed in accordance with its ECS prior to grading near wetlands and waterbodies and in the 100-year floodplain, and immediately after initial soil disturbance in all other areas. These erosion and sediment controls would be inspected and maintained throughout construction and restoration of the Project. Following clearing, Millennium would grade the construction right-of-way and ATWS areas where necessary to provide a level work surface. Topsoil would be segregated in accordance with the Millennium's ECS.

Eastern System Upgrade Project
Typical Pipeline Construction Sequence

Figure 3

Millennium would construct the trench with a backhoe or ditching machine. Large stones or bedrock would be broken using conventional rock-trenching methods where possible; however, Millennium anticipates that blasting would be required at some locations along the pipeline where bedrock is encountered at depths that interfere with conventional rock-trenching methods (see section A.8.2). Millennium would stockpile excavated soils along the right-of-way, typically on the side of the trench away from the construction traffic and pipe assembly area (on the "spoil side").

Where the Huguenot Loop is collocated with Millennium's existing mainline, topsoil would be stored on the same side of the trench as the existing pipeline. Where applicable in agricultural, residential, and non-saturated wetland areas, subsoil would be stored separately from topsoil piles. The trench would be excavated at least 12 inches wider than the diameter of the pipe and to a sufficient depth to allow a minimum of 3 feet of soil cover between the top of the pipe and the final graded land surface after construction. Pipeline cover may be greater than 3 feet at road, railroad, stream, wetland, foreign utility, and agricultural land crossings. In compliance with 49 CFR 192, the depth of cover would be a minimum of 2 feet in areas of consolidated bedrock.

Individual sections of pipe would be trucked to the construction right-of-way and strung along the trenchline in a single, continuous line. Typically, a track-mounted, hydraulic pipe-bending machine would tailor the shape of the pipe to conform to the contours of the terrain. The pipe segments would then be placed on temporary supports and welded together into long 'strings'. Millennium would weld its pipeline in compliance with 49 CFR 192 *(Transportation of Natural and Other Gas by Pipeline Minimum Federal Safety Standards*), American Petroleum Institute Standard 1104 (*Welding of Pipelines and Related Facilities),* and Millennium's specifications. Completed welds would be coated to prevent corrosion and the coating would be inspected for defects; if necessary, the coating would be repaired prior to lowering the pipeline into the trench.

Prior to lowering in the pipe, Millennium would inspect the trench to ensure it is free of rocks and other debris that could damage the pipe or its protective coating. The pipe would then be lifted from the temporary supports and lowered into the trench using sideboom tractors. In rocky areas, a layer of soil or sand would be placed on the bottom of the trench to protect the pipe. Once the pipe has been lowered and set in place, the trench would be backfilled with previously excavated materials. If excavated materials are not suitable (in other words, they are too rocky), the pipeline would be covered with more suitable fill or protected with a rock shield (padding placed around the pipe). Topsoil would not be used to provide padding around the pipe. Excess soil may be spread evenly within upland areas in the right-of-way, and in accordance with landowner and agency requirements.

After backfilling, Millennium would hydrostatically test pipeline segments to ensure the system is free from leaks and meets safety requirements at operating pressures.

Water would be obtained for testing from both commercially available and surface water sources, as described in section B.2.2. The water in the pipe segments would be pressurized and held for a minimum of eight hours in accordance with 49 CFR 192 and applicable permit conditions. Millennium would repair any leaks detected and retest the pipe segment. Upon completion of hydrostatic testing, the water would be discharged in accordance with Millennium's ECS within the same watershed from which it was obtained, as well as federal and state requirements. Refer to section B.2.2 of this report for additional information on hydrostatic testing.

Final cleanup would begin after backfilling and as soon as weather and site conditions permit. In accordance with the FERC's Plan, weather and season permitting, Millennium would complete final cleanup (including removal of construction debris, replacement of topsoil where applicable, final grading, and installation of permanent erosion control devices) within 20 days after the trench is backfilled. In residential areas, cleanup and restoration would occur within 10 days of backfilling. When final cleanup would be prevented by winter snowfall, Millennium would implement its Winter Construction Plan, which includes measures to temporarily stabilize the right-of-way and avoid erosion until spring thaw conditions (see section A.8.2).

Millennium would implement restoration guidelines in accordance with its ECS and applicable permit requirements. Areas disturbed by construction would be graded to match original contours and surrounding drainage patterns, except where permanent drainage changes in would be required to prevent scour or erosion. A slight crown on top of the trench may be left to allow for settling of soil air pockets. Temporary and permanent erosion and sediment control measures, including silt fencing, water bars, and vegetation would be installed. Fences, gates, driveways, and roads disturbed by pipeline construction would be restored to pre-construction conditions or better, as practicable. Markers showing the location of the pipeline would be installed at fence and road crossings to convey emergency information in accordance with applicable government regulations, including DOT safety requirements.

In most upland locations, Millennium would revegetate areas disturbed by construction with a grass seed mixture and apply mulch as appropriate to avoid erosion. Millennium developed its seed mixture in accordance with NYSDEC's *New York State Standards and Specification for Erosion and Sediment Control* (NYSDEC 2005). At the landowner's request, actively cultivated cropland may be left unseeded.

8.2 Special Pipeline Construction Procedures

Waterbody Crossings

Millennium proposes to cross streams using open-cut, dry-ditch (dam-and-pump or flume), and trenchless (HDD or conventional bore) crossing methods. Millennium would implement the measures specified in the FERC Procedures, its ECS, and any

additional requirements that may be specified in federal or state waterbody crossing permits.

Open-Cut Method

An open-cut crossing method is proposed at waterbodies that are dry or have no perceptible flow at the time of crossing. Millennium would conduct this crossing method using backhoe-type excavators operating from the banks of the waterbody, unless the waterbody width requires equipment to operate within the dry streambed. Spoil excavated from the trench would be placed at least 10 feet upland from the bank (where possible) for use as backfill. A prefabricated segment of pipeline would then be placed into the trench using sideboom tractors. Millennium would use concrete coated pipe or set-on weights, as necessary, to provide negative buoyancy for the pipeline. The pipeline would be installed at a depth sufficient to allow a minimum of 5 feet of cover under waterbodies. Once the trench is backfilled, the banks would be restored as near as practicable to pre-construction contours and stabilized. Stabilization measures would include seeding, installation of erosion control blankets, use of native woody vegetation, or installation of riprap materials, as appropriate. Millennium would consult the appropriate regulatory agencies prior to using non-vegetative materials, such as riprap, for stream stabilization. Because waterbodies crossed using the open-cut method would be dry at the time of crossing, impacts on water quality would be minimized. If conditions changed during construction such that perceptible flow was present, or likely to become present, Millennium would implement contingency measures including installing a culvert to maintain flow, or moving equipment and material out of the stream channel and temporarily stabilizing the crossing if a storm event is predicted.

Dam-and-Pump Crossing Method

A dam-and-pump crossing diverts or isolates flow during pipe installation. The dam-and-pump method involves installing temporary dams upstream and downstream of the proposed waterbody crossing, typically using sandbags. Following dam installation, pumps with hoses transport the streamflow around the construction work area and trench. Additional pumps dewater the area between the dams. Intake screens installed at the pump inlets prevent or limit entrainment of aquatic life, and energy-dissipating devices at the pump discharge point minimize erosion and streambed scour. Trench excavation and pipe installation would then commence through the dewatered and relatively dry portion of the waterbody channel. After pipe installation, Millennium would backfill the trench, and restore the stream banks, prior to removing the temporary dams to restore flow through the construction work.

Flume Crossing Method

The flume method is similar to the dam-and-pump crossing method but uses flumes instead of pumps to maintain water flow and fish passage during pipeline

construction. During a typical flume crossing, water would be diverted across the trenching area through one or more flume pipes of suitable diameter to convey the maximum water flow. Temporary sandbag and plastic sheeting dams would support and seal the ends of the flume to direct stream flow into the flume and over the construction area. These temporary dams at both the upstream and downstream sections of the flume would create a containment area where turbid water would be confined. Millennium would pump the trench water through an upland dewatering structure to create a dry work area for trench excavation and pipe installation. Immediately after backfilling, Millennium would re-contour the stream bottom and restore the stream banks. Then the flume and temporary dams would be removed and flow through the construction work area would be restored.

Conventional Bore Crossing Method

Millennium proposes to use the conventional bore construction method at two waterbody crossings. This method eliminates impacts on the bed and banks of the waterbody. The conventional bore crossings typically consist of excavating a pit on each side of the waterbody; placing boring equipment within the pits; boring a hole under the feature and pulling a section of pipe through the hole. Dewatering the bore pits would be similar to dewatering the trench described above for the dam-and-pump and flume crossing methods. For long crossings, pipe sections could be welded into a pipe string before being pulled through the borehole.

HDD Crossing Method

Millennium proposes to use the HDD method of construction at three locations along the proposed pipeline route (see table A-7). The HDD method involves drilling a pilot borehole under the waterbody, or targeted feature, then enlarging that borehole through successive reaming until the borehole is large enough to accommodate the pipe. For a 36-inch-diameter pipeline, the borehole diameter would be about 52 inches.

Table A-7
Summary of Horizontal Directional Drill Locations for the Eastern System Upgrade Project

HDD	Begin (Entry) MP	End (Exit) MP	Length (feet)	Primary Features Avoided
Neversink River HDD	0.9	0.4	2,302	Neversink River and Wetland W-27
Mountain Road/ Bedell Drive HDD	3.8	2.9	3,052	Mountain Road, Schoolhouse Road, Fort Van Tyle Road, Bedell Drive, Wetland W-20, Wetland W-21, residential development
Interstate Highway-84 HDD	3.9	4.7	4,093	Interstate Highway 84, Wetland W-17

Throughout the process of drilling and enlarging the borehole, drilling mud (made of a naturally occurring non-toxic bentonite clay material and water) would be circulated through the drilling tools to lubricate the drill bit, remove drill cuttings, and stabilize the borehole during reaming and during placement of the pipeline.

Pipe sections long enough to span the entire crossing would be staged and welded along the construction work area and then pulled through the drilled borehole. This crossing method requires ATWS for the HDD entry and exit points, but generally avoids impacts on the feature being crossed, with the exception of hand-clearing minimal vegetation (a 2-to 3-foot-wide path) to lay the HDD guide wire and for personnel and equipment to access and monitor the drill path from the potential inadvertent return of drilling mud to the surface. Millennium has provided an HDD Plan with its application that addresses the prevention, detection, required notifications, and response to inadvertent returns in upland areas, wetlands, and waterbodies. In response to inadvertent returns of drilling mud to the surface, on-site personnel would assess the volume and discharge location to inform appropriate containment and response measures. In the event an inadvertent release enters a flowing waterbody, Millennium would work to stop the flow and isolate the release, and would develop a clean-up plan based on site-specific conditions, in consultation with appropriate agencies.

Millennium conducted geotechnical investigations at each proposed HDD location, the results of which indicate that the subsurface materials appear to be favorable for the HDD installation. Analysis conducted to evaluate the potential for an inadvertent release of drilling fluids shows that the potential for a release is low for drilling along each of the planned crossings. To further minimize the potential for an inadvertent return in a waterbody that would be crossed by an HDD, Millennium may implement the intersect method at the Neversink River, Mountain Road/Bedell Drive, and Interstate Highway 84 HDDs, which would require two drill rigs set up on opposite sides of the crossing, and pilot holes drilled from each side of the waterbody with the intersection of these drilled boreholes at a predetermined point beneath the waterbody. In the event of a failed HDD attempt, Millennium would re-evaluate and re-locate HDD entry and exit points to an adjacent area and attempt the HDD again. Millennium has developed an alternate open-cut crossing plan for the HDD crossing of the Neversink River in the event that HDD attempt fails. Implementation of the alternative open-cut crossing would require extra ATWS to support construction of a coffer dam and for staging construction equipment and material. The coffer dam would protect downstream water quality during the open-cut crossing by minimizing sedimentation. In the event that the HDD of the Neversink River fails, Millennium would consult with applicable agencies and obtain necessary approvals prior to implementing the alternative open-cut crossing. See section B.2.2 for further information on waterbodies crossed by the Project.

Wetland Crossings

Millennium would delineate and mark wetland boundaries in the field prior to construction activities. Wetlands would be crossed via conventional bore, HDD, or open-cut methods. Conventional bore and HDD crossing methods would be the same as those described above for waterbody crossings, and the locations where HDD construction would cross wetlands are shown in table A-7 above. At open-cut wetland crossings, woody vegetation within the construction right-of-way would be cut off at ground level and removed from the wetlands, generally leaving the root systems intact; the pulling of tree stumps and grading activities would be limited to the area directly over the trenchline unless it is determined that safety-related construction constraints require otherwise. Millennium would install temporary sediment control devices prior to grading near wetlands and, as necessary, after initial disturbance of wetlands or adjacent upland areas to prevent sediment flow into wetlands in accordance with its ECS. Millennium would maintain these devices until revegetation of the wetlands is complete. Construction equipment operating in wetland areas would be limited to that needed to clear the right-of-way, dig the trenches, install the pipeline, backfill the trenches, and restore the right-of-way. In addition, Millennium would install trench plugs to maintain wetland hydrology and use timber mats (or similar measures) in saturated wetlands or other wetland areas where rutting could occur.

Millennium would determine the method of pipeline construction within each wetland by soil stability and saturation at the time of construction. Where soils are stable and are not saturated at the time of crossing, the pipeline would be installed using methods similar to those in upland areas. Other methods identified in our Procedures could be used where wetland soils are saturated and/or inundated, if applicable. Stringing and welding of the pipe would be conducted prior to trenching in wetlands per FERC's Procedures, which are incorporated in Millennium's ECS.

Topsoil would be stripped from the area directly over the trenchline (except in areas of standing water or in saturated conditions) and stockpiled separately from the subsoil. Following pipeline installation, Millennium would backfill the trench with subsoil then topsoil, and install permanent erosion control measures in accordance with its ECS. Saturated wetlands would typically be allowed to revegetate naturally. Per Millennium's ECS, unsaturated wetlands would be seeded with annual rye grass and forested and NYSDEC-regulated wetlands would be revegetated with a native seed mix. Millennium would use hay or straw as mulch in wetlands only if required in writing by state and federal agencies per its ECS.

During field surveys, Millennium identified man-made features crossed by the Project that could be designated as wetlands due to the presence of wetland hydrology, hydrophytic vegetation, and hydric soils. In the event that flowing water is present in these features during construction, Millennium would use a dry crossing technique to protect water quality and prevent downstream sedimentation (see section B.2.3).

Some staging areas may be required adjacent to wetlands for the assembly and fabrication of the pipeline to perform a wetland crossing. These ATWS would be at least 50 feet from the edge of the wetland except in cases where this is not feasible (for example, near HDD entry and exit locations). In these cases, Millennium has requested alternative measures from the FERC's Procedures that would allow a setback less than 50 feet from wetlands (see appendix C). Appendix C identifies the location and rationale for changes in setback distances at wetland crossings. We have reviewed these ATWS locations, and Millennium's justifications for them, and have found them acceptable. See section B.2.3 for further information on wetlands.

Road and Railroad Crossings

Millennium would construct across local, state, federal, and private roads using the open cut, conventional bore or HDD crossing methods (see table A-8). One private road, a paved driveway associated with a residence at MP 5.2, would be crossed by the Project via open-cut. Millennium has provided a site-specific plan for this residence, which specifies that the trench would not be excavated until the pipe is ready for installation, and backfilling of the trench would occur shortly thereafter, or within the same day (see appendix D). The remaining 19 public and private road and railroad crossings would be conducted using trenchless techniques which would avoid direct impacts on the road surface and associated transportation using these features. Seven paved roads, one active railroad, and one abandoned railroad would be crossed by conventional bore. Ten paved roads would be crossed by HDD.

Table A-8
Road and Railroad Crossings Associated with the Eastern System Upgrade Project

Road or Railroad Name	MP	Crossing Method	Surface Type
Route 209	0.0	Bore	Paved
Tufano Lane [a]	0.0	Bore	Paved
Shinhollow Road	1.6	Bore	Paved
Norfolk Southern Railroad	1.7	Bore	N/A
Mountain Road (35)	2.9	HDD	Paved
Schoolhouse Road	3.2	HDD	Paved
Fort Van Tyle Road	3.4	HDD	Paved
Bedell Drive	3.5	HDD	Paved
Bedell Drive	3.6	HDD	Paved
Interstate 84 southbound	4.0	HDD	Paved
Interstate 84 northbound	4.1	HDD	Paved
Greenville Turnpike	4.1	HDD	Paved

Table A-8 (continued)
Road and Railroad Crossings Associated with the Eastern System Upgrade Project

Road or Railroad Name	MP	Crossing Method	Surface Type
Fudel Drive	4.2	HDD	Paved
Tapstone Lane	4.3	HDD	Paved
Route 6	5.0	Bore	Paved
Mi Bar Lane[a, b]	5.2	Open cut	Paved
Toad Pasture Road	5.7	Bore	Paved
Ridge Road	7.0	Bore	Paved
South Plank Road	7.1	Bore	Paved
Abandoned railroad	7.6	Bore	N/A

[a] Private road.
[b] Where crossed by the Project, Mi Bar Lane is a private, paved driveway.

Foreign Utility Crossing

The Huguenot Loop would require crossings of existing utilities including 10 overhead electric utilities, 5 telephone lines, and 3 pipelines (see table A-9). Millennium would use field instrumentation or excavation of test pits by hand to locate existing utilities within construction work areas. Where trenching would occur near a buried utility, soft digging methods, such as hand digging or use of an excavator with teeth or side cutters, would be implemented. If foreign utilities are accidentally damaged during construction, Millennium would stop work and evacuate the immediate area. To aid in immediate response in the event of accidental damage, Millennium would coordinate with the utility company to have a representative on-site during excavation.

Where the Huguenot Loop crosses existing pipeline(s), it would typically be installed under existing pipelines to maintain the required soil cover over the pipelines along with a safe separation between the pipelines during construction and operation. Therefore, trench depths would be 15 feet or greater.

In addition to the foreign utilities identified in table A-9, Millennium may encounter Columbia Gas Transmission, LLC's (Columbia) abandoned A5 Line, a 10- and 12-inch natural gas pipeline that was abandoned in-place in 1988 and that partially occurs within Millennium's existing permanent right-of-way (see FERC Docket No. CP87-339-000). Millennium plans to leave the A5 Line in place if encountered during construction; however, if it is necessary to remove portions of the A5 Line for installation of the Huguenot Loop, Millennium would excavate a trench over the abandoned pipeline for its removal, cut the pipe, and dispose of the removed pipeline segment of at an approved facility. Based on coordination with Columbia and Millennium regarding the A5 Line,

we do not anticipate that the abandoned pipeline is contaminated with polychlorinated biphenyls.

Table A-9
Foreign Utilities Crossed by the Eastern System Upgrade Project

MP	Utility Type	Operator
0.0	Pipeline	Orange & Rockland
0.0	Pipeline	Orange & Rockland
0.0	Pipeline	Orange & Rockland
1.6	Telephone line	Frontier Communications
1.6	Telephone line	Frontier Communications
1.8	Telephone line	Frontier Communications
2.9	Telephone line	Frontier Communications
3.2	Overhead electric	Orange & Rockland
3.4	Overhead electric	Orange & Rockland
3.5	Overhead electric	Orange & Rockland
3.6	Telephone line	Frontier Communications
4.2	Overhead electric	Orange & Rockland
4.3	Overhead electric	Orange & Rockland
5.0	Overhead electric	Orange & Rockland
5.0	Overhead electric	Orange & Rockland
5.2	Overhead electric	Orange & Rockland
5.7	Overhead electric	Orange & Rockland
7.1	Overhead electric	Orange & Rockland

Agricultural Areas

Agricultural areas would be crossed by the Eastern System Upgrade Project. Millennium would implement measures in its ECS, which incorporates measures from the NYSDAM pipeline construction guidance document (NYSDAM 2011) and the FERC Plan to minimize impacts on agricultural areas, including requirements regarding minimum depth of pipeline cover, topsoil segregation, and post-construction monitoring and remediation. Construction in these areas would be conducted in a manner similar to conventional pipeline construction; however, Millennium would not segregate the topsoil over its existing mainline right-of-way. Millennium would protect the topsoil over the existing pipeline from the movement of equipment and construction activities by matting the areas where construction equipment would cross the existing pipeline. Where topsoil segregation would occur, the full depth of topsoil, up to 12 inches, would be segregated and stored separately from subsoil. Millennium would use a construction right-of-way up to 125-feet-wide; however, additional temporary workspace may be needed in agricultural areas for topsoil stockpiling where agricultural land occurs in areas of steep

side slopes. During backfill operations, subsoil would be used to initially backfill the trench, and then the topsoil would be reapplied to the top of the trench and the graded right-of-way.

Millennium has not identified any agricultural drainage systems that would be crossed by the Project. If any are located during construction or through landowner discussions, site-specific measures would be implemented to minimize impacts on the systems. In the event of damage by Project-related activities, Millennium would repair or replace these systems. Per the FERC Plan, seeding would not be required in cultivated cropland unless requested by the landowner. Revegetation of agricultural land would be considered successful when, upon visual survey, crop growth and vigor were similar to adjacent undisturbed portions of the same field. Millennium would conduct post-construction monitoring in accordance with the NYSDAM pipeline construction guidance document on agricultural land. Soils would be decompacted, if required, in accordance with Millennium's ECS and the NYSDAM pipeline construction guidance document (NYSDAM 2011). See section B.5.1 for further information on agricultural areas.

Residential Areas

Seven residences and three businesses are within 50 feet of proposed construction workspaces. Millennium has provided site-specific plans for these residences within 50 feet of work areas (see appendix D). Where the pipeline would cross residential yards, Millennium would either segregate and conserve topsoil or have topsoil imported. After construction, final grading would be conducted within 10 days of backfilling the trench and all turf, ornamental shrubs, and specialized landscaping would be restored in accordance with landowner agreements. See section B.5.1 for additional information on residential areas.

Rugged Terrain

Portions of the Project would cross areas with steep side slopes (see table A-10). These areas can be susceptible to landslides, or slips, during construction following trench backfill (see section B.1.1). In these areas, Millennium may use cut-and-fill construction to provide for safe working conditions. Grading activities would remove the upslope side of the construction right-of-way, which would then be used to fill the downslope side of the construction right-of-way to create a safe and level surface for travel lanes and equipment operation. Potential impacts associated with steep slopes and rugged terrain, as well as associated mitigation measures, are further discussed in section B.1.1.

Table A-10 Areas of Steep Slopes Crossed by the Eastern System Upgrade Project		
Location (MP)	**Slope Percent[a]**	**Mitigation**
Huguenot Loop		
0.7 - 0.7	50%	HDD
0.7 - 0.8	130%	
0.8 - 0.8	40%	
0.8 - 0.8	130%	
0.9 - 0.9	65%	Construction of temporary swales and sediment traps during construction. Millennium modified construction workspace to avoid direct impacts on spring/wetland features in this area.
0.9 - 1.0	40%	
0.9 - 1.1	55%	
1.2 - 1.2	50%	Installation or temporary swales and sediment traps during construction. Restoration with trench breakers, compacted backfill, slope breakers, jute matting, and other erosion and sedimentation controls.
1.2 - 1.2	30%	
1.2 - 1.2	30%	
1.3 - 1.3	35%	
1.3 - 1.3	30%	
1.3 - 1.4	40%	
1.8 - 1.8	40%	
2.0 - 2.0	40%	
2.1 - 2.1	35%	
2.1 - 2.2	35%	
2.5 - 2.5	30%	
2.7 - 2.7	40%	
2.8 - 2.8	40%	
3.0 - 3.0	30%	HDD
3.0 -3.0	35%	
3.1 - 3.1	35%	
4.1 - 4.1	40%	
4.3 - 4.3	30%	
5.3 - 5.3	40%	Installation or temporary swales and sediment traps during construction. Restoration with trench breakers, compacted backfill, slope breakers, jute matting, and other erosion and sedimentation controls.
5.4 - 5.4	30%	
6.4 – 6.4	40%	
6.4 - 6.5	45%	

Table A-10 (continued)
Areas of Steep Slopes Crossed by the Eastern System Upgrade Project

Location (MP)	Slope Percent[a]	Mitigation
Highland Compressor Station		
N/A	40-50%	Redirecting surface flow around steep slopes by installing temporary diversion swales uphill from the steep slope. Depth to rock is relatively shallow such that once the rock face is exposed the potential for erosion is very limited.
Hancock Compressor Station		
N/A	40-50%	Redirecting surface flow around steep slopes by installing temporary diversion swales uphill from the steep slope. In most areas of steep slopes, controlled fill would be placed in compacted lifts to reduce the potential for erosion.

N/A = not applicable

[a] Millennium identified steep slopes using photogrammetric mapping data collected using Global Positioning System observations in November, 2015. Slopes of 130 percent indicate overhangs near the Neversink River crossing.

Blasting

Where possible, Millennium would attempt to avoid blasting on the Project by breaking apart large stones or bedrock using mechanical rock breaking methods such as mechanically ripping the rock with a backhoe or using a hydraulic hammering attachment operated from a backhoe. However, blasting may be necessary in areas where bedrock is encountered at depths (typically less than 5 feet) that interfere with conventional rock-trenching methods. Blasting would be conducted in accordance with state and local regulations and Millennium's Bedrock Blasting Plan to minimize the effects of blasting and mitigate any impact caused by blasting. Millennium would conduct pre- and post-blast testing of occupied structures, groundwater wells, springs, and seeps, and utilities within 150 feet of blasting. Blasting is further discussed in section B.1.1.

Winter Construction

In the event that weather conditions result in snowfall events greater than 6 inches or frozen soils during Project construction, Millennium would implement measures in its Winter Construction Plan, including methods of snow handling and removal; snow removal would be limited to construction work areas. In frozen soil conditions, Millennium would limit topsoil stripping to equipment that can accurately strip variable topsoil depths; if topsoil segregation is not possible, Millennium would stop topsoil removal activities until soil conditions improve. As discussed in section A.7, when final cleanup would be prevented by winter snowfall, Millennium would implement measures to temporarily stabilize the right-of-way and avoid erosion until spring thaw conditions.

8.3 Aboveground Facility Construction Procedures

Aboveground facility construction would be conducted in accordance with Millennium's ECS and construction plans, our Plan and Procedures, and federal and state approvals, as applicable. In general, construction of new facilities or expansion of existing facilities would begin with clearing and grading the area to be fenced. Millennium anticipates that blasting may be required for site preparation at the Highland Compressor Station site. As described in section A.8.2, Millennium would implement its Bedrock Blasting Plan in the event that blasting is required. Subsequent activities would include preparing foundations, installing underground piping, erecting and installing buildings, installing aboveground piping and machinery, testing the piping, testing the control equipment, cleaning up, and stabilizing the work area.

8.4 Environmental Compliance Inspection and Monitoring

Prior to construction, Millennium would conduct environmental training for the appropriate construction personnel. Construction contractors typically receive environmental training applicable to their job duties and construction management and the environmental inspectors (EI) receive all Project-specific information. The training program would focus on the ECS; Project-specific Certificate and other permit conditions; regulatory requirements, such as those pertaining to endangered species, cultural resources, or wetlands; and other Project-specific mitigation plans.

Millennium would be represented during construction by its Chief Construction Inspector, Craft Inspectors, and a minimum of one EI. The EI would report directly to the Chief Construction Inspector; EI responsibilities would include monitoring compliance with environmental measures required by the Project-specific Certificate and other permit conditions; documenting compliance with environmental requirements; and identifying and overseeing corrective actions where necessary. The EI would have the authority to stop activities that violate the Project's environmental conditions and to order appropriate corrective action.

Millennium would conduct post-construction monitoring to document restoration and revegetation of the right-of-way and other disturbed areas. Millennium would monitor wetlands for a period of at least three years until revegetation is successful in accordance with its ECS. Millennium would monitor upland areas after the first and second growing seasons following restoration or until revegetation is successful in accordance with its ECS. In agricultural areas, Millennium would conduct post-construction monitoring in accordance with the NYSDAM pipeline construction guidance document on agricultural land. Millennium would also file quarterly monitoring reports with FERC to document the status of revegetation in disturbed areas. These reports would describe the results of post-construction inspections, any problem areas, and corrective actions taken. Monitoring would cease if an area meets performance standards at the end of the second year (or in any subsequent year).

Within three years of construction, Millennium would file with FERC a wetland revegetation monitoring report. Millennium would continue to file wetland revegetation monitoring reports on an annual basis thereafter until revegetation efforts are considered successful. In addition, FERC staff would inspect the Project throughout construction to independently verify compliance with the Commission's order. FERC staff would continue to monitor and inspect the vegetation along the Project route until restoration and revegetation are deemed successful.

8.5 Operations and Maintenance

Millennium would operate and maintain the new pipeline, aboveground facilities, and modified facilities in accordance with all applicable federal and state regulations, including 49 CFR 192. Millennium would periodically inspect the pipeline from the air and/or ground, in accordance with applicable regulatory requirements, to identify potential concerns that may affect the safety and operation of the pipeline. If pipeline patrols or vegetation maintenance identify areas on the right-of-way where erosion is occurring, Millennium would repair existing erosion control devices or install additional devices as necessary (including vegetation) to stabilize the area and prevent future erosion, throughout the life of the Project.

To maintain accessibility to the right-of-way and accommodate pipeline integrity surveys, vegetation along the permanent pipeline right-of-way would be cleared periodically, using mechanical mowing or cutting where necessary, and in accordance with the ECS. Millennium would not conduct routine vegetation maintenance in upland areas more frequently than every three years, with the exception of a 10-foot-wide corridor centered on the pipeline that Millennium would maintain in an herbaceous state to allow for periodic corrosion and leak surveys. In no case would routine vegetation maintenance clearing occur between April 15 and August 1 of any year to minimize potential impacts on migratory birds during operation of the pipeline facilities. In accordance with FERC's Procedures, included in Millennium's ECS, routine maintenance would not be conducted in wetlands and waterbody riparian areas between HDD entry and exit points.

Active cropland would be allowed to revert to pre-construction use for the full width of the right-of-way. In non-cultivated upland areas, routine vegetation maintenance clearing would be done in accordance with the FERC Plan. In wetlands, a 10-foot-wide corridor centered over the pipeline could be maintained in an herbaceous state, and trees within 15 feet of the pipeline with roots that may compromise the pipeline integrity may be selectively cut and removed from the right-of-way.

Millennium would also perform regular operation and maintenance activities on equipment at the aboveground facilities associated with the Project. These activities would include calibration, inspection, and scheduled routine maintenance. Operational

testing would be performed on safety equipment to ensure proper functioning, and problems would be corrected.

9. Non-jurisdictional Facilities

Under Section 7 of the NGA and as part of its decision regarding whether or not to approve the facilities under its jurisdiction, the Commission is required to consider all factors bearing on the public convenience and necessity. Occasionally, proposed projects have associated facilities that do not come under the jurisdiction of the FERC. These non-jurisdictional facilities may be integral to a project (for instance, a natural gas-fueled power plant at the end of a jurisdictional pipeline) or they may be minor, non-integral components of the jurisdictional facilities that would be constructed and operated because of a project.

The Highland Compressor Station would require a new transmission line to connect the existing electric transmission line along Route 55. The final specifications for 1.5-mile-long overhead medium- or high-voltage transmission line would be determined by the New York State Electric and Gas Corporation, and Millennium would provide a figure depicting the potential route for the overhead electric line to FERC when available. Additionally, the Hancock Compressor Station would require minor upgrades to its existing electrical connection, within the facility boundary. These electric transmission lines would be under the jurisdiction of New York State; however, we have included these non-jurisdictional facilities in our cumulative impacts analysis (see section B.10).

10. Permits and Approvals

As discussed, in section A.1, the EPA and NYSDAM participated as cooperating agencies in the preparation of this EA. The EPA has delegated water quality certification, under Section 401 of the Clean Water Act (CWA), to NYSDEC. The EPA also oversees the issuance of a National Pollutant Discharge Elimination System permit by the state agency, under Section 402 of the CWA, for point-source discharge of used water into waterbodies.

The NYSDAM is a state agency that works to promote a viable agricultural industry, foster agricultural environmental stewardship, and safeguard the food supply of New York. The NYSDAM has prepared guidance documents for construction of pipelines within agricultural areas. Millennium's ECS also incorporates provisions of the NYSDAM pipeline construction guidance document on agricultural land (NYSDAM 2011). In addition to the state and federal cooperating agencies, two federally-recognized Native American Tribes participated in the preparation of this EA, the Stockbridge-Munsee Band of Mohicans and the Delaware Tribe of Indians. Table A-11 provides a list of federal and state permits related to construction and operation of the Project.

Table A-11
Environmental Permits, Approvals, and Consultations for the Eastern System Upgrade Project

Administering Agency	Permit/Approval/Consultation	Status
Federal		
FERC	Certificate of Public Convenience and Necessity	Application submitted July 2016
U.S. Army Corps of Engineers (COE) - New York District	CWA, Section 404	Application submitted August and September 2016
U.S. Fish and Wildlife Service (FWS) - New York Ecological Services Field Office	The Endangered Species Act of 1973, (ESA) Section 7 Consultation Migratory Bird Treaty Act (MBTA) Consultation Bald and Golden Eagle Protection Act (BGEPA) Consultation	Initial consultation submitted January 2016; Information for Planning and Conservation package submitted August 2016. Consultation is ongoing.
State of New York		
New York State Department of Environmental Conservation (NYSDEC)	Section 401 CWA Water Quality Certification	Application submitted August and September 2016
	NYSDEC/COE Joint Permit Application: Freshwater Wetlands Permit and Protection of Waters Permit	Application submitted August and September 2016
	State Pollutant Discharge Elimination System Permits for Construction Activities	Applications submitted August and September 2016
	Air State Facility Permit: Highland Compressor Station	Application submitted July 2016
	Air State Facility Permit: Hancock Compressor Station modification	Application submitted July 2016
New York Natural Heritage Program (NYNHP)	Threatened and Endangered Species Occurrence Data Request	List of sensitive species and vegetation communities in the Project area received February 2016
New York Bureau of Parks, Recreation, and Historic Preservation (the New York State Historic Preservation Office [SHPO])	Section 106 of the National Historic Preservation Act (NHPA) Clearance	Initial consultation submitted to SHPO January 2016; Initial Phase I Archaeological Survey Report submitted in March 2016; Revised Phase I Survey Report submitted in August 2016; SHPO concurrence was issued in March and August 2016; Architectural Survey Letter Report was submitted in July 2016; SHPO concurrence was issued in December 2016.
New York State Department of Agriculture and Markets (NYSDAM)	Consultation	Initial consultation submitted January 2016

Table A-11 (continued)
Environmental Permits, Approvals, and Consultations for the Eastern System Upgrade Project

Administering Agency	Permit/Approval/Consultation	Status
New York State Department of Transportation (NYSDOT)	Accommodation of utilities within the state highway right-of-way	Application to be submitted April 2017 (anticipated)
County and Local		
Orange County Department of Public Works	Permit for work within the county right-of-way	Application to be submitted April 2017
Delaware County Department of Public Works	Permit for work within the county right-of-way	Application to be submitted April 2017
Sullivan County Department of Public Works	Permit for work within the county right-of-way	Application to be submitted April 2017
Town of Ramapo	Stormwater Review	Application to be submitted July 2017

Note: This table lists the major permits, approvals, and consultations for the Project. It is not intended to be comprehensive.

B. ENVIRONMENTAL ANALYSIS

Construction and operation of the Project would have temporary, short-term, long-term, and permanent impacts. As discussed throughout this EA, temporary impacts are defined as occurring only during the construction phase. Short-term impacts are defined as lasting between two and five years. Long-term impacts are defined as lasting five years or more. Permanent impacts are defined as lasting throughout the life of the Project.

1. Geology and Soils

1.1 Geology

Physiographic Setting and Geologic Conditions

The Project facilities would be located in three physiographic provinces, including the Middle Section of the Valley and Ridge Physiographic Province, the Southern New York Section of the Appalachian Plateaus Physiographic Province, and the Piedmont Lowlands Section of the Piedmont Physiographic Province. The Huguenot Loop and the aboveground facilities located in Orange County would be in the Middle Section of the Valley and Ridge Physiographic Province, which is characterized by long, even ridges, with long, continuous valleys. Elevations along the Huguenot Loop, including the Huguenot Meter Station, Westtown Meter Station, pig launcher/receiver, and Alternate Interconnect, range from 420 to 1,270 feet above mean sea level (USGS 2004a). The elevation at the Wagoner Interconnect is about 1,300 feet above mean sea level.

The proposed Highland Compressor Station in Sullivan County and the existing Hancock Compressor Station in Delaware County are located in the Southern New York Section of the Appalachian Plateaus Physiographic Province, characterized as a glaciated plateau with narrow relief valleys (USGS 2004a, Olmsted and Healy 1962). Elevations at the proposed Highland Compressor Station and the Hancock Compressor Station range from 1,200 to 1,400 feet and 1,450 to 1,600 feet above mean sea level, respectively. The Ramapo Meter Station in Rockland County is in the Piedmont Lowlands Section of the Piedmont Physiographic Province, which is characterized by ridges, rolling hills, and plateaus (USGS 2004a). Elevations at the Ramapo Meter Station range from 350 to 430 feet above mean sea level.

Surficial geologic materials in the area of the Project consist primarily of glacial till, outwash sand and gravel, and recent alluvium. Small areas of kame deposits also occur along the Huguenot Loop. Geotechnical investigations in the Project area indicate that, where glacial or alluvial overburden is present, the depth to bedrock is 90 feet or greater. The Project facilities are underlain by sedimentary bedrock composed of shale, sandstone, limestone, siltstone, dolomite, and conglomerate, with the exception of the Ramapo Meter Station, which is underlain by granite and granite gneiss (New York State

Geologic Survey [NYSGS] 2016). While USGS mapping identified potential karst terrain underlying a portion of the Huguenot Loop, geotechnical investigations and field reconnaissance did not find evidence of karst features. Karst is further discussed below.

Paleontological Resources

Paleontological resources are the fossilized remains of prehistoric plants and animals, as well as the impressions remaining in rock or other materials. The Project is atop bedrock formations consisting primarily of sedimentary bedrock from the Devonian, Silurian, and Ordovician Periods (NYSGS 2016). Although the Project would have the potential to encounter paleontological resources in the form of marine invertebrate fossils, unique and/or significant paleontological resources would likely not be encountered (NYSDEC 2013; New York State Department of Transportation [NYSDOT] 2013). Therefore, we conclude the Project would not adversely affect paleontological resources.

Mineral Resources

The primary minerals produced in the Project area counties are crushed stone, sand and gravel, clay, and dimension sandstone and slate[11] (USGS 2016a). No active mining operations would be crossed by the Project, and no inactive or permit-pending mining operations were identified near the Project (NYSDEC 2016a). According to the NYSDEC Division of Mineral Resources, one reclaimed aboveground sand and gravel mining operation is located about 960 feet northwest of MP 0.4 of the Huguenot Loop (NYSDEC 2016a). The mine is reclaimed and active mining operations have ceased at that location. No coal, oil, or gas mines/wells occur within 0.25 mile of the Project, as discussed below (NYSDEC 2016a, NYSDEC 2016b). Therefore, we conclude the Project would not affect present and/or future extraction of nearby mineral resources.

Coal Resources

The Project would not affect any active or inactive coal resources. Information regarding coal mining activities and locations in the Project area was obtained from the NYSDEC Division of Mineral Resources. There are no active or inactive/abandoned coal mines within 0.25 mile of the Project (NYSDEC 2016a).

Oil and Natural Gas Resources

The Project would not affect any active or inactive oil and/or natural gas resources. Based on data from NYSDEC, Division of Mineral Resources, there are no active or inactive oil and/or gas wells located within 0.25 mile of the Project (NYSDEC

[11] Rock that is cut or quarried in accordance with required dimensions.

2016b). In addition, the Project would not cross any known gas storage facilities (U.S. Energy Information Administration 2015).

Geologic Hazards and Impact Mitigation

Geologic hazards are natural physical conditions that, when active, can result in damage to land and structures, or injury to people. Potential geologic hazards can be related to seismic activities, such as earthquakes and fault rupture. Other potential geologic hazards may include soil liquefaction, landslides, and subsidence. The pipeline alignment and aboveground facility sites were evaluated with respect to those geologic processes that have a potential for occurrence in the Project area.

Seismicity, Ground Rupture, and Soil Liquefaction

The Project occurs within a region of relatively low historical earthquake activity. A review of earthquakes over the last 50 years identified 66 events within 50 miles of the Project, all with magnitudes of 3.6 or less. On average, these earthquakes were more than 22 miles from the Project area. The closest event to the Project was about 3.6 miles away and occurred in March of 2008 with a magnitude of 1.9, which is described on the Mercalli Intensity Scale as typically not felt or rarely felt (USGS 2016b and c).

The horizontal force a structure must withstand during an earthquake is related to ground acceleration, and seismic hazards can be assessed based on peak ground acceleration (PGA). PGA is the maximum acceleration experienced by a particle during an earthquake. The USGS produces ground motion hazard maps at a given level of probability to exceed PGA values. PGA values are represented as a factor of "g". The factor "g" is equal to the acceleration of a falling object due to gravity. For buried pipelines, the design operational earthquake is considered to be the PGA associated with a 10 percent probability of exceedance in 50 years (475-year return period); and for aboveground structures, it is considered to be the PGA associated with a 2 percent probability of exceedance in 50 years (2,500-year return period). Review of the USGS Seismic Hazard Maps (USGS 2014a) indicates that there is a 10 percent probability of a 3 to 4 percent "g" exceedance in 50 years for the proposed Huguenot Loop. A three to four percent PGA is characterized as light perceived ground shaking and no potential for damage (USGS 2016d). For the aboveground facilities, there is a 2 percent probability of a 3 to 6 percent, 7 to 10 percent, and 15 to 20 percent "g" exceedance in 50 years for the Hancock Compressor Station, Highland Compressor Station, and the Ramapo Meter Station, respectively. A 3 to 6 percent PGA is characterized as light to moderate perceived ground shaking and very light to no potential for damage; a 7 to 10 percent PGA is associated with moderate to strong perceived shaking with very light to light damage; and a 15 to 20 percent PGA is associated with strong to very strong perceived ground shaking and light to moderate potential damage (USGS 2016d).

In addition, according to the USGS Quaternary Fold and Fault database, no Quaternary-Period faults would be crossed or encountered by the Project facilities (USGS 2014b).

Soil liquefaction occurs when loose (low density or uncompacted) sandy, water-saturated soils temporarily lose their strength and liquefy by strong ground-shaking due to earthquakes or other rapid loading. Given the probability of exceedance of PGA between 15 to 20 percent at the Ramapo Meter Station, as described above, Millennium performed a geotechnical investigation to determine whether soil conditions necessary for liquefaction are present at the site. Geotechnical borings at the site encountered unsaturated bedrock between 13 and 26 feet deep, indicating that the where the foundations would be constructed for this meter station, the subsurface lithology is not conducive to soil liquefaction.

The proposed pipeline and aboveground facilities would be constructed to meet or exceed federal standards, and would be constructed in accordance with International Building Code 2012 (Chapter 16 and Section 1613) and American Society of Civil Engineers 7-10, Minimum Design Loads for Buildings and Other Structures.

Landslides

Landslides involve the downslope mass movement of soil, rock, or a combination of materials on an unstable slope. The Project is within an area consisting primarily of low, rolling topography. Landslide incidence and susceptibility mapping compiled by the USGS for the Project area show that landslide incidence at the Huguenot Loop is considered low from MP 2.7 to MP 7.8 and moderate from MP 0.0 to MP 2.7 (USGS 2016e). Landslide incidence is low at the Hancock Compressor Station and the Ramapo Meter Station and moderate at the Highland Compressor Station.

However, some areas of steep side slopes occur along the Project route. In areas with steep slopes side slopes (slopes greater than 30 percent), soils may be unstable and present erosion management problems when disturbed, often requiring various erosion and sedimentation control measures during pipeline construction and operation. Soils on steep slopes are further discussed in B.1.2. Landslide incidence may be more frequent in these areas of steep slopes and steep side slopes. About 14 percent of the Huguenot Loop, or 1.1 mile, would traverse slopes and side slopes greater than 30 percent (see table A-10). Additionally, portions of the Highland and Hancock Compressor Stations are comprised of steep slopes.

No evidence of recent land movement was observed during field investigations of the Project area conducted by Millennium. However, during construction, Millennium would implement the measures outlined in its ECS to minimize potential risks from landslides and soil erosion. These techniques include the use of erosion control devices (e.g., temporary swales and sediment traps) and other best management practices to

stabilize soils. Following construction, slopes would be returned to their original contours and vegetation would be reestablished in accordance with the ECS. Steep slopes may require erosion control fabric or other site stabilization measures to prevent erosion until a vegetative cover is established. Millennium would implement and monitor erosion and sediment controls and revegetation success as outlined in its ECS to minimize erosion and runoff. Prior to construction at the Highland and Hancock Compressor Stations, Millennium would install temporary diversion swales uphill from steep slopes to divert surface flow around the work area, and temporary erosion and sediment controls would be installed after the initial disturbance of soils. During construction, fill would be placed and compacted in layers to reduce the potential for erosion. Therefore, we conclude that the Project would not increase the risk of landslides.

Subsidence

Ground subsidence is a lowering of the land surface elevation that results from changes that take place underground. Subsidence can range from small, localized areas of collapse to a broad, regional lowering of the ground surface. Common causes of land subsidence include the dissolution of limestone in areas of karst terrain and the collapse of underground mines. Subsidence could also be caused by the pumping of water, oil, and gas from underground reservoirs. As discussed, there are no current or former underground mining activities or oil and gas facilities in the Project workspace, and, as such, there is no potential for land subsidence associated with underground mines or oil-producing activities.

Karst features such as sinkholes, caves, and caverns form as a result of long-term dissolution of soluble bedrock such as carbonate rocks including limestone, dolomite, and gypsum, creating a potential for pipelines constructed through karst terrain to become unsupported. Sinkholes may develop from the raveling of soils over the carbonate bedrock into solution channels within the bedrock mass (Smith and Sinn 2013). Raveling is the process by which water transports soil particles downward into cavities in the underlying bedrock. Surficial limestone and dolostone are present in the Orange County towns of Warwick, Minisink, Wawayanda, and Goshen, and caves have been identified in Goshen, located about 10 miles east of the Project (Orange County Department of Planning and Orange County Water Authority 2010).

In the Project area, USGS mapping identified potential karst terrain underlying the Huguenot Loop in vicinity of the Neversink River from MP 0.2 to MP 1.8 (USGS 2004b). Field reconnaissance and geotechnical investigations were conducted to identify potential karst features at this location. During the field reconnaissance no surficial depressions, sinkholes, or other evidence of karst terrain were observed. Geotechnical borings taken at the site encountered siltstone overlain by a 0.5 to greater than 127- foot-thick layer of glacial and alluvial soils; no calcareous bedrock or subsurface evidence of

solution channels were encountered in the borings. As such, karst conditions are not present.

Crossing karst terrain using the HDD method poses a risk for the loss of drilling fluids into nearby waterbodies. Due to the identification of karst terrain in Orange County mentioned above, Millennium conducted an HDD feasibility analysis for the crossing of the Neversink River. The feasibility analysis included a geotechnical investigation and a geophysical investigation to determine the subsurface lithology at the HDD crossing and to characterize the depth and competence of the bedrock along the proposed HDD bore path. The results of the investigations determined that the subsurface material is generally sand and sand with silt overlaying moderately hard siltstone bedrock; and the bore path section under the Neversink River would be in competent bedrock favorable for stable subsurface drilling.

As discussed, in the unlikely event of an inadvertent release of drilling fluids, Millennium would implement the measures in its HDD inadvertent release contingency plan which addresses measures for the prevention, detection, required notification, and mitigation of an inadvertent release in upland areas and within the waterbody.

Flash Flooding

Bank erosion and/or scour from flash flooding could result in exposure of the pipeline or cause the pipeline to become unsupported. All pipeline facilities are required to be constructed in accordance with DOT regulations in 49 CFR 192. To prevent bank erosion and/or scour, following completion of pipeline installation and construction, Millennium would grade all disturbed construction areas back to their original surface contours, excluding areas that would require permanent drainage alteration. In addition, temporary and permanent sediment control devices such as silt fencing, hay bales, and diversion terraces would be installed to prevent bank erosion and scour following completion of the Project. The potential for scour at waterbodies that would be crossed using open-cut methods is discussed in section B.2.2.

Blasting

Blasting is sometimes required for pipeline projects in areas with shallow bedrock. Millennium would attempt to avoid blasting on the Project by breaking apart large stones or bedrock using mechanical rock breaking methods such as mechanically ripping the rock with a backhoe or using a hydraulic hammering attachment operated from a backhoe. Millennium anticipates that blasting may be required along the Huguenot Loop from MP 0.8 to MP 1.1 and from MP 2.5 to MP 7.8 due to shallow depth to bedrock and the potential presence of greywacke, which is a type of hard sandstone. Blasting may also be necessary at the Highland Compressor Station site. Millennium has prepared a project-specific Bedrock Blasting Plan to minimize the effects of blasting and mitigate any impact caused by blasting. Blasting activities would comply with applicable federal,

state, and local requirements governing the use of explosives. With implementation of the mitigation measures identified in Millennium's ECS and Bedrock Blasting Plan, we conclude that Project impacts by blasting on nearby resources would not be significant; and, given the conditions in the Project area, impacts on geologic resources are not anticipated. Noise impacts associated with blasting activities are discussed in section B.8.2.

1.2 Soils

Soil information and tables for the Project were developed using the U.S. Department of Agriculture (USDA) Natural Resources Conservation Service (NRCS) Soil Survey Geographic Database (USDA-NRCS 2016). The Project area has been glaciated and is characterized by glacial till and glacial outwash overburden. Dominant soil orders include Entisols, Histosols, and Inceptisols, which are very deep, somewhat excessively drained to poorly drained, and loamy or sandy soils (USDA-NRCS 2006). The latter consists of plateaus with nearly level to moderate slopes and narrow valleys with steep walls and smooth floors. The predominant soil order is Inceptisols, which includes shallow to very deep, well drained to very poorly drained, and loamy or loamy-skeletal soils (USDA-NRCS 2006). Potential impacts on soils from the Project are generally associated with soil limitations and certain soil characteristics, as described below.

Soil Limitations

Soils were grouped and evaluated according to the characteristics that could affect construction or increase the potential for soil impacts during construction. These characteristics include prime farmland, compaction prone and hydric soils, highly erodible soils, and the presence of stones and shallow bedrock. Additional soil-related issues considered in the analysis include revegetation and soil contamination (see table B-1).

USDA-NRCS Designated Farmland Soils

The USDA-NRCS defines prime farmland as land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops (USDA-NRCS 2015a). This designation includes cultivated land, pasture, woodland, or other land that is either used for food or fiber crops, or is available for these uses. Urbanized land, built-up land, and open water cannot be designated as prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods, and is not subject to frequent, prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., by draining or irrigating) (USDA-NRCS 2015a).

Table B-1
Soil Characteristics and Limitations for the Eastern System Upgrade Project (acres)[a]

Facility	Prime Farmland or Farmland of Statewide Importance[b]	High Compaction Potential/ Hydric Soils[c,d]	Highly Water Erodible[e]	Shallow Bedrock[f]	Low Revegetation Potential[g]
Pipeline right-of-way and ATWS[h]	41.3	18.2	1.6	44.5	66.3
Aboveground facilities[i]	21.7	2.9	0.1	26.1	19.0
Cathodic protection groundbed	0.2	0.0	0.0	0.0	0.1
Contractor/pipe yards	11.7	4.2	3.3	5.8	8.7
Staging areas	8.9	4.4	3.3	4.5	2.8
Access roads[j]	9.9	3.2	1.6	6.5	4.2
Percent of Project area[k]	44.8	15.7	4.7	41.8	48.3

[a] Total acreage does not equal the total impact acreage for the Project as not all soils are classified with limitations and certain soils are classified as having multiple limitations.

[b] Prime farmland includes soils designated by the USDA-NRCS if drained and/or reclaimed of excess salts and sodium.

[c] Soils categorized as compaction prone include soils with clay loam or finer texture and a drainage class of poor, somewhat poor, and very poor. All soils represented in this category are hydric, but may not have a high compaction potential.

[d] Hydric soils included soils classified by the USDA-NRCS as being partially hydric and hydric.

[e] Water erodible soils included soils with a K factor of "High".

[f] Shallow bedrock soils included soils, which have a depth to bedrock of less than 5 feet (60 inches).

[g] Soils with low revegetation potential included soils with a capability class of three or greater, a low water capacity, and a slope greater than 8 percent.

[h] Totals include permanent and temporary impacts associated with the Project (ATWS, temporary workspace, and permanent easement).

[i] Totals include the aboveground facilities for the Project (Hancock Compressor Station, Highland Compressor Station, Wagoner Interconnect, Huguenot Meter Station, Westtown Meter Station, Ramapo Meter Station, pig launcher/receiver, and Alternate Interconnect).

[j] Totals include all temporary and permanent access roads for the Huguenot Loop and the aboveground facilities.

[k] Totals do not equal 100 percent as not all soils are classified with limitations and certain soils are classified as having multiple limitations.

Criteria for farmland of statewide importance can be established within each state. In New York, farmland of statewide importance includes soils that do not meet all the criteria for designation as prime farmland, may have limitations that reduce the choice of plants, or may require certain conservation practices (USDA-NRCS 2015b). About 45.2 percent of land potentially affected by the Project is classified as prime farmland or farmland of statewide importance (see table B-1).

The proposed Huguenot Loop, including ATWS, would affect 41.3 acres of soil designated as prime farmland and farmland of statewide importance. Portions of the

aboveground facilities are also located on soils designated as prime farmland or farmland of statewide importance, including the proposed Highland Compressor Station, the existing Hancock Compressor Station, the existing Westtown and Ramapo Meter Stations, the Alternate Interconnect at MP 7.6, and the proposed pig launcher/receiver at MP 0.1. The majority of the USDA-NRCS-designated soils that would be affected by the proposed pipeline loop and aboveground facilities are within existing rights-of-way and facility boundaries and are not actively cultivated farmland. However, 12.6 acres of prime farmland and farmland of statewide importance are located outside of existing rights-of-way and facility boundaries and would be within the operational footprint of the Huguenot Loop and aboveground facilities. Of that, 6.0 acres would be permanently converted to non-agricultural use for operation of the aboveground facilities. Construction and operation impacts on active agricultural land are further discussed in section B.5.1.

Additionally, about 5.9 acres of prime farmland and farmland of statewide importance would be permanently converted to non-agricultural use for the construction and operation of the permanent access roads. In addition, the majority of temporary access roads are located on soils designated as prime farmland or farmland of statewide importance. However, these are existing roads; no farmland conversion would occur as a result of the use of these roads during construction or operation of the Project.

Portions of proposed Contractor/Pipe Yards 1, 2, and 3 and Staging Areas 2, 3, and 4 would be located on soils designated as prime farmland and farmland of statewide importance. Contractor/Pipe Yards 2 and 3 are on land owned by Millennium that is not in agricultural use. Contractor/pipe yards and staging areas would be restored to previous use after construction. Where contractor/pipe yards and staging areas affect active agricultural areas, these areas would be returned to agricultural use and restored in accordance with the Project ECS.

To minimize potential impacts on farmland from construction of the Project, Millennium would implement measures outlined in its ECS, which incorporates our Plan and NYSDAM's pipeline construction guidance document on agricultural land (NYSDAM 2011). Topsoil would be segregated from subsoil and would be replaced in the proper order during backfilling and final grading to help ensure post-construction revegetation success. However, topsoil segregation would not occur on the portions of the construction right-of-way over Millennium's existing pipeline. Millennium would protect the topsoil over the existing pipeline from the movement of equipment and construction activities by matting the areas where construction equipment would cross the existing pipeline. Millennium would also comply with the NYSDAM pipeline construction guidance document, section 3.6, by not using excess rock for trench backfill within 24- to 30-inches from the final grade in agricultural land, depending on soil type, such that the size, density, and distribution of remaining rock on the construction work area is similar to adjacent non-disturbed areas. Soil compaction in agricultural areas

during construction would be minimized or remediated as discussed below. Construction and operation impacts on active agricultural land are further discussed in section B.5.1.

Soil Compaction and Hydric Soils

Soil compaction modifies the structure of soil and, as a result, alters its strength and drainage properties. Soil compaction decreases pore space and water-retention capacity, which restricts the transport of air and water to plant roots. As a result, soil productivity and plant growth rates may be reduced, soils may become more susceptible to erosion, and natural drainage patterns may be altered. Consequently, soil compaction is of particular concern in agricultural areas and in areas of hydric soils. The susceptibility of soils to compaction varies based on moisture content, composition, grain size, and density of the soil. Soils that form under conditions of extended saturation, flooding, or ponding during the growing season may develop anaerobic conditions in the upper horizon, and are considered to be hydric (59 CFR 16835). Due to extended periods of saturation, hydric soils can be prone to compaction and rutting.

To minimize compaction, Millennium would limit off-road traffic to those areas required for construction. Millennium would also implement measures to minimize compaction on saturated soils, such as timber mats or the use of low ground-pressure equipment, to the extent practicable. In saturated wetlands where soils cannot be stabilized, construction equipment would use access roads in upland areas to access the right-of-way. Where sufficient access is not available, equipment would be limited to one pass through a wetland. After construction, areas of heavy compaction would be tilled as necessary and affected areas would be graded and restored to original contours prior to final revegetation. In agricultural areas, decompaction would be conducted in accordance with NYSDAM's pipeline construction guidance document (NYSDAM 2011). In residential areas, topsoil segregation would be implemented if requested by the landowner and allowed by site-specific conditions. Following restoration of residential land, the topsoil and subsoil would be tested for compaction and decompacted if needed.

Soil Erosion

Soil erosion potential is affected by soil characteristics such as texture, grain size, organic content, slope of the land, and the type and density of vegetative cover. Soils most susceptible to erosion by water typically have bare or sparse vegetative cover, non-cohesive soil particles, such as silt loam soils in the Project area, with low infiltration rates, and are located on moderate to steep slopes. About 4.7 percent of the soils that would be affected by construction of the Project are considered to be highly susceptible to erosion by water (see table B-1); a small portion (0.1 percent) of the soils are considered to be highly susceptible to erosion by wind. Millennium would minimize erosion impacts during construction by using temporary erosion control devices, such as silt fences and hay bales, in accordance with its ECS. Following construction, permanent erosion control devices, such as slope breakers, would be installed, and vegetation would

be established to stabilize the soils and monitored at a minimum through the first and second growing season per the measures described in Millennium's ECS, which generally adheres to the FERC Plan. At the existing and proposed compressor stations, stormwater management features would be constructed, including bioretention and detention basins, to treat runoff during frequent storm events and store runoff during major storm events so that runoff rates would be similar or less than existing runoff rates. Millennium's proposed stormwater management features would minimize the potential for increased stormwater runoff and associated erosion and sedimentation due to the construction and modification of compressor stations.

Shallow Depth to Bedrock

Construction through soils with shallow bedrock (bedrock less than 5 feet from the surface) could result in the incorporation of bedrock fragments into surface soils. Shallow bedrock is present in 41.8 percent of the Project area (see table B-1). As discussed in section B.1.1, Millennium would attempt to avoid blasting by breaking apart large stones or bedrock using mechanical rock trenching methods. In the event that blasting becomes necessary, Millennium would implement its Bedrock Blasting Plan and would comply with state and local regulations. Millennium would also comply with NYSDAM's pipeline construction guidance document, section 3.6, by not using excess rock for trench backfill within 24- to 30-inches from the final grade in agricultural land, depending on soil type, such that the size, density, and distribution of remaining rock on the construction work area is similar to adjacent non-disturbed areas. Unless approved by the landowner for use onsite for slope stabilization, beneficial reuse, or habitat restoration, excess rock that could not be backfilled would be disposed of at an approved site, such as a landfill or used as riprap for stream bank stabilization where allowed by regulatory agencies.

Low Revegetation Potential

Revegetating areas affected by construction of the Project may be more difficult in areas with poor drainage, shallow depth to bedrock, and steep slopes. Additionally, construction activities could affect soil fertility and facilitate the dispersal and establishment of invasive weeds. As shown in table B-1, 48.3 percent of soils that would be affected by Project construction have a low revegetation potential. Where necessary, temporary soil stabilization measures, such as mulching or matting, would be implemented to ensure new vegetation is able to establish. As stated in its ECS, Millennium would only use mulch in wetlands if required in writing by state and federal agencies. Soils disturbed by the Project would be revegetated using a seed mix specified in Millennium's ECS or by landowners and permitting agencies. Millennium would apply mulch, lime, and fertilizer in accordance with its ECS to ensure revegetation success. The final seed mixes should germinate quickly, effectively control erosion, and provide an environmentally beneficial vegetative cover. Where applicable, segregated

topsoil would be replaced after the subsoil to ensure post-construction revegetation success, and soils would be decompacted as described above.

Inadvertent Spills or Discovery of Contaminants

Other potential impacts during construction would include the accidental release of petroleum hydrocarbons or other hazardous materials, as well as the discovery of contaminated soils during trench excavation and grading activities. Soil contamination during construction could result from material spills or trench excavation through pre-existing contaminated areas. Millennium researched environmental databases and identified three potentially hazardous sites within 0.25 mile of the Project. Of these three sites, two sites (located about 274 feet and 392 feet from MP 3.3 and 3.7, respectively) were acute releases of residential heating fuel that have had corrective actions taken and are classified as closed. The third site (located about 1,267 feet from MP 0.4) was reported as a failed gasoline tank tightness test and is classified as closed. The closed status of these sites indicates that it is unlikely that contamination would be encountered at these sites during construction. Millennium would implement its SPRP, which specifies cleanup procedures in the event of an inadvertent leak or spill. If contaminated or suspect soils (such as those with olfactory and/or visual evidence of impact, i.e. oil-stained sediments) were identified during trenching operations, Millennium would implement its Unanticipated Discovery of Contamination Plan. Work in the area would be halted until an appropriate plan of action is determined based on the type and extent of contamination and local, state, and federal regulations.

Soil Impacts and Mitigation

To minimize impacts on soils, Millennium collocated about 88 percent of the length of the Huguenot Loop with Millennium's existing mainline. Millennium would implement its ECS, SPRP, Unanticipated Discovery of Contamination Plan, Bedrock Blasting Plan, Invasive Species Management Plan, and Winter Construction Plan, as well as NASDAM's pipeline construction guidance to minimize impacts on soils associated with the Project. Measures to segregate topsoil from subsoil in non-saturated wetlands, agricultural land residential land, and in areas requested by the landowner would contributed to post-construction revegetation success, and minimize the loss of crop productivity and the potential for long-term erosion problems. Measures to minimize erosion and reduce or mitigate for soil compaction included in Millennium's ECS would also minimize impacts and contribute to successful restoration of affected soils. We conclude that Millennium's use of its ECS and its adherence to guidance by NYSDAM during construction and restoration would adequately minimize impacts on soils for the Project.

Construction and operation of the proposed aboveground facilities would permanently convert soils to an industrial use. The Project would result in the loss of 33.8 acres of soils associated with aboveground facilities and permanent access roads, of

which 25.2 acres are outside exiting facility boundaries. Of the prime farmland within the Project area, 11.9 acres, or 12.7 percent, would be converted to industrial/commercial land which would no longer be available for agricultural use. Therefore, we conclude that impacts on soils from aboveground facilities would be permanent, but minor.

2. Water Resources and Wetlands

2.1 Groundwater Resources

Existing Groundwater Resources

Bedrock aquifers that underlie the Project area are of local extent and generally yield small volumes (between 2 and 100 gallons per minute) of water (Olcott 1995). Glacial till deposits in the Project area yield little water because they generally contain fine grained material and are unsorted and unstratified; yields typically range from less than 1 to a few gallons per minute (Olcott 1995).

As discussed in section B.1, the Huguenot Loop and the aboveground facilities located in Orange County would be in the Middle Section of the Valley and Ridge Physiographic Province, which is underlain by sandstone and carbonate-rock aquifers (Olcott 1995, Trapp and Horn 1997). Although sandstone formations can yield large quantities of water, the rocks are highly variable; therefore, it is difficult to quantify the water yields that can be produced from these aquifers (Trapp and Horn 1997). The proposed Highland Compressor Station in Sullivan County and the existing Hancock Compressor Station in Delaware County are located in the Southern New York Section of the Appalachian Plateaus Physiographic Province, and are underlain by crystalline rock aquifers that comprise a variety of igneous and metamorphic rocks (Olcott 1995). The Ramapo Meter Station in Rockland County is in the Piedmont Lowlands Section of the Piedmont Physiographic Province, and is underlain by Mesozoic sandstone and basalt aquifers (Olcott 1995).

Wells in sedimentary bedrock aquifers in the Project area may provide sufficient water for small domestic supplies. While water quality parameters including total dissolved solids vary depending upon the mineral composition of the aquifer, groundwater sourced from sandstone aquifers is generally hard, and may contain high levels of dissolved iron and manganese (Frimpter 1985, Olcott 1995). Groundwater sourced from crystalline rock aquifers is generally suitable for most uses, but may be acidic or have concentrations of iron and manganese that exceeds federal limits (Olcott 1995).

A system of shallow (surficial), unconsolidated valley-fill glacial aquifers underlies the Project where bedrock formations are overlain by an aquifer system of coarse-grained glacial outwash, ice-contact, and alluvial deposits. Well yields in these

aquifers vary from 10 to as much as 3,000 gallons per minute, depending on the aquifer composition (Olcott 1995).

Spills of hazardous materials and leaking storage tanks, septic systems, and landfills are the most prevalent groundwater concerns in the state of New York (NYSDEC 2012). While many spills are small and quickly contained or cleaned up, the large number of spills and materials involved remain a high concern to the state. Both storage tanks and septic systems also remain a source of concern for the state. Project impacts on groundwater quality are addressed below; section B.5 discusses septic systems that would be crossed by the Project. Landfills permitted in New York since 1988 have all been lined and the last unlined landfill operating in New York was closed in 2001 (NYSDEC 2012).

Designated Sole Source Aquifers

The EPA defines a principal or sole source aquifer as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. The Huguenot Loop would not cross any SSAs; however, the New Jersey Fifteen Basin Aquifers system is about 0.4 mile to the southeast of MP 7.8 (EPA 2016a). One aboveground facility, the existing Ramapo Meter Station, is located over the Ramapo River Basin Aquifer Systems SSA (see table B-2). Additionally, the Hancock Compressor Station is within the Delaware River Streamflow Zone recharge area for the New Jersey Coastal Plains Aquifer SSA, but is not within the SSA (EPA 2016a). Impacts on surface water, including potential impacts on surface water quality, which could affect groundwater quality via aquifer recharge, are discussed in section B.2.2. No other aboveground facilities are in the vicinity of SSAs.

Table B-2
Principal Aquifers and Sole Source Aquifers Crossed by the Eastern System Upgrade Project

Aquifer Type	Begin MP	End MP	Depth to Groundwater (feet)	Average Yield[a]	New York Primary or Principal Aquifer	EPA SSA
Huguenot Loop						
Unconfined	0.0	1.1	0-10	10-100	Principal	N/A
Unconfined	7.2	7.4	0-10	10-100	Principal	N/A
Huguenot Meter Station						
Unconfined	0.0	0.0	0-10	10-100	Principal	N/A
Ramapo Meter Station						
Unconfined	N/A	N/A	>10	>100	Primary	Ramapo River Basin Aquifer Systems SSA

Source: NYSDEC 2008a, Olcott 1995, Trapp and Horn, 1997, Frimpter 1985.
[a] Represented in gallons per minute.

Public Water Supply

Primary aquifers are highly productive aquifers used as sources of water by major municipal water systems. Principal aquifers are known to be highly productive or have geology suggesting abundant potential water supply, but are not intensively used as sources of water supply by major municipal water systems (NYSDEC 1990). No principal, primary, or sole source aquifers supporting public water supplies underlie the proposed Highland Compressor Station site, existing Hancock Compressor Station, existing Westtown and Ramapo Meter Stations, Alternate Interconnect, or pigging facilities. The existing Ramapo Meter Station overlies the Ramapo River Basin Aquifer Systems SSA. The unconfined aquifers that underlie the Huguenot Loop and existing Huguenot Meter Station are considered principal aquifers by the state of New York (New York State Geographic Information System [NYSGIS] 2008). Table B-2, above, identifies the principal, primary, and sole source aquifers that would underlie the Project, by milepost.

Millennium is in consultation with the New York State Department of Health (NYSDOH) and is awaiting their reply regarding public and private water supply wells and springs in the Project area. According to NYSDEC data, public and private drinking water wells were not identified within 150 feet of the Project (NYSDEC 2016c). However, during field surveys, civil survey crews identified 15 wells within 150 feet of Project construction workspaces. Field surveys located 21 seeps or springs associated with wetlands or waterbodies within 150 feet of Project areas (see table B-3). No seeps or springs are located within the trenchline of the Huguenot Loop.

Source Water Protection Areas

New York State's Source Water Assessment Program (SWAP) is implemented by the NYSDOH. The SWAP identifies sources of water used by public water systems and the drainage areas that supply these source waters (NYSDOH 1999). Millennium is in consultation with NYSDOH regarding potential SWAP areas designated for surface and groundwater protection crossed by the Project; to date, no response regarding the location of these areas relative to the Project has been received. Although the location of any SWAP areas crossed by the Project has not been provided, the measures described below to avoid and minimize potential impacts would apply to the entire Project area to protect groundwater quality.

Table B-3
Water Supply Wells, Springs, and Seeps within 150 feet of Project Construction Work Areas

Approximate MP	Water Supply Type	Distance from Construction Workspace
Huguenot Loop		
0.0	Well	24 feet
0.0	Well	62 feet
0.1	Well	64 feet
0.9	Seep or spring	87 feet
1.0	Seep or spring	41 feet
1.0	Seep or spring	82 feet
1.6	Well	49 feet
1.6	Well	51 feet
3.0	Well	149 feet
3.4	Well	73 feet
3.5	Well	0 feet
3.5	Well	44 feet
3.6	Seep or spring	31 feet
3.6	Seep or spring	129 feet
3.6	Well	87 feet
3.7	Well	51 feet
4.0	Seep or spring	98 feet
4.0	Seep or spring	111 feet
4.0	Seep or spring	67 feet
4.4	Seep or spring	41 feet
4.6	Seep or spring	107 feet
4.6	Seep or spring	138 feet
4.9	Seep or spring	59 feet
4.9	Seep or spring	23 feet
5.2	Well	61 feet
5.5	Seep or spring	90 feet
5.6	Well	6 feet
5.7	Well	44 feet
5.7	Well	59 feet
6.4	Seep or spring	34 feet
7.1	Seep or spring	0 feet
7.1	Seep or spring	0 feet
7.1	Seep or spring	30 feet
7.1	Seep or spring	78 feet
7.1	Seep or spring	106 feet
7.1	Seep or spring	26 feet

[a] No water supply wells, springs, and seeps were identified within 150 feet of the Highland and Hancock Compressor Stations or Ramapo Meter Station.

Groundwater Impacts and Mitigation

Construction of the Huguenot Loop would generally require the excavation of a trench to a sufficient depth to allow for appropriate soil cover, typically up to maximum depth of 15 feet although the trench could be deeper at foreign utility crossings. In areas where the water table is near the surface, groundwater could sustain minor impacts from temporary changes in overland water flow and recharge from trenching, backfilling, and clearing and grading of the right-of-way. Soil compaction from construction could reduce the ability of the soil to absorb water, thereby reducing groundwater recharge.

In instances where trench dewatering would be required, Millennium would discharge trench water into well-vegetated uplands to serve as a filter medium or into dewatering structures (as described in Millennium's ECS) that would allow water to infiltrate the ground. Upon completion of construction, Millennium would restore the ground surface to original contours, to the extent practicable, and would re-vegetate the right-of-way with the goal of restoring the preconstruction overland flow and recharge patterns. Construction, operation, and maintenance of the facilities would not be expected to have significant or long-term impacts on groundwater resources with implementation of Millennium's ECS.

An inadvertent spill of fuel or hazardous materials during refueling or maintenance of construction equipment could also affect groundwater if not cleaned up appropriately. Contaminated soils could continue to leach contaminants into groundwater long after a spill has occurred. To minimize the risk of potential fuel or hazardous materials spills, Millennium would implement its SPRP, which includes spill prevention measures, mitigation measures, and cleanup methods to reduce potential impacts should a spill occur. If Millennium encounters contaminated soil or groundwater during construction, it would implement the measures in its Unanticipated Discovery of Contamination Plan, included in its ECS. As described in these plans, Millennium would stop work, identify the type and extent of contamination, and develop a response action in adherence to applicable regulations. This Project would not necessitate storage or collection of condensate at the aboveground facilities. In addition, three private septic systems have been identified within the temporary workspace for the Huguenot Loop at MP 0.0, MP 0.1, and MP 5.6. Millennium would relocate the septic system at MP 0.0 out of the workspace to avoid impacts. Millennium would follow mitigation measures and the Project ECS to minimize or avoid damage to the other two septic systems, such as installing protective matting over the septic fields during construction (see section B.5).

Millennium would implement its SPRP, which prohibits refueling and storage of hazardous materials within 200 feet of identified active private water wells and 400 feet of public water supply wells. As discussed in section B.1.1, Millennium would attempt to avoid blasting by breaking apart large stones or bedrock using mechanical rock trenching methods. In the event that blasting becomes necessary, Millennium would implement its Bedrock Blasting Plan and would comply with state and local regulations.

Field surveys identified 15 private water supply wells and 21 seeps or springs within 150 feet of the Huguenot Loop. To date, no water supply wells, seeps, or springs have been identified within 150 feet of the proposed workspace for the proposed new or modified compressor stations. Millennium does not anticipate that blasting would be required in the vicinity of seeps and springs during the pipeline construction; however, if shallow bedrock is encountered and is not rippable, drilling and blasting could be used. In consultation with landowners, Millennium would conduct pre- and post- blast surveys for water yield and quality of groundwater wells, seeps, and springs within 150 feet of blasting to identify any changes in conditions. However, given the presence of wells within 150 feet of the construction workspace and to monitor potential effects of Project construction, **we recommend that:**

- **Millennium should offer to conduct, with the well owner's permission, pre- and post-construction monitoring of well yield and water quality for wells within 150 feet of construction workspace.**

No seeps or springs are located within the trenchline of the Huguenot Loop; impacts on water yield or flow of seeps and springs within Project workspace at MP 3.5 and 7.1 could result from soil compaction during construction. Millennium would avoid impacts on the spring or seep at MP 3.5 since the pipeline would be installed via HDD at that location. At MP 7.1, two springs or seeps within the construction workspace are within wetland W-07; in standing water or saturated soils, timber mats or similar devices would be used to minimize impacts from rutting and compaction (see section 2.3).

Millennium would implement the measures in its ECS and Bedrock Blasting Plan, and would adhere to applicable water quality standards. In the event that impacts on private wells or springs occur as a result of construction of the Project, Millennium would provide an alternative water source, repair any permanent damage, or otherwise compensate landowners.

To avoid or minimize potential impacts, Millennium would comply with its SPRP, and the measures in its ECS. Therefore, we conclude the Project would not result in significant long-term or permanent impacts on groundwater resources in the Project area.

2.2 Surface Water Resources

Existing Surface Water Resources

The Eastern System Upgrade Project is located within seven hydrologic unit code (HUC) subwatersheds; the watersheds and approximate locations are provided in table B-4. Millennium conducted field surveys of the Project area in 2015 and 2016 to identify wetlands and waterbodies crossed by the Project. The Huguenot Loop would require 14 waterbody crossings, including 8 perennial and 6 intermittent waterbodies. In addition, use of temporary and permanent access roads for the Project would require nine

waterbody crossings, including three intermittent, three perennial, two ephemeral, and one pond. One pond would be within the construction workspace for temporary access road TAR-0006, but would not be crossed, and one perennial waterbody would be located within Staging Area 4. Information on each waterbody crossing for the Project, including name, water quality classification, flow regime, crossing width, and crossing method is provided in appendix E.

Table B-4
Watersheds Crossed by the Eastern System Upgrade Project

Subwatershed (Hydrologic Unit Code 12)	Drainage Area (acres)	Facilities
Lower Neversink River	27,957	Huguenot Loop MP 0.0-2.6; Wagoner Interconnect; Huguenot Meter Station; pig launcher/receiver
Headwaters to Shawangunk Kill	19,481	Huguenot Loop MP 2.6 - 3.7
Rutgers Creek	26,223	Huguenot Loop MP 3.7 - 5.2; MP 5.6 – 5.9; MP 6.2 – 7.8; Westtown Meter Station; Alternate Interconnect
Indigot Creek	12,160	Huguenot Loop MP 5.2 - 5.6; 5.9 – 6.2
Halfway Brook	18,123	Highland Compressor Station
Pea Brook-Delaware River	23,086	Hancock Compressor Station
Mahwah River	16,627	Ramapo Meter Station

Perennial waterbodies flow or contain standing water year-round and are typically capable of supporting populations of fish and macroinvertebrates. Intermittent waterbodies contain water seasonally, and are typically dry for part of the year. Ephemeral waterbodies generally contain water only in response to surface runoff and rising water tables following precipitation or spring snowmelt. Maps depicting the waterbody crossings are provided in appendix A.

Of the 25 total proposed waterbody crossings and waterbodies in Project workspaces, 19 crossings are classified as minor (less than 10-feet-wide), 4 are classified as intermediate (10-to 100-feet-wide), 1 waterbody, the Neversink River, is classified as major (greater than 100-feet-wide); one pond within the construction workspace temporary access road TAR-0006 would not be crossed (see appendix E). Portions of the pipeline would also cross 100-year floodplains and may be prone to flash flooding.

Sensitive Waterbody Crossings

Section 303(d) of the CWA requires that each state review, establish, and revise water quality standards for the surface waters within the state. States develop monitoring and mitigation programs to ensure that water standards are attained as designated. Waters that fail to meet their designated beneficial use(s) are considered impaired and are

listed under a state's 303(d) list of impaired waters. The Project would cross three streams designated as impaired listed on the NYSDEC Priority Waterbodies List, as identified in appendix F (NYSDEC 2010a, EPA 2016b). Millennium would cross the waterbodies via trenchless construction or a dry construction technique (dam-and-pump or flume), and would use erosion controls in accordance with its ECS to minimize runoff to the waterbodies during construction.

The Project would not cross designated High Quality or Exceptional Value waterbodies, or state or federal wild and scenic rivers. The Huguenot Loop would cross three fisheries of special concern that may support trout populations. These are designated as C(T) waterbodies; these waterbodies are suitable for fish, shellfish, and wildlife propagation and survival (class C) and trout (T) (see appendix F). In addition, the existing access road to the Hancock Compressor Station would cross one C(T) designated waterbody using an existing culvert. Fisheries are discussed in section B.3.2. The Project would cross one waterbody that supports state and federally listed mussels, the Neversink River, at MP 0.7 of the Huguenot Loop. Impacts on threatened and endangered species are discussed in section B.4.

Surface Water Intakes and Source Water Protection Areas

No potable surface water intakes are within 3 miles downstream of any Project waterbody crossing (NYSDEC 2016d). Millennium is in consultation with NYSDOH regarding potential SWAP areas designated for surface and groundwater protection crossed by the Project; no response regarding the location of these areas relative to the Project has been received. Although the location of SWAP areas potentially crossed by the Project has not been provided, the measures described below to avoid and minimize potential impacts would apply to the entire Project area to protect surface water quality.

Floodplains

The Project facilities would cross the Federal Emergency Management Act (FEMA) 100-year floodplain at the locations shown in table B-5. According to FEMA, these floodplains have a 1 percent annual chance of a flood event (FEMA 2016). In addition to the locations identified in table B-5, portions of Contractor/Pipe Yards 1, 2, and 3 and ATWS for construction of the Ramapo Meter Station would be located within the 100-year floodplain. Per the requirements of Executive Order (EO) 11988 on Floodplain Management, we analyzed the total permanent (operational) footprint of the Project relative to the total acres of the impacted floodplains and conclude that there would be an insignificant permanent loss of floodplain storage due to operation of the Project facilities. Construction workspaces would be revegetated following Project construction and topographic contours would be restored.

Table B-5 100-Year Flood Zones Crossed by the Eastern System Upgrade Project			
Facility	**Begin MP**	**End MP**	**Length (miles)/ Total(acres)**
Pipeline Facilities			
	0.1	0.4	0.3 mile
	0.4	0.5	0.1 mile
	0.5	0.8	0.2 mile
	0.8	0.8	<0.1 mile
Huguenot Loop	4.4	4.5	0.1 mile
	7.2	7.3	0.1 mile
	7.4	7.5	0.1 mile
	7.5	7.6	<0.1 mile
	7.6	7.6	<0.1 mile
Aboveground Facilities			
Ramapo Meter Station	N/A	N/A	0.4 acre
Alternate Interconnect	7.6	7.6	<0.1 acre
Source: FEMA 2016			

At the Alternate Interconnect location, aboveground components would be limited to piping at the interconnect with Millennium's existing mainline, and Millennium would not modify the elevation of the site. No other aboveground facilities would be located within the 100-year floodplain. Based on Millennium's proposed construction techniques and mitigation measures described in its ECS, we conclude that construction of these Project facilities would not significantly impact flood storage capacity within the 100-year floodplain.

Surface Water Impacts and Mitigation

The proposed pipeline route includes 14 waterbody crossings. Millennium proposes to cross each waterbody using conventional bore, HDD, or a dry ditch (dam-and-pump or flume) method if perceptible flow is present at the time of crossing. Except for the intermittent waterbody at MP 0.8, which is within the path of the HDD of the Neversink River crossing, intermittent waterbodies that do not have flowing water at the time of construction may be crossed with upland construction methods. Millennium would construct waterbody crossings in accordance with state and federal permits, and its ECS. Typical waterbody crossing methods are described in section A.8.2. Millennium would also minimize waterbody impacts by reducing the right-of-way width at trenched crossing locations to 75 feet where practicable. We received comments expressing concerns for Project impacts on the Upper Delaware River and Halfway Brook. The Project would not cross the Upper Delaware River or Halfway Brook; therefore, direct impacts on these waterbodies or associated riparian vegetation would not occur. Indirect

impacts from sedimentation would be minimized by implementation of the measures in Millennium's ECS, as described above.

Millennium does not anticipate that blasting would be required within waterbodies during the pipeline construction; however, if shallow bedrock is encountered and is not rippable, drilling and blasting would be used to install the pipeline. Millennium anticipates that the Project areas with the greatest potential for blasting include the east side of the Neversink River (MP 0.8 to MP 1.1); no trenched waterbody crossings are proposed in that location. In addition, blasting may be required at locations between MP 2.5 and MP 7.8 due to the potential presence of greywacke. One waterbody has a shallow depth to bedrock within an area of greywacke, an unnamed tributary to Rutgers Creek at MP 6.3. Millennium would follow the measures described in its ECS and Bedrock Blasting Plan, maintain streamflow during blasting, and limit the duration of surface water disturbance.

In accordance with its ECS and DOT requirements, Millennium would install the pipeline with a minimum cover of 3 feet between the streambed and the top of the pipeline, except in consolidated rock, where a minimum of 2 feet of cover would be required. However, to minimize the potential for impacts to the pipeline from streambed scour, Millennium analyzed the maximum scour depth for dry ditch crossings of perennial, intermediate waterbodies including Rutgers Creek (MP 7.3) and an unnamed tributary to Rutgers Creek (MP 7.7). The estimated scour depth for these waterbodies ranged from 0.3 to 4.0 feet. To minimize the potential for scour to impact the pipeline, Millennium would bury the pipeline at a depth of 5 feet below the streambed at these locations. Based on the maximum estimated scour depths described above, we conclude that a burial depth of 5 feet at these locations would be sufficient over the long-term. The depth of burial at waterbodies crossed by HDD would be significantly deeper than the minimum requirement. In addition, the pipeline would be maintained in accordance with DOT pipeline standards in 49 CFR 192, which include requirements for monitoring pipeline conditions.

Pipeline construction could result in temporary impacts on water quality due to increased turbidity from construction in or near flowing surface waters. Millennium would install erosion controls in accordance with its ECS to minimize impacts during construction. Trench spoil would be placed at least 10 feet from the waterbody edge for use as backfill, and temporary erosion controls would be installed to prevent migration of trench spoil into the waterbody. The highest levels of sediment are generated with the wet open-cut method; however, this crossing method is not proposed for use. Where waterbodies are crossed via HDD or conventional bore, direct impacts on the bed and banks of the waterbody would generally be avoided. As described in section B.1.1, geotechnical investigations indicate that HDD construction at the proposed locations is feasible, with minimum chance for a release of drilling fluids. However, if an inadvertent release of HDD drilling fluid occurs within a waterbody, the resulting turbidity could

temporarily affect water quality. Millennium would implement the measures in its HDD Plan, which addresses measures for prevention, detection, required notifications, and mitigation for inadvertent releases. In the event an inadvertent release enters a flowing waterbody, Millennium would work to stop the flow and isolate the release, and would develop a clean-up plan based on site-specific conditions, in consultation with appropriate agencies. In addition, Millennium's adherence to measures in its SPRP, including locating hazardous material storage and equipment refueling activities at least 100 feet from waterbodies, would reduce the potential for hazardous materials to enter waterbodies.

After installation of the pipeline, Millennium would replace the excavated spoil in the trench and restore the streambed and banks as close as practicable to their pre-construction contours. During final restoration, Millennium would seed stream banks and riparian areas with conservation grasses and legumes or native plant species in accordance with applicable agency requirements and Millennium's ECS. Where flow conditions or waterbody bank conditions would not allow for stabilization via revegetation, Millennium would implement additional measures, such as the use of riprap from the construction work area to stabilize waterbody banks, in consultation with NYSDEC.

ATWS would be located at least 50 feet from the water's edge in accordance with Millennium's ECS per the requirements of FERC's Procedures unless otherwise requested by Millennium and approved in advance by FERC. The locations where Millennium is requesting a deviation from FERC's Procedures regarding the location of ATWS within 50 feet of waterbodies as identified in appendix C. At these locations, which are associated with HDD construction, Millennium would designate at least one EI to monitor HDD activities and to be present where ATWS is within 50 feet of or within a waterbody. Additionally, Millennium would install sediment and erosion controls per its ECS to minimize the potential for impacts on the waterbody. We have reviewed the site-specific justifications for these deviations and find them acceptable.

One minor, perennial waterbody would be located in Staging Area 4. Millennium would implement erosion controls per its ECS and install a temporary equipment crossing to minimize impacts on the waterbody. The temporary and permanent access roads required for construction of the Huguenot Loop would require waterbody crossings (see appendix E). Waterbodies would be crossed using existing culverts, which would maintain waterbody flow. Where temporary access road TAR-0006 would be adjacent to a pond, Millennium would implement erosion control measures to avoid sedimentation of the waterbody. Unless otherwise requested by landowners, Millennium would restore temporary access roads to pre-construction conditions. Construction of the new, permanent access road to the Highland Compressor Station would include installation of an open-bottom box culvert to cross a minor, intermittent stream. The open-bottom box culvert would avoid direct impacts on the waterbody. With implementation of Millennium's ECS

as well as applicable permit conditions, we conclude Millennium would minimize and mitigate impacts on surface waters and these impacts would not be significant.

Hydrostatic Testing

In accordance with DOT regulations, Millennium would conduct hydrostatic testing of the pipelines prior to placing them into service. Hydrostatic testing is a method by which water is introduced to segments of pipe and then pressurized to verify the integrity of the pipeline. In addition, aboveground facilities would be hydrostatically tested to ensure structural integrity before being put in service. Millennium would also use water in the drilling mud required for HDD construction and for suppression of fugitive dust (see section B.8.1). Millennium would use commercially supplied water and water sourced from a 2.2-acre private pond located at MP 5.0 (WB-04), totaling about 2,538,500 gallons for hydrostatic testing (about 1,513,500 gallons), HDD activities (about 605,000 gallons), and fugitive dust control (about 420,000 gallons) as shown in table B-6. Use of water from pond WB-04 would result in a temporary, minor reduction in the pond volume; use of the pond as a water source has been included in Millennium's agreement with the landowner. Millennium would conduct hydrostatic testing in accordance with applicable NYSDEC permits. To minimize water use, test water would be transferred between pipeline segments and facilities where practicable. Millennium would screen pump intakes to prevent impacts on aquatic organisms (see section B.3.3). To minimize impacts on fisheries and aquatic resources during withdrawal and discharge of hydrostatic test water, Millennium would implement the measures described in section B.3.2.

The discharge of hydrostatic test water could contribute to a change in the water quality of receiving waters, especially during low flow or drought conditions when there is less water available in the receiving stream for dilution. High flow or velocity discharges could also result in erosion of upland areas or stream banks and increased sedimentation or turbidity. However, test water for the new pipe would be discharged to well-vegetated areas at the pipeline locations, as shown in table B-6, through an energy-dissipating device and the discharge rate would be managed to prevent erosion. Hydrostatic test water for some facilities may also be discharged at a licensed disposal facility. Water used for HDD construction at the Neversink River and hydrostatic test water would be discharged at either MP 2.9, MP, 5.0, or a licensed disposal facility, minimizing the potential for discharged water to enter the Neversink River, which supports state and federally listed mussels (see section 4.3). Environmental impacts from the withdrawal and discharge of water would be minimized by implementing measures outlined in Millennium's ECS and in accordance with the FERC Procedures, such as regulating the discharge rate and installing sediment barriers. Millennium would also be required to obtain and comply with state water withdrawal and discharge permits. Therefore, we conclude impacts from discharge of hydrostatic test water would be temporary and minor.

Table B-6
Total Water Use for Construction of the Eastern System Upgrade Project

Facility/Activity	Source(s)	Discharge Location (MP)	Estimated Volume Uptake/ Discharge Volume (gallons)
Huguenot Loop			
Hydrostatic testing of the Huguenot Loop, MP 0.0 to 7.8[a]	WB-04	2.8, 5.0, 7.6, or 7.8	1,306,000
Neversink River HDD	WB-04 or commercially-available water	2.8, 5.0, or licensed facility	125,000
Interstate 84 HDD	WB-04	5.0	220,000
Mountain Road/Bedell Drive HDD	WB-04	2.8	260,000
Fugitive dust suppression	WB-04 or commercially-available water	N/A	420,000
Compressor Stations			
Highland Compressor Station	commercially-available water	licensed facility	67,000
Hancock Compressor Station	commercially-available water	licensed facility	42,000
Meter Stations			
Huguenot Meter Station	WB-04 or commercially-available water	2.8, 5.0, or licensed facility	5,000
Wagoner Interconnect	N/A	N/A	N/A
Westtown Meter Station	WB-04	7.8	5,000
Ramapo Meter Station	commercially-available water	licensed facility	76,000
Additional Aboveground Facilities			
Pig launcher/receiver	WB-04 or commercially-available water	2.8, 5.0, or licensed facility	10,000
Alternate Interconnect	WB-04	7.6	2,500
Project Total	--	--	**2,538,500**

[a] The Huguenot Loop would be tested in five or six segments, and test water would be transferred between segments.

2.3 Wetlands

The U.S. Army Corps of Engineers (COE) and EPA jointly define wetlands as areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support a prevalence of wetland vegetation adapted for life in saturated soil conditions (COE 1987). Wetlands generally include swamps, marshes, bogs, and similar areas.

Existing Wetland Resources

Millennium conducted wetland surveys on all workspaces affected by the Project in November 2015 and April and June 2016 in accordance with the COE Wetland Delineation Manual and Northcentral and Northeast regional supplement (COE 1987, COE 2012).

Wetland types were assigned using the National Wetlands Inventory (NWI) classification system (Cowardin *et al.* 1979). Palustrine emergent (PEM), palustrine scrub-shrub (PSS), and palustrine forested (PFO) wetlands were documented in the Project area. PEM wetlands are characterized by erect, rooted, herbaceous hydrophytes, excluding mosses and lichens; PSS wetlands contain emergent vegetation with woody vegetation less than 20 feet tall; and PFO wetlands are dominated by hydrophytic tree species at least 20 feet tall. The Huguenot Loop would require 22 wetland crossings totaling 3.1 acres (see appendix F). Where wetlands are located adjacent to the construction workspace for temporary and permanent access roads along the Huguenot Loop, Millennium would fence the wetlands and avoid direct impacts. Construction of the new permanent access road to the Highland Compressor Station would result in the loss of less than 0.1 acre of PFO wetland. No wetlands would be affected by construction or operation of aboveground facilities or within contractor/pipe yards or staging areas associated with the Project. The milepost location, feature identification number, wetland type, proposed crossing method, approximate crossing length, and impacts on wetlands associated with construction and operation in the Project area are provided in appendix F.

Wetlands are further classified in New York's Freshwater Wetlands Act, the goal of which is to preserve, conserve, and protect freshwater wetlands for the benefit and development of New York State. To be protected under New York's Freshwater Wetlands Act, a wetland must be at least 12.4 acres in size. Smaller wetlands may be protected if considered of unusual local importance. The Project would cross Class II and Class III wetlands. Class II and III wetlands meet any of the cover type, ecological associations, special features (such as habitat for listed, vulnerable or rare animal and plant species, archaeological significance, or association with an unusual geological feature), or hydrological and pollution control features (such as sewage treatment capacity, hydrological connection to an aquifer designated as potentially useful water supply, or receiving significant pollution that could be treated by wetlands), or distribution and location characteristics (such as location within an urbanized area or

publicly owned land, or visibility from a highway, parkway, scenic highway or passenger railroad) defined in Title 6 New York Codes, Rules, and Regulations Part 664. Where practicable, Millennium would avoid impacts on NYSDEC-classified wetlands by using HDD construction methods (see appendix F). Millennium is consulting with NYSDEC regarding the classification of wetlands crossed by the Project, and would be subject to regulation under New York's Freshwater Wetlands Act.

Wetland Impacts and Mitigation

Construction of the Project would impact about 3.1 acres of wetlands, including about 0.8 acre of PFO wetland and 2.4 acres of PEM wetland. No impacts on PSS wetland would occur. Of that, 1.8 acre (0.4 acre of PFO wetland and 1.4 acre of PEM wetland) would be within the operational areas of the Project (see table B-7). Operation of the pipeline would require right-of-way maintenance that would result in the permanent conversion of 0.2 acre of PFO wetland to PEM/PSS wetlands. Wetland impacts would be primarily within the right-of-way for the proposed Huguenot Loop; however, the new permanent access road proposed at the Highland Compressor Station site would result in less than 0.1 acre of permanent impacts on PFO wetland. No wetlands would be affected by construction and operation of the aboveground facilities, contractor/pipe yards, and staging areas. Table B-7 summarizes impacts of the Project on wetlands. Detailed information regarding each wetland that would be crossed by the Project is included in appendix F.

Table B-7
Wetland Impact Summary of the Eastern System Upgrade Project

NWI Classification	Wetland Area Affected During Construction (acres)[a]	Wetland Area Affected During Operation (acres)[b]
Huguenot Loop		
PFO	0.8	0.4
PEM	2.4	1.4
Subtotal	***3.1***	***1.8***
Highland Compressor Station Access Roads		
PFO	<0.1	<0.1
Project Summary		
Subtotal PFO	***0.8***	***0.4***
Subtotal PEM	***2.4***	***1.4***
Project Total	**3.1**	**1.8**

[a] The numbers in this table have been rounded for presentation purposes. As a result, the totals may not reflect the sum of the addends.

[b] Operational impacts include the total acreage of wetlands within the permanent right-of-way. Although 0.35 acre of PFO would be within the permanent right-of-way, only 0.16 acre would be permanently maintained as PEM/PSS wetland. Millennium does not anticipate maintenance mowing in PEM/PSS areas beyond a 10-foot-wide area centered over the pipeline.

The primary impact of Project construction on wetlands would be the potential alteration of wetland vegetation due to clearing, excavation, rutting, compaction, and mixing of topsoil and subsoil. Construction could also affect water quality within wetlands due to sediment loading or inadvertent spills of fuel or chemicals. Temporary construction impacts on wetlands could include the loss of vegetation; soil disturbance associated with grading, trenching, and stump removal; and changes in the hydrological profile. Impacts on PFO wetlands would also include long-term or permanent conversion to PEM and/or PSS wetland types through tree removal. In the case of conversion of wetland vegetation type, no permanent loss of wetlands would occur, but functional changes to the wetland community would result.

Impacts on wetlands would be greatest during and immediately following construction. The majority of these effects would be short-term in nature and would cease when, or shortly after, the wetlands are restored and revegetated. Following revegetation, the wetland would eventually transition back into a community with functionality similar to that of the pre-construction state. In emergent wetlands, the herbaceous vegetation would regenerate quickly (typically within one to three years). Millennium would cross wetlands in accordance with state and federal permits and its ECS, which incorporates measures from our Procedures. The wetland crossing method would depend on site-specific conditions present during construction, as discussed in section A.8.2.

Millennium would avoid direct impacts on wetlands by crossing about 1,465 feet of wetlands using HDD and conventional bore construction methods. However, if an inadvertent release of HDD drilling fluid occurs within a wetland, temporary impacts on wetland vegetation and hydrology would occur. Millennium would implement the measures in its HDD Plan, which addresses measures for prevention, detection, required notifications, and mitigation for inadvertent release as discussed in section A.8.2.

Certain ATWS would be adjacent to or within wetlands in areas requiring special construction techniques near HDDs (see appendix B). Where Millennium has requested an alternate measure from our Procedures regarding the placement of ATWS, erosion and sediment controls would be installed in accordance with the ECS to minimize wetland impacts. In standing water or saturated soils, timber mats or similar devices would be used to minimize impacts from rutting and compaction. Millennium would designate at least one EI to monitor construction activities at each HDD, and would conduct daily inspections where ATWS is within 50 feet of a wetland until restoration.

Millennium does not anticipate that blasting would be required within wetlands during the pipeline construction; however, the potential for shallow bedrock that may require blasting has been identified in wetlands that would be crossed by the Project at MP 6.3 and MP 7.6. If shallow bedrock is encountered and is not rippable, drilling and blasting would be used to install the pipeline. Millennium would follow its ECS and Bedrock Blasting Plan which would minimize the effects of blasting in wetlands.

Where soils are stable and are not saturated at the time of crossing, the pipeline would be installed using methods similar to those in upland areas. Tree stumps and root systems would be removed from areas directly over the trenchline. In the absence of safety-related construction constraints, stumps and root systems would be left in place in the remainder of the construction right-of-way. Millennium would segregate the topsoil up to one foot in depth in wetlands where hydrologic conditions permit. Segregated topsoil would be stockpiled separately from the subsoil and would be placed in the trench following subsoil backfilling. Millennium would restore and monitor wetland crossings in accordance with its ECS. Unless standing water is present, wetlands would be seeded with annual rye grass and other species as described in the ECS. In addition, all PFO wetlands disturbed by the Project would be seeded with a native wetland seed mix as identified in Millennium's ECS. Saturated wetlands include those with standing water or completely saturated soils at the time of construction. Topsoil segregation is generally not practical in saturated wetlands. Otherwise, construction would be similar as described for unsaturated wetlands. Saturated wetlands would be crossed using timber mats to avoid rutting.

Less than 0.1 acre of PFO wetland would be lost due to construction of the permanent access road proposed at the Highland Compressor Station. The access road has been designed to minimize impacts by crossing wetland HL-W-01 at a location where the wetland is relatively narrow. Alternative access road locations would result in greater impacts on wetlands. Millennium would construct erosion controls in accordance with its ECS and an EI would be designated to monitor construction activities for the duration of the wetland crossing. An EI would also inspect the crossing daily until permanent restoration measures are implemented. In addition, Millennium is in consultation with the COE and NYSDEC, and would comply with applicable permits for wetland impacts at this location. Therefore, we conclude that there would be minor permanent impacts on PFO wetlands.

Millennium would minimize wetland impacts by implementing the construction and mitigation measures outlined in its ECS and adhering to applicable permit requirements. In addition, Millennium plans to use bore or HDD methods to avoid impacts on multiple wetlands. General construction and mitigation measures from Millennium's ECS include:

- limiting construction right-of-way width in wetlands to 75 feet, except where site-specific conditions necessitate a wider right-of-way (see appendix F);

- limiting construction equipment in wetlands to that needed to clear the right-of-way, excavate the trench, fabricate the pipe, install the pipe, backfill the trench, and restore the right-of-way;

- installing sediment barriers prior to ground disturbance near wetlands;

- minimizing the length of time that topsoil is segregated and the trench is open;
- using low ground weight equipment or operating equipment on timber matting, prefabricated equipment mats, or terra mats on saturated soils or where standing water is present;
- installing trenchline barriers and/or sealing the trench bottom as necessary to maintain the original wetland hydrology;
- prohibiting the use of lime, fertilizer, or mulch during the restoration of wetlands unless required in writing by federal and state agencies;
- seeding wetland areas with seed mixes consistent with NYSDEC recommendations and Millennium's ECS; and
- limiting vegetation maintenance on the operational right-of-way in wetlands to a 10-foot-wide herbaceous corridor centered over the pipeline and the cutting and removal of trees and shrubs greater than 15 feet in height that could impact the pipeline coating.

With implementation of these minimization and mitigation measures, we conclude that wetland impacts associated with the construction and operation of the Project would not be significant.

3. Vegetation, Aquatic Resources, and Wildlife

3.1 Vegetation

Existing Vegetation Resources

Ecoregions are areas with similar environmental resources and characteristics; classification at the ecoregion level describes the environmental factors that contribute to the dominant vegetation cover. The Huguenot Loop and aboveground facilities in Orange County are in the Ridge and Valley ecoregion, which is a belt of parallel valleys and ridges and dominated by northern hardwood and oak-pine forest (EPA 2013, Commission for Environmental Cooperation [CEC] 2011, Bailey 1995). The Highland Compressor Station is within the North Central Appalachians ecoregion, part of an elevated plateau made up of low mountains and high hills. The North Central Appalachians ecoregion is generally vegetated by northern hardwood forest (EPA 2013, CEC 2011). The existing Hancock Compressor Station is within the Northern Appalachian Plateau and Uplands ecoregion, which is characterized by rolling hills, low mountains, and open valleys and includes large areas of oak and northern hardwood forest (EPA 2013, CEC 2011). The Ramapo Meter Station is in the Northeastern Highlands ecoregion, which is characterized by hilly and mountainous terrain with

narrow valleys, as well as some plains with hills and northern hardwood and spruce fir forests (EPA 2013, CEC 2011).

Construction and operation of the Project would affect the following general vegetation cover types: agricultural land, upland forested land, open land (including existing rights-of-way, pastures, and non-agricultural land), forested wetlands, and non-forested wetlands (see table B-8). Impacts on developed land (including industrial/commercial and residential land) are discussed in section B.5.1 and wetlands are discussed in B.2.3.

Agricultural land in the Project area is used for growing hay and corn. The proposed pipeline facilities would disturb about 23.2 acres of agricultural land, of which 6.0 acres would be in the permanent right-of-way. Impacts on agricultural land are further addressed in section B.5.1. Most forested land in New York has been previously disturbed by agriculture, logging, and existing rights-of-way, creating early successional forest cover types (Birch 1996, NYSDEC 2010b). Early successional forests are composed of young, early-colonizing tree species and lack a closed, mature tree canopy. Species documented during field surveys included American elm (*Ulmus americana*), red maple (*Acer rubrum*), eastern hemlock (*Tsuga canadensis*), black cherry (*Prunus serotina*), eastern white pine (*Pinus strobus*), white ash (*Fraxinus americana*), black birch (*Betula lenta*), shagbark hickory (*Carya ovata*), American beech (*Fagus grandifolia*), common winterberry (*Ilex verticillata*), and northern spicebush (*Lindera benzoin*). Construction of the Huguenot Loop would disturb about 46.4 acres of forested upland, of which 0.6 acre would be within Millennium's existing right-of-way.

Construction of the pipeline would disturb 33.2 acres of open land, of which 17.3 acres would be maintained as permanent right-of-way. Field surveys conducted by Millennium within open land habitats commonly identified native grass and herbaceous species including annual ragweed (*Ambrosia artemisiifolia*), fox sedge (*Carex vulpinoidea*), red clover (*Trifolium pretense*), orchard grass (*Dactylis glomerata*), Kentucky bluegrass (*Poa pratensis*), reed canarygrass (*Phalaris arundinacea)*, and Queen Anne's lace (*Daucus carota*).

Construction of the proposed aboveground facilities would affect 0.3 acre of agricultural land, 24.8 acres of upland forest, and 4.0 acres of open land. Areas within the temporary construction workspace for aboveground facilities would be returned to pre-construction conditions. Operation of the aboveground facilities would result in the permanent impacts on 0.3 acre of agricultural land, 8.5 acres of upland forest, and 0.8 acre of open land, which would be converted to industrial/commercial use or maintained as open land for the life of the Project.

Table B-8
Acreage of Construction and Operation Impacts of the Eastern System Upgrade Project on Vegetation[a]

Facility	Agricultural		Forested		Open Land		Forested Wetlands		Non-Forested Wetlands[b]		Total	
	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op	Con	Op
Pipeline Facilities												
Huguenot Loop (new land)[c, d]	9.4	3.3	32.7	8.1	7.2	5.4	0.8	0.4	1.3	0.6	51.4	17.7
Huguenot Loop (existing easement)	4.6	2.7	0.6	0.4	21.1	12.0	0.0	0.0	1.1	0.8	27.4	15.9
ATWS (new land)	9.0	0.0	13.0	0.0	4.0	0.0	0.0	0.0	0.0	0.0	26.0	0.0
ATWS (existing easement)	0.1	0.0	<0.1	0.0	0.9	0.0	0.0	0.0	0.0	0.0	1.1	0.0
Subtotal	***23.2***	***6.0***	***46.4***	***8.5***	***33.2***	***17.3***	***0.8***	***0.4***	***2.4***	***1.4***	***105.9***	***33.5***
Access roads	0.8	0.0	12.0	10.6	1.0	0.3	<0.1	<0.1	0.0	0.0	13.7	11.0
Contractor/pipe yards and staging areas	6.9	0.0	0.9	0.0	28.9	0.0	0.0	0.0	0.0	0.0	36.7	0.0
Aboveground Facilities												
Highland Compressor Station	0.0	0.0	16.8	5.3	0.9	0.2	0.0	0.0	0.0	0.0	17.7	5.5
Hancock Compressor Station	0.0	0.0	6.0	2.0	1.1	0.3	0.0	0.0	0.0	0.0	7.2	2.3
Wagoner Interconnect	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Huguenot Meter Station	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Westtown Meter Station	<0.1	<0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	<0.1
Ramapo Meter Station	0.0	0.0	1.7	0.9	1.9	0.1	0.0	0.0	0.0	0.0	3.6	1.0
Pig launcher/receiver	0.0	0.0	0.3	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.4	0.4
Cathodic protection groundbed	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2
Alternate Interconnect	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Subtotal	***0.3***	***0.3***	***24.8***	***8.5***	***4.0***	***0.8***	***0.0***	***0.0***	***0.0***	***0.0***	***29.1***	***9.5***
Project Total	**31.2**	**6.2**	**84.0**	**27.6**	**67.0**	**18.4**	**0.8**	**0.4**	**2.4**	**1.4**	**185.3**	**54.0**

Con = Construction; Op = Operation.

[a] The numbers in this table have been rounded for presentation purposes. As a result, the totals may not reflect the sum of the addends.

[b] Non-forested wetlands include PEM and PSS wetlands.

[c] Construction impact acreages are based on a temporary right-of-way between 75- and 125-feet-wide. Impacts do not include the area between HDD entry and exit points, where impacts would be limited to hand-clearing a maximum 10-foot-wide footpath.

[d] The operational footprint is based on a 50-foot-wide permanent right-of-way in upland areas and wetlands. Millennium does not intend to maintain the permanent right-of-way in non-forested wetlands and would only maintain a 30-foot-wide area (centered over the pipeline) within forested wetlands; therefore, actual impacts on wetlands during operation may be less.

Construction and modification of access roads to support construction of the Huguenot Loop and aboveground facilities would impact 0.8 acre of agricultural land, 12.0 acres of forested upland, and 1.0 acre of open land. During operation, permanent access roads would result in the conversion of 10.6 acres of forested upland and 0.3 acre of open land to developed land for the life of the Project. During construction, contractor/pipe yards and staging areas would affect about 6.9 acres of agricultural land and 28.9 acres of open land. Although some forested land (0.9 acre) does occur within the proposed contractor/pipe yards, no tree clearing would be required.

Vegetation Communities of Special Concern

Millennium consulted with the U.S. Fish and Wildlife Service (FWS) and obtained data from the New York Natural Heritage Program (NYNHP) to determine the presence of sensitive or protected vegetation within the Project area (Conrad 2016). No designated critical habitat is located within the Project area per the FWS Information for Planning and Conservation; threatened and endangered species are discussed in section B.4 (FWS 2016a). The NYNHP identified three significant natural communities that occur in the Project area: floodplain forest, chestnut oak forest, and hemlock-northern hardwood forest (NYSDEC 2015a).

Based on the NYNHP's review the Project would cross a section of floodplain forest at the Neversink River (MP 0.7). Floodplain forest areas are typically hardwood forests that occur in low areas, including river deltas and terraces of river floodplains. Typical dominant vegetation includes silver maple (*Acer saccharinum*), ash (*Fraxinus spp.*), cottonwood (*Populus deltoides*), and box elder (*Acer negundo*), among other tree species (NYNHP 2014). The pipeline would be installed via HDD at this location, thereby avoiding direct impacts, and impacts would be restricted to hand clearing of vegetation limited to a three-foot-wide corridor to lay a guide wire for the HDD installation; no trees would be removed. Chestnut oak forests are typically dominated by tree species such as chestnut oak (*Quercus montana*) and red oak (*Quercus rubra*). These hardwood forests occur on well-drained sites within the Appalachian Mountains (NYNHP 2014). Construction of the pipeline would disturb 10.7 acres of chestnut oak forest that exists outside of Millennium's existing right-of-way; operation of the pipeline would result in the permanent conversion of 1.5 acres of chestnut oak forest to open land.

Hemlock northern hardwood forests are mixed forest that typically occur on mid-elevation slopes and on moist, well drained sites on the edge of swamps. This community is typically co-dominated by species including eastern hemlock, sugar maple, red maple, yellow birch (*Betula alleghaniensis*), or other hardwoods species (NYNHP 2014). Construction of the pipeline would affect 4.4 acres of hemlock northern hardwood forest and operation of the pipeline would result in the permanent conversion of 1.2 acres to open land. In addition, 0.3 acre of hemlock hardwood forest would be temporarily affected by the construction of temporary access road TAR-0003.

Noxious and Invasive Weeds

Noxious or invasive plant communities can out-complete and displace native plant species, thereby negatively altering the appearance, composition, and habitat value of affected areas. Plant species identified as noxious and invasive by the NYSDEC were observed within the Project area during Millennium's field surveys, including Canada thistle (*Cirsium arvense)*, common buckthorn (*Rhamnus cathartica)*, common reed (*Phragmites australis)*, garlic mustard (*Alliaria petiolata)*, Japanese barberry (*Berberis thunbergi)*, Japanese stiltgrass (*Microstegium vimineum)*, multiflora rose (*Rosa multiflora)*, mugwort (*Artemisia vulgaris)*, purple loosestrife (*Lythrum salicaria)*, and tatarian honeysuckle (*Lonicera tatarica)* (NYSDEC 2014).

Vegetation Impacts and Mitigation

The Project would affect 185.3 acres of vegetation during construction; 54.0 acres would be within the operational footprint of the Project. Aboveground facilities would permanently convert 0.3 acre of agricultural land, 8.5 acres of forested land, and 0.8 acre of open land to industrial land. Table B-8, above, summarizes the temporary construction and permanent operational impacts of the Project on each vegetation community type. Impacts on developed and agricultural land are discussed in section B.5.1, wetland impacts are discussed in section B.2.3.

Prior to construction, the pipeline right-of-way and workspaces would be cleared of vegetation to the extent necessary to allow for safe working conditions. Millennium may hand-clear small-diameter vegetation in heavily vegetated areas along the path for laying the telemetry cable between the HDD entry and exit points. Where possible (e.g., in temporary construction workspaces), tree stumps and roots would be left in place to facilitate natural revegetation. Cleared timber and vegetation would be burned, chipped, or sold in accordance with landowner preferences and local ordinances. Erosion and sedimentation controls would be installed according to Millennium's ECS following soil disturbance.

During operation, maintenance of the permanent pipeline right-of-way would be necessary to allow for visibility and access for pipeline monitoring and maintenance activities. In upland areas, the permanent right-of-way would be 50-feet-wide. Routine mowing would be conducted no more frequently than once every three years across the entire width of the right-of-way in upland areas; however, a 10-foot-wide corridor centered on the pipeline could be mowed at a frequency necessary to allow for periodic pipeline surveys. In wetlands, as discussed in section B.2.3, vegetation maintenance on the operational right-of-way would be limited to a 10-foot-wide herbaceous corridor centered over the pipeline and the cutting and selective removal of trees within 15 feet of the pipeline with roots that may compromise the pipeline integrity.

During construction and operation of the Eastern System Upgrade Project, Millennium would use existing access roads to the maximum extent possible.

Millennium would also use ATWS, contractor/pipe yards, and staging areas to support construction of the Project. Contractor/pipe yards and staging areas would be primarily located in open and agricultural land; no tree clearing within these areas is proposed. Vegetated areas within ATWS, contractor/pipe yards, staging areas, and temporary access roads would be returned to pre-Project conditions and allowed to revegetate after construction.

Community-Specific Impacts

Impacts on forest vegetation from construction of the Project would be long-term. Re-growth of trees to pre-construction condition would take 20 to 30 years for many species. Hardwood species, such as oaks, could take more than 50 years to reach maturity. Upland forest vegetation in the permanent right-of-way would be maintained in an herbaceous state through the operational life of the Project. Upland forest outside of the operational footprint of the aboveground facilities, including 11.5 acres at the Highland Compressor Station and 4.1 acres at the Hancock Compressor Station, would be temporarily impacted during construction. During operation, 5.3 and 2.0 acres of upland forest would be permanently converted to industrial land at the Highland and Hancock Compressor Stations, respectively.

The term "edge effect" is commonly used in conjunction with the boundary between natural habitats, especially forests, and disturbed or developed land such as pipeline corridors. Where land adjacent to a forest has been cleared, creating an open/forest boundary, sunlight and wind penetrate to a greater extent, resulting in tree destabilization from increased wind shear, drying out of the interior of the forest near the edge, encouraging growth of opportunistic species at the edge, and changing air temperature, soil moisture, and light intensity (Murica 1995). Fragmentation of forested areas can result in changes in vegetation (for example, invasion of shrubs along the edge). As currently designed, about 88 percent of the pipeline would be adjacent to or overlapping Millennium's existing mainline right-of-way; construction adjacent to existing rights-of-way minimizes fragmentation.

For non-forested vegetation types, including agricultural land, open land, and non-forested wetlands, impacts associated with construction of the pipeline would generally be temporary or short-term. Agricultural land generally returns to crop production the season following construction. Herbaceous areas would return to their vegetative cover within 1 to 3 years, and scrub-shrub areas would return to their vegetative cover within 3 to 5 years post-construction. To facilitate revegetation, Millennium would re-seed disturbed areas using seed mixes in accordance with NYSDEC recommendations and measures described in its ECS, unless otherwise specified during landowner consultation or by permit requirements (NYSDEC 2005). Before a permanent vegetation cover is established within the right-of-way, Millennium would stabilize the construction areas using a seasonal variety of ryegrass, depending on the time of year and in accordance with its ECS. Aboveground facilities within the operational footprint would be permanently converted to developed land.

Mitigation

To minimize direct and indirect impacts on vegetative communities from construction and operation of the Project, Millennium would implement the measures in its ECS and Invasive Species Management Plan, including:

- minimizing vegetative clearing through collocation with Millennium's existing right-of-way where practicable (about 6.9 miles of the proposed route);
- using existing roads for access to the Project where practical;
- installing temporary erosion control measures, such as slope breakers, sediment barriers, and mulch;
- visually inspecting agricultural land to ensure that crop growth and vigor in areas affected by construction is similar to those of adjacent portions of the same field, or as otherwise agreed to by the landowner; and
- monitoring and reporting to FERC to document the status of revegetation until deemed successful.

Following construction, Millennium would monitor revegetation success within all construction workspaces. Revegetation would be considered successful if the density and cover of non-nuisance vegetation were similar in density and cover to adjacent undisturbed land, or in accordance with any state or local permit requirements.

Millennium would follow the measures included in its ECS and Invasive Species Management Plan to control the spread of noxious weeds and invasive plant species. In the event that invasive plants species spread to areas of the right-of-way where they were not present prior to construction, Millennium would remove invasive species either by hand-pulling or use of approved herbicides, in coordination with landowners and as recommended by applicable federal and state agencies. Herbicides would only be used to control invasive species in wetlands if approved by applicable agencies. Inspections would take place after the first and second growing seasons and continue until the disturbed areas are adequately restored.

Based on the types and amounts of vegetation affected by the Project and Millennium's proposed avoidance, minimization, and mitigation measures to limit Project impacts, we conclude that impacts on vegetation from the Project would not be significant.

3.2 Aquatic Resources

Freshwater waterbodies in New York are classified as either coldwater or warmwater and given letter classifications under regulation 6, New York Code of Rules and Regulations, Part 701 which denote their best use: AA, A, B, C, and D (NYSDEC

2015b, 2015c). Freshwater classes AA, A, B, and C are all suitable for fish, shellfish, and wildlife propagation and survival. To be classified as a coldwater fishery, the water temperature must be below 70 degrees Fahrenheit and contain a high oxygen content; during field surveys and in consultation with NYSDEC, Millennium did not identify any warmwater waterbodies near the Project (Gierloff 2016a, 2016b).

Field surveys identified a total of 2 ephemeral, 9 intermittent, 12 perennial, and 2 pond crossings within the Project workspace, of which 17 are classified as Class C or higher. The Huguenot Loop would cross nine waterbodies classified as Class C or higher, including three waterbodies classified as C(T) streams (see appendix E). One Class C waterbody would be within the footprint of Contractor/Pipe Yard 4. In addition, access roads for the Project would cross five Class C waterbodies, including where the existing access road to the Hancock Compressor Station would cross one C(T) designated waterbody using an existing culvert. One Class C pond would be adjacent to temporary access road TAR-0006 and would be protected by erosion controls.

Fisheries of Special Concern

Millennium consulted with the National Marine Fisheries Service, FWS, and NYSDEC to identify fisheries of special concern in the Project area, including waterbodies that may contain federally or state listed threatened, endangered, or candidate species and their habitats. The Project would cross one waterbody that supports state and federally listed mussels, the Neversink River, at MP 0.7 of the Huguenot Loop. Potential impacts on threatened and endangered species are discussed in section B.4.

In addition to fisheries of special concern under the purview of the National Marine Fisheries Service and FWS, the NYSDEC classifies all waterbodies with a rating of B or higher, or those rated C with suitable trout habitat, as protected streams. The Project would cross C(T) designated waterbodies at four locations of which three are along the Huguenot Loop (Shin Hollow Brook at MP 1.7 and 2.5, and Rutgers Creek at MP 7.3) and one, an unnamed tributary to Pea Brook, would be crossed by the existing access road to the Hancock Compressor Station using an existing bridge and culvert (see appendix E).

Aquatic Resources Impacts and Mitigation

A total of 25 waterbody crossings are within the Project construction workspace, of which 16 are classified by NYSDEC as Class C or higher, and therefore capable of supporting fisheries (NYSDEC 2015c). Waterbody crossing methods are described in detail in section A.8.2 and listed in appendix E. To minimize impacts from sedimentation and turbidity in streams crossed by the proposed pipeline, Millennium is proposing to cross waterbodies using dry-ditch methods (dam-and-pump or flume) where there is discernable flow. The crossing of intermittent waterbodies that do not have flowing water at the time of construction may be completed with upland construction

methods. In addition, five waterbodies would be crossed by HDD and two would be crossed by conventional bore. In-stream blasting is not anticipated to be required (see section B.2.2). In the event that blasting becomes necessary, Millennium would implement the measures in its Bedrock Blasting Plan, would maintain streamflow during blasting, and would comply with state and local regulations.

Millennium is continuing to consult with the NYSDEC regarding fishery classifications and timing windows for construction through fisheries; however, as mentioned in its ECS, the FERC timing window for construction through coldwater fisheries (June 1 through September 30) would be implemented unless the NYSDEC provides written approval for an alternate timing window (see appendix E).

While dry-ditch crossing methods would reduce turbidity and downstream sedimentation during construction, minor aquatic habitat alteration could still occur. Temporary impediments, changes to behavior, temporary loss of habitat, and/or the alteration of water quality could increase the stress rates, injury, and/or mortality experienced by fish. Where dam-and-pump methods are used, Millennium would screen pump intakes to minimize the potential for fish entrainment, injury, and mortality.

Millennium's use of the conventional bore and HDD crossing method would avoid direct impacts on fisheries during construction at crossings of five waterbodies, including the Neversink River and Rutgers Creek. However, if an inadvertent release of HDD drilling fluid occurs within a waterbody, the resulting turbidity could impact water quality and impede fish movement, potentially increasing the rates of stress, injury, and/or mortality experienced by fishes. In addition, water quality could be adversely affected by an accidental spill of hazardous material into a waterbody. Millennium's adherence to its HDD Plan and ECS would minimize the potential for these impacts, as well as the response time for notification and clean-up, should an inadvertent release or spill occur. Specific measures to minimize impacts on waterbodies, and the fisheries they contain, are discussed in section B.2.2.

During operation, to minimize impacts on waterbodies and fisheries, Millennium would maintain a 25-foot-wide riparian strip within the permanent right-of-way adjacent to waterbodies and would limit vegetative maintenance within the riparian area to a 10-foot-wide strip centered over the pipeline with selective tree-clearing within 15 feet of the pipeline.

No waterbodies potentially supporting fisheries would be affected by construction or operation of aboveground facilities. Use of temporary and permanent access roads would require eight waterbody crossings, of which one is designated as potentially supporting trout fisheries. Seven waterbody crossings would be completed using existing culverts; the proposed new permanent access road to the Highland Compressor Station would require construction of an open-bottom box culvert that would minimize potential impacts on aquatic resources by avoiding direct in-stream placement of road materials. Millennium's adherence to its ECS would mitigate potential impacts from temporary use

of access road crossings. In addition to the waterbodies crossed by access roads, one waterbody would be within the construction workspace for temporary access road TAR-0006 and would be protected by erosion controls per Millennium's ECS. In addition, where one perennial waterbody is located within Contractor/Pipe Yard 4, Millennium would construct a bridge and install erosion controls per its ECS to minimize potential impacts during construction.

Water for hydrostatic testing and HDD construction would be from a private pond and commercially available sources (see section B.2.2); therefore, Millennium has identified mitigation measures that would be implemented where surface water withdrawals would be used Project construction. To minimize impacts on fisheries and aquatic resources, Millennium would implement the following measures, including:

- allowing the water intake structure to float instead of laying on the waterbody bed;
- using screen around the intake to prevent fish and macroinvertebrates for becoming trapped;
- regulating the discharge rate, using energy dissipation devices, and installing sediment barriers, as necessary, to prevent sedimentation and waterbody bed scour; and
- reusing hydrostatic test water to the extent practicable.

Impacts on aquatic resources from construction and operation of the Project would be temporary and Millennium would limit impacts on aquatic resources by implementing its ECS and using trenchless (HDD and conventional bore) and dry-ditch waterbody crossing methods. Therefore, we conclude that impacts on aquatic resources from the Project would not be significant.

3.3 Wildlife Resources

Wildlife habitat types are based on the vegetation types in the Eastern System Upgrade Project area and include open land, forested upland, agricultural land, industrial/commercial land, residential land, open water, and wetlands (including PFO, PSS, and PEM). In addition, about 6.9 miles (88 percent) of the 7.8-mile-long pipeline would be adjacent to Millennium's existing right-of-way. Vegetation types are described in detail in section B.3.1; wetlands are described in detail in section B.2.3.

Forested upland habitat in the Project area is primarily early successional forest that provides food, cover, and nesting habitat for a variety of wildlife species, including mammals such as cottontail rabbit, snowshoe hare, white-tail deer, and red and gray foxes, and birds such as the woodcock, chestnut-sided warbler, golden-winged warbler, yellow warbler, yellow-breasted chat, field sparrow, and ruffed grouse (NYSDEC 2011).

Open land includes non-forested upland areas, such as shrubland and open fields, pastures, and previously disturbed areas (e.g., maintained rights-of-way). Open land habitat is dominated by grasses, herbs, and shrubs. Depending on the degree of vegetative development, open land also provides food, cover, and nesting habitat for a variety of wildlife species. Common bird species to open land in the Project area includes the bobolink, northern harrier, short-eared owl, sedge wren, grasshopper sparrow, and Henslow's sparrow (NYSDEC 2008b). Species that use open land may also occur on agricultural land, which provides foraging and resting habitat for numerous habitat generalists.

Three different types of wetland habitats occur in the Project area: PFO, PSS, and PEM wetlands. Wetland habitat types are described in detail in section B.2.3. PFO wetlands are dominated by hardwoods that provide food, cover, and nesting habitat. PSS wetlands consist of low and compact vegetation dominated by shrubs and PEM wetlands are dominated by grasses, sedges, and rushes. Wetlands in the Project area support species such as the white-footed mouse, raccoon, muskrat, mink, beaver, red-winged blackbird, swamp sparrow, tree swallow, herons, green frog, northern water snake, and numerous turtles and frogs (NYSDEC 2006). Developed land (industrial/commercial and residential) typically provides limited habitat for wildlife.

Migratory Birds

Migratory birds are species that nest in the United States and Canada during the summer and then migrate to and from tropical regions of Mexico, Central and South America, and the Caribbean for the non-breeding season. Migratory birds are protected under the Migratory Bird Treaty Act ([MBTA] – 16 U.S Code 703-711) and bald and golden eagles are additionally protected under the Bald and Golden Eagle Protection Act ([BGEPA] – 16 U.S Code 668-668d). EO 13186 (66 FR 3853) directs federal agencies to identify where unintentional take is likely to have a measurable negative effect on migratory bird populations and to avoid or minimize adverse impacts on migratory birds through enhanced collaboration with the FWS.

EO 13186 was issued, in part, to ensure that environmental analyses of federal actions assess the impacts of these actions/plans on migratory birds. It also states that emphasis should be placed on species of concern, priority habitats, and key risk factors, and it prohibits the take of any migratory bird without authorization from the FWS. On March 30, 2011, the FWS and the Commission entered into a Memorandum of Understanding (MOU) that focuses on avoiding, minimizing, or mitigating adverse impacts on migratory birds and strengthening migratory bird conservation through enhanced collaboration between the Commission and the FWS. This voluntary MOU does not waive legal requirements under the MBTA, the Endangered Species Act (ESA), the NGA, or any other statute and does not authorize the take of migratory birds. The entire Eastern System Upgrade Project would be within Region 28 (Appalachian Mountains) of the North American Bird Conservation Initiative. In total, 234 migratory

bird species occur within Region 28 (Appalachian Mountains Bird Conservation Region Partnership 2005).

Managed and Sensitive Wildlife Areas

The FWS and NYNHP were consulted to identify managed or sensitive wildlife habitats near the Project (FWS 2016a, Conrad 2016). Agency consultation and review of NYNHP databases identified no state WMAs or existing or proposed National Wildlife Refuges that would be crossed by the Project. The closest state managed land for wildlife protection and conservation is the Mongaup Valley WMA, which is located about 0.6 mile southeast of the Highland Compressor Station site. The Mongaup Valley WMA is open year-round and contains over 6,300 acres of land. The WMA is identified as an Important Bird Area by Audubon New York and includes with bald eagle viewing blinds, a wild trout fishery, and 42 species of fish including crappie, largemouth bass, and pan fish (NYSDEC 2016e). Based on the distance, rolling topography, and wooded land between the proposed Highland Compressor Station site and the Mongaup Valley WMA, we do not anticipate any direct or indirect impacts on the WMA as a result of construction and operation of the Eastern System Upgrade Project.

The Huckleberry Ridge State Forest, owned and managed by the state of New York would be crossed by the Huguenot Loop at MP 1.9. The forest consists of multiple hiking trails and camping areas. Hunting and trapping are seasonally allowed for small game as well as turkey, deer, and bear. Predator species such as bobcats and coyotes are also sought. Construction of the Huguenot Loop would result in temporary impacts on approximately 19.2 acres of land within the state forest, of which approximately 3.1 acres would be retained for operation of the Project. In addition, the Project would cross trails associated with the state forest as described in section B.5.3. Because the Huguenot Loop would be collocated with Millennium's existing mainline right-of-way where it crosses the Huckleberry Ridge State Forest, the potential impacts from fragmentation of wildlife habitat would be minimized. However, it is possible that minor, short-term impacts on wildlife including the displacement of individuals from the construction areas and adjacent habitats could occur during construction.

The proposed Huguenot Loop would cross the Neversink River Preserve, a floodplain forest managed by The Nature Conservancy, as discussed in section B.5.2. Millennium would cross the preserve and the Neversink River at MP 0.4 using the HDD method thereby minimizing direct impacts on wildlife within the preserve and river. Surface water impacts from the proposed crossing of the Neversink River are discussed in section B.2.2, and impacts on floodplain forest within the Neversink River Preserve are discussed in section B.3.1.

Additional details regarding managed areas are provided in section B.5.3. In addition, the Excelsior Sportsman's Club, a hunting association, is located about 0.3 mile north of the proposed Highland Compressor Station site. Based on distance and the presence of vegetative barriers between the Excelsior Sportsman's Club and the Project

area, no impacts on wildlife present within the Excelsior Sportsman's Club's boundaries would occur as a result of construction or operation of the Project. Section B.5.3 includes additional details regarding the Excelsior Sportsman's Club.

Wildlife Impacts and Mitigation

Construction and operation of the Project would result in various short- and long-term impacts on wildlife. Impacts would vary depending on the specific habitat requirements of the species in the area and the vegetative land cover crossed by the proposed pipeline right-of-way. Potential short-term impacts on wildlife include the displacement of individuals from construction areas and adjacent habitats and the direct mortality of small, less mobile mammals, reptiles, and amphibians that are unable to leave the construction area. Long-term impacts would include permanent conversion of forested or scrub-shrub habitats to cleared and maintained right-of-way, and periodic disturbance of wildlife during operation and maintenance. Altered habitat and periodic disturbance could also increase wildlife mortality, injury, and stress.

Blasting may be required on the Project. In the event that blasting becomes necessary for construction, Millennium would implement the measures in its Bedrock Blasting Plan, which includes development of site-specific methods to prevent flying debris (see section B.1.1). If blasting were conducted, wildlife close to the blast could be injured or killed; however, the preparation of rock for blasting, such as drilling shot holes and the movement of machinery and people, would likely cause enough disturbances to displace most wildlife from the immediate vicinity prior to the blast.

In total, construction of the Project, including the Huguenot Loop, ATWS, aboveground facilities, contractor/pipe yards, and access roads would impact 84.0 acres of upland forest, 67.0 acres of open land, 31.2 acres of agricultural land, and 3.1 acres of wetlands. During operation, 27.6 acres of upland forest, 18.4 acres of open land, 6.2 acres of agricultural land, and 1.8 acres of wetlands would be within the permanent Project footprint. Additional details regarding affected land are provided in section B.5.1.

Fragmentation of forested areas results in changes in vegetation (e.g., shrubs inhabiting the forest edge) which may limit the movement of species between adjacent forest blocks, increase predation, and decrease reproductive success for some species (Rosenberg *et al.* 1999). Millennium has collocated about 88 percent (6.9 miles) of the proposed pipeline with its existing right-of-way to minimize habitat fragmentation. Forest fragmentation and edge effects are further described in section B.3.1.

Millennium proposes to use 16 temporary access roads and 4 permanent access roads for construction and operation of the facilities (see table A-6). The new permanent access roads would permanently affect 10.6 acres of wildlife habitat, primarily composed of forested upland.

Millennium would implement impact minimization measures as described in its ECS. These measures would include:

- minimizing vegetative clearing through collocation with existing pipeline rights-of-way;

- revegetating the right-of-way, where applicable, with seed mixes developed in accordance with NYSDEC recommendations, landowner consultation, and permit requirements; and

- not conducting vegetation maintenance over the full width of the permanent right-of-way in wetlands and maintaining a 25-foot-wide buffer of native vegetation along the edge of waterbodies.

Although individual mortality of some wildlife species could occur because of the Project, the effects of these individual losses on wildlife populations resulting from construction of the proposed pipeline would occur at the individual level and would be temporary and minor. Since 88 percent of the pipeline construction activities would be adjacent to Millennium's existing right-of-way, impacts due to loss or conversion of wildlife habitat would be minimized. Due to the presence of similar habitats adjacent to and in the vicinity of construction activities, and the implementation of impact avoidance and minimization measures, we conclude that construction and operation of the Eastern System Upgrade Project would not have population-level impacts or significantly measurable negative impacts on wildlife.

Migratory Birds

The primary concern for impacts on migratory birds, including bald eagles, is mortality of eggs and/or young, since immature birds could not avoid active construction. Tree clearing and ground disturbing activities could cause disturbance during critical breeding and nesting periods, potentially resulting in the loss of nests, eggs, or young. In addition, forest fragmentation could increase predation and competition, and reduce nesting and mating habitat for migratory and ground-nesting birds (Faaborg *et al.* 1995). Millennium has proposed a pipeline route that would minimize impacts on migratory birds by placing about 88 percent of the pipeline adjacent to Millennium's existing pipeline right-of-way.

Although multiple bird species occur in the Project area, no federally listed threatened or endangered bird species are known to occur in the area. Millennium would conduct all tree clearing between October 1 and March 31, thereby avoiding the peak migratory bird nesting season (between April 15 and August 1). This timeframe is consistent with the tree clearing timing restrictions to protect the federally listed Indiana bat (see section B.4.1). During operations, Millennium would prohibit all vegetative maintenance activities between April 15 and August 1 to minimize disturbance of ground nests. Millennium initiated consultation with the FWS in January 2016. Consultation is

ongoing, and FWS has not identified specific measures required to protect migratory birds during Project construction. Millennium would continue to consult with the FWS regarding impacts on migratory birds to identify any additional clearing restrictions. The Project is within the range of the bald eagle, which is federally protected under the BGEPA and state listed by NYSDEC as threatened. Refer to section B.4.1 for additional information regarding bald eagles.

Based on the characteristics and habitat requirements of migratory birds known to occur in the Project area, the amount of similar habitat adjacent to and in the vicinity of the Project, and Millennium's implementation of the measures in its ECS, including timing restrictions for clearing of vegetation, we conclude that construction and operation of the Eastern System Upgrade Project would not have significant impacts on migratory bird populations.

4. Threatened and Endangered Species

Special status species are those species for which state or federal agencies afford an additional level of protection by law, regulation, or policy. Special status species include federally listed species protected under the ESA, as amended, species proposed or candidates for listing by the FWS, and those species that are state listed as threatened, endangered, or other special status. Section 7(a)(2) of the ESA requires the Commission to ensure that any action it authorizes, funds, or carries out would not jeopardize the continued existence of federally listed or proposed listed species, or result in the adverse modification or destruction of critical habitat for federally listed and proposed species.

As the lead federal agency for the Eastern System Upgrade Project, FERC is responsible for the ESA consultation with the FWS. Species classified as candidates for listing under the ESA do not currently carry regulatory protection but, if applicable, are typically considered during our assessment as they may be listed in the future. Similarly, species protected under state statutes do not carry regulatory protection under the ESA but impacts are reviewed if the applicable agency indicates its potential presence in the Project area during consultation.

Informal consultations were conducted by Millennium, as our non-federal representative, with the FWS - New York Field Office to determine whether any federally listed threatened or endangered species, federal species of concern, or designated critical habitats occur in the Project area. Millennium also consulted with NYSDEC regarding state listed species and habitats; occurrence data for federally and state listed species were obtained from the NYSDEC-NYNHP.

Millennium's consultation with the FWS and NYSDEC identified potential habitat and occurrences for threatened and endangered species in the Project area. Millennium also conducted species-specific surveys as described below. In addition to those species identified by the FWS and NYSDEC, Millennium identified one state listed endangered plant, puttyroot (*Apelcrum hyemale*), in the survey area for the Highland Compressor

Station. Table B-9 describes the federally and state listed species that may occur in the Project area, their preferred habitat, and our determination of effect. Species with a determination of "no effect" as documented in table B-9 are not discussed further. No designated critical habitat occurs in the Project area.

4.1 Birds

Bald Eagle

The Project is within the range of the bald eagle, which is federally protected under the BGEPA and is state listed as threatened in New York. Because the Neversink River corridor was identified as important overwintering habitat for bald eagles during consultation with NYSDEC, Millennium conducted surveys to identify bald eagle nests in the vicinity of the Project crossing of the Neversink River.

Two bald eagle nests were observed approximately 1,700 and 5,000 feet north of the proposed Huguenot Loop workspaces; although no fledglings were observed, a pair of adults was documented in the vicinity of each nest. Millennium submitted the results of the bald eagle survey to the FWS and NYSDEC in July, 2016, and concurrence on the field survey results is pending.

No impacts on the bald eagles or nests recorded during the survey are anticipated since Project construction and operation activities would occur well beyond the 660-foot minimum distance recommended by the FWS' National Bald Eagle Management Guidelines (FWS 2007). In the event that a newly encountered bald eagle nest is identified in the Project area, Millennium would coordinate with the FWS for approval prior to beginning construction in the vicinity of the nest and would implement the FWS' guidelines to avoid disturbance at bald eagle nest sites. Given the absence of active nests in the Project workspace and Millennium's implementation of FWS guidelines to minimize impacts on nesting bald eagles, we conclude that the Project would not adversely affect this species.

Table B-9
Federal and State Threatened and Endangered Species and Species of Concern Potentially Occurring in the Project Area

Species	Federal Status	State Status	Habitat Description	Effect Determination
Birds				
Bald eagle (*Haliaeetus leucocephalus*)	BGEPA	T	Prefers areas near large, open waterbodies with abundant fish and nearby tall trees suitable for nesting. Adults begin building nests between October and early December, and lay eggs in February to March (FWS 2007).	*May affect, not likely to adversely affect;* no active nests are within the Project area and FWS guidelines would be implemented for newly identified nests.
Mammals				
Indiana bat (*Myotis sodalis*)	E	E	Hibernates in caves and abandoned mines during the winter. Roosts in maternity colonies in spring, summer, and fall located under the exfoliating bark of dead trees in riparian zones, bottomland and floodplain habitats, wooded wetlands, and upland communities. Forages in forested areas, cleared areas adjacent to forests, and over ponded areas that support abundant flying insects (FWS 2012).	*May affect, not likely to adversely affect;* the Project would be within the range of this species and Indiana bat calls were documented during acoustic surveys along the Huguenot Loop; however, Millennium proposes to avoid direct impacts by conducting tree clearing between October 1 and March 31, 2016 when the bats are hibernating or concentrated near their hibernacula.
Northern long-eared bat (*Myotis septentrionalis*)	T	T	Hibernates in caves and abandoned mines during the winter. Roosts singly or in colonies underneath exfoliating bark of dead trees, in cavities, or in crevices of both living and dead trees. Occasionally found using structures as roost sites (for example, barns and sheds). Forages within the understories of forested habitat (FWS 2015).	*May affect, not likely to adversely affect;* the Project would be within the range of this species; however, Millennium proposes to avoid direct impacts by conducting tree clearing between October 1 and March 31, 2016 when the bats are hibernating or concentrated near their hibernacula.
Mussels				
Dwarf wedgemussel (*Alasmidonta heterodon*)	E	E	Inhabits streams and rivers with low to moderate currents and sand, clay, or gravel substrate. Adults generally remain buried; parasitic larvae attach themselves to a fish for several weeks before detaching and settling on the sediment (FWS 2005).	*May affect, not likely to adversely affect;* habitat in the Neversink River where individuals were documented during field surveys would be crossed by HDD. Due to the implementation of mitigation measures, impacts from construction are not anticipated.
Brook floater (*Alasmidonta varicose*)	--	T	Favors gravelly riffles in creeks and small rivers. Substantial populations in New York are limited to the Neversink River, although limited numbers may occur in tributaries of the Susquehanna, in Shawangunk Kill, and in the Delaware River basin (NYNHP 2016a).	*May affect, not likely to adversely affect;* no individuals were observed during field surveys and potential habitat in the Neversink River would be crossed by HDD. Due to the implementation of mitigation measures, impacts from construction are not anticipated.

Table B-9 (continued)
Federal and State Threatened and Endangered Species and Species of Concern Potentially Occurring in the Project Area

Species	Federal Status	State Status	Habitat Description	Effect Determination
Plants				
Small whorled pogonia (*Isotria medeoloides*)	T	E	Generally grows in older hardwood forest stands with an open understory, although it sometimes grows in softwood stands. Prefers acidic soils with a thick layer of dead leaves, often on slopes near streams. Flowers in May and June, but may not bloom annually (FWS 2016b).	*No effect;* field surveys were conducted in potentially suitable soils during July and August, 2016. No individuals were observed during the survey.
Puttyroot (*Apelcrum hyemale*)	--	E	Generally grows in hardwood and mixed forest habitat near limestone outcrops or talus in moist to swampy soils. Flowers in May and June (NYNHP 2016b)	*No effect;* this species was observed during field surveys conducted at the Highland Compressor Station site. The Project facilities were sited to avoid direct impacts on this species and Millennium would plant conifers along the limits of the Project workspace nearest to the puttyroot location to minimize any potential habitat changes due to increased sunlight penetration from tree clearing for the Project.
Reptiles				
Bog turtle (*Clemmys muhlenbergii*)	T	E	Lives in open, sunny, spring-fed wetland areas with scattered dry areas. They are active from April through October. Nests are built during summer, in moss or sedges above the water level adjacent to the wetlands (FWS 2010).	*May affect, not likely to adversely affect;* Potential habitat was identified during Phase 1 surveys; however, no bog turtles were identified during Phase 2 presence/absence surveys.
Timber rattlesnake (*Croatus horridus*)	--	T	Hibernates in winter in open, steep, south facing slopes with rock fissures or talus surrounded by hardwood forest. During the active period (late April to mid-October), found in cooler, thicker woods with a closed canopy; gravid females may be found on open, rocky ledges (NYSDEC 2016f).	*May affect, not likely to adversely affect; s*urveys documented individuals within 900 feet of the Ramapo Meter Station. Millennium would implement mitigation measures and provide enhanced habitat during restoration.

E = endangered; T = threatened.

4.2 Mammals

Indiana Bat

The federally and state listed endangered Indiana bat was identified during Information for Planning and Conservation database review and during consultations with NYSDEC. Millennium conducted acoustic surveys to document the presence of Indiana bats within the Project area in Orange and Rockland Counties, New York; the known range of the species does not extend into Sullivan and Delaware Counties. Surveys were conducted along the western portion of the Huguenot Loop and at the Ramapo Meter Station sites per a FWS-approved study plan prepared in accordance with the 2016 Range-Wide Indiana Bat Summer Survey Guidelines (FWS 2016c). Where presence has been established through review of the NYNHP records along the eastern portion of the Huguenot Loop, no surveys were conducted. Direct impacts on the species could occur if roost trees or hibernacula were disturbed during periods of use. Long-term, indirect impacts could also occur due to the permanent loss of suitable roost trees from vegetation clearing during construction and operation. Suitable roost trees have exfoliating bark, including those that are dead or dying, and those that have cracks or crevices (FWS 2012).

No known hibernacula within the Project area were identified by the applicable agencies; however, NYSDEC has documented two known summer roost sites within 2.5 miles of the Huguenot Loop. Calls attributable to Indiana bats were documented at four study sites along the Huguenot Loop; none were documented at the Ramapo Meter Station site. Millennium submitted its Indiana bat survey report to the FWS and NYSDEC in July 2016 and concurrence is pending. To avoid take of the species during construction, Millennium would restrict tree clearing to the period when Indiana bats are in hibernation (October 1 to March 31), as recommended by FWS (FWS 2012).

Construction of the Project could result in the long-term and permanent loss of potential Indiana bat habitat where forested land would be cleared for construction, and where forested land would be maintained as open land in the permanent right-of-way. Impacts on potential Indiana bat habitat would be minimized since the pipeline would be collocated with Millennium's existing right-of-way along most of the route. However, in Orange and Rockland Counties where the Indiana bat occurs, the Huguenot Loop and aboveground facilities would result in the disturbance of 49.0 acres of forested upland areas during construction and the loss of 9.4 acres of upland forest during operation. Millennium would avoid potentially suitable roost trees where practicable during construction and would install artificial roost structures within the Project area where it is within areas of known Indiana bat occurrence. Consultation with the FWS regarding impacts on the Indiana bat is ongoing.

Millennium would avoid direct impacts on the Indiana bat through adherence to the FWS-recommended tree-clearing window, and would minimize impacts on potential

bat habitat via collocation with existing facilities, avoidance of roost trees where practicable, and installation of artificial roost structures. Therefore, we conclude that the Project *may affect, but is not likely to adversely affect* the Indiana bat.

Northern Long-Eared Bat

The northern long-eared bat (*Myotis septentrionalis*) is state listed as threatened and was federally listed as threatened under the ESA on April 2, 2015 due to population declines from white-nose syndrome. The FWS also established a final rule under Section 4(d) of the ESA, effective February 16, 2016, that targets the prohibition of incidental take in those areas affected by white-nose syndrome. Within affected areas, incidental take is prohibited if it occurs within a hibernaculum; if it results from tree removal activities within 0.25-mile of a known hibernaculum; or if it results from removal of a known, occupied maternity roost or trees within 150 feet of the maternity roost during the pup season (June 1 through July 31) (FWS 2016d). Based on a review of FWS data, the Project area is within the area affected by white-nose syndrome and the northern long-eared bat has the potential to occur in the Project area (FWS 2016e).

Direct impacts on the northern long-eared bat would be similar to those listed for the Indiana bat, including habitat loss from disturbance of roost trees and hibernacula during periods of use. However, habitat loss is not a contributing factor in species decline, and indirect effects would be limited on impacts on known hibernacula that would preclude seasonal use by northern long-eared bats. Millennium's implementation of the tree-clearing window for the protection of Indiana bats (tree clearing would occur from October 1 to March 31) would protect northern long-eared bats from direct take. No known hibernacula or maternity roosts have been identified by the applicable agencies within 0.25 mile of the Project. Further, where acoustic surveys were conducted to document occurrence of Indiana bats, no calls attributable to northern long-eared bats were documented. As direct impacts on the northern long-eared bat would be avoided through adherence to the tree-clearing window, and no known hibernacula or occupied maternity roosts are within the Project area, we conclude that the Project *may affect, but is not likely to adversely affect* the northern long-eared bat.

4.3 Mussels

Based on consultation with the FWS and NYSDEC, freshwater mussels including the federally and state endangered dwarf wedgemussel (*Alasmidonta heterodon*) and the state threatened brook floater (*Alasmidonta varicosa*) have the potential to occur in the Project area. Based on NYSDEC-NYNHP records, these species are documented as occurring in the Neversink River.

Millennium conducted freshwater mussel surveys in the Neversink River in a 1.5-acre area at the proposed crossing location in August 2016. Two live dwarf wedgemussels and one shell were identified during surveys, as well as individuals of

several other freshwater mussel species. Brook floater were not found during the survey. Millennium submitted its mussel survey report to the FWS and NYSDEC in October 2016 and concurrence is pending. Millennium would avoid direct impacts on the Neversink River by using the HDD construction method. As described in section B.1.1, Millennium conducted an HDD feasibility analysis for the crossing of the Neversink River and found that the bore path section under the Neversink River would be in competent bedrock favorable for stable subsurface drilling. However, if an inadvertent release of HDD drilling fluid occurs during the HDD, the resulting turbidity could impact water quality. In addition, water quality could be adversely affected by an accidental spill of hazardous material. Millennium's adherence to its ECS, HDD Contingency Plan, and SPRP would minimize or avoid potential impacts on the Neversink River. In the event that the HDD crossing of the Neversink River is unsuccessful, Millennium would consult with applicable agencies regarding impacts on threatened and endangered freshwater mussels, and would obtain necessary approvals prior to implementing an alternative crossing method. Therefore, we conclude that the Project *may affect, but is not likely to adversely affect* federally and state listed mussels.

4.4 Reptiles

Bog Turtle

The federally threatened and state endangered bog turtle (*Clemmys muhlenbergii*) occurs in the Project area in Orange and Rockland Counties, New York. Potential bog turtle habitat includes wetlands that contain areas of perennially saturated soils, predominantly emergent vegetation, and deep (3- to 5-inch) mucky soils (FWS 2006). A wetland complex found to contain these three characteristics (either together or in separate areas) during Phase 1 (habitat) surveys is considered suitable habitat and may require Phase 2 surveys to determine species presence or absence. In November 2015 and April and June 2016, Millennium conducted Phase 1 surveys within wetlands crossed by the Project to identify suitable bog turtle habitat. Based on the results of the Phase 1 surveys and per FWS recommendations, Millennium conducted Phase 2 surveys in 6 wetlands with potential suitable bog turtle habitat (wetlands W-28A, W-21, W-20, W-19, W-16, W-07; see appendix F for documentation of wetlands crossed by the Project); no bog turtles were encountered during field surveys. Further, of the six wetlands with potential habitat, two wetlands (W-28A and W-19) would be outside of the construction workspace and two wetlands (W-21 and W-20) would be crossed via HDD, thereby minimizing or avoiding direct impacts on potential bog turtle habitat. The results of Phase 1 and 2 surveys were submitted to the FWS and NYSDEC, and consultation is ongoing. In addition, Millennium is awaiting comments from NYSDEC on the state-regulated wetlands crossed by the Project. As no bog turtles were encountered during Phase II surveys, we find that construction and operation of the Project *may affect, but is not likely to adversely affect* the bog turtle.

Timber Rattlesnake

The timber rattlesnake is state listed as threatened in New York, and the NYNHP has records of timber rattlesnake occurrences at 6 locations within 1.5 miles of Project workspaces, including a known hibernacula and a foraging area within 0.4 mile of the Ramapo Meter Station. Millennium surveyed potentially suitable habitat within the pipeline right-of-way and at aboveground facility sites at locations identified by NYSDEC in 2016 to document the presence of timber rattlesnakes. During surveys, timber rattlesnakes were found at 2 dens about 900 feet from the Ramapo Meter Station. In addition, potentially suitable foraging habitat was documented near the Highland Compressor Station site.

The survey results were submitted to NYSDEC in July 2016 and January 2017, and concurrence is pending. Construction at the Ramapo Meter Station could result in the disturbance of timber rattlesnakes that den near construction workspaces. In addition, individual snakes could experience direct mortality if present in areas of active construction; however, individuals that are mobile would likely avoid the work areas during construction.

Millennium would implement avoidance and mitigation measures described in its Timber Rattlesnake Impact Assessment and Mitigation Plan to minimize the potential for disturbance or loss of timber rattlesnakes, including:

- conducting clearing and grading during the period when timber rattlesnakes are in hibernation in New York (November 1 to March 31), or having a licensed, qualified timber rattlesnake biologist present to monitor workspaces for timber rattlesnakes during construction outside of the hibernation period; and

- implementing a Project-specific Rattlesnake Encounter Plan.

The Rattlesnake Encounter Plan includes measures for education of Millennium's construction and operation workforce regarding rattlesnake avoidance, and measures that would be implemented in the event that a timber rattlesnake is observed in or near the work area. In addition, Millennium is consulting with NYSDEC regarding habitat enhancement via creation of rock basking areas during restoration within the Highland Compressor Station and Ramapo Meter Station construction workspaces.

Because timber rattlesnakes were not identified within Project workspaces and with Millennium's mitigation, we conclude that the Project would not have an adverse effect on the timber rattlesnake.

Millennium is still consulting with the FWS and NYSDEC regarding federally and state listed threatened and endangered species that may be present in the Project area.

The FWS must concur with our determinations of effect for federally listed species to complete the ESA consultation process. To ensure compliance with our responsibilities under Section 7 of the ESA regarding federally listed species, **we recommend that:**

- **Millennium should <u>not begin construction</u> of the Project <u>until</u>:**

    a. the staff receives comments from the FWS regarding the proposed actions;

    b. the FERC staff completes any necessary Section 7 consultation with the FWS; and

    c. Millennium has received written notification from the Director of the Office of Energy Projects (OEP) that construction and/or use of mitigation (including implementation of conservation measures) may begin.

5. Land Use and Visual Resources

The Eastern System Upgrade Project would affect 209.2 acres of land during construction, including the pipeline construction right-of-way, ATWS, aboveground facilities, access roads, contractor/pipe yards and staging areas. Of that, 38.0 acres are within Millennium's existing easement and existing aboveground facility boundaries. Of the 209.2 acres affected by construction, about 139.9 acres would be restored to pre-construction uses. The remaining 69.3 acres, including 24.9 acres currently maintained by Millennium as right-of-way, an existing facility, or access road, would be within the operational footprint of the Project.

The proposed pipeline would cross multiple land types in Orange County, New York, the majority of which would be open land (4.1 miles), forested land (1.5 miles), or agricultural land (1.1 miles). Other land uses crossed include wetlands (0.6 mile), industrial/commercial land and residential land (0.2 mile each), and open water (0.1 mile). In addition, about 6.9 miles (88 percent) of the 7.8-mile-long pipeline would be adjacent to Millennium's existing right-of-way. As stated above, the areas affected by construction would include Millennium's existing right-of-way and aboveground facility sites, and land outside of these areas. Following construction, areas associated with the existing pipeline right-of-way and aboveground facility sites would continue to be maintained as before. In addition to these areas, about 44.3 acres of new land would be permanently encumbered by operation of the Project. About 42.4 percent of this newly encumbered acreage would be for new pipeline right-of-way, 29.2 percent would be for aboveground facilities, and 28.3 percent would be for new permanent access roads. Table B-10 summarizes the Project's temporary (construction) and permanent (operational) land use impacts. Impacts on open water and wetlands are discussed in sections B.2.2 and B.2.3, respectively.

Table B-10
Land Use Affected by Construction and Operation (in Acres) of the Eastern System Upgrade Project[a]

Facility	Agricultural		Upland Forest		Open Land		Industrial/ Commercial		Wetlands[b]		Open Water		Residential		Total	
	Con[c]	Op[d]	Con[c]	Op[d]	Con[c]	Op[d]	Con[c]	Op[d]	Con[c]	Op[d]	Con[c]	Op[d]	Con[c]	Op[d]	Con[c]	Op[d]
Pipeline Facilities																
New pipeline right-of-way	9.4	3.3	32.7	8.1	7.2	5.4	0.7	0.4	2.0	1.0	0.1	<0.1	2.0	0.7	54.1	18.8
Existing pipeline right-of-way	4.6	2.7	0.6	0.4	21.1	12.0	0.2	0.2	1.0	0.8	0.1	<0.1	0.5	0.2	28.0	16.3
ATWS on new land	9.0	0.0	13.0	0.0	4.0	0.0	0.3	0.0	0.1	0.0	0.0	0.0	2.0	0.0	28.4	0.0
ATWS on existing easements	0.1	0.0	<0.1	0.0	0.9	0.0	0.1	0.0	0.0	0.0	0.0	0.0	0.1	0.0	1.3	0.0
Subtotal	***23.2***	***6.0***	***46.4***	***8.5***	***33.2***	***17.3***	***1.3***	***0.6***	***3.1***	***1.8***	***0.2***	***0.1***	***4.5***	***1.0***	***111.9***	***35.2***
Access roads	0.8	0.0	12.0	10.6	1.0	0.3	5.0	4.3	<0.1	<0.1	0.0	0.0	0.6	0.0	19.3	15.3
Contractor/pipe yards and staging areas	6.9	0.0	0.9	0.0	28.9	0.0	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.0	37.2	0.0
Aboveground Facilities																
Highland Compressor Station	0.0	0.0	16.8	5.3	0.9	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	17.7	5.5
Hancock Compressor Station	0.0	0.0	6.0	2.0	1.1	0.3	5.6	3.2	0.0	0.0	0.1	0.1	0.0	0.0	12.9	5.6
Alternate Interconnect	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2
Wagoner Interconnect	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.2	0.0	0.0	0.0	0.0	0.0	0.0	2.2	2.2
Huguenot Meter Station	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4
Westtown Meter Station	<0.1	<0.1	0.0	0.0	0.0	0.0	0.6	0.6	0.0	0.0	0.0	0.0	0.0	0.0	0.6	0.6
Ramapo Meter Station	0.0	0.0	1.7	0.9	1.9	0.1	2.8	2.7	0.0	0.0	0.0	0.0	0.0	0.0	6.3	3.7
Pig launcher/receiver	0.0	0.0	0.3	0.3	0.1	0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.4	0.4
Cathodic protection groundbed	0.2	0.2	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.2	0.2
Subtotal	***0.3***	***0.3***	***24.8***	***8.5***	***4.0***	***0.8***	***11.7***	***9.2***	***0.0***	***0.0***	***0.1***	***0.1***	***0.0***	***0.0***	***40.9***	***18.8***
Project Total	**31.2**	**6.2**	**84.0**	**27.6**	**67.0**	**18.4**	**18.5**	**14.1**	**3.1**	**1.8**	**0.3**	**0.2**	**5.1**	**1.0**	**209.2**	**69.3**

[a] The numbers in this table have been rounded for presentation purposes. As a result, the totals may not reflect the sum of the addends.

[b] The wetlands category includes both forested and non-forested wetlands.

[c] Construction impact acreages are based on a nominal temporary right-of-way between 75 and 125 feet. Impacts do not include the area between HDD entry and exit points, where impacts would be limited to hand-clearing a maximum 3-foot-wide footpath.

[d] The operational footprint is based on a new 25-foot-wide permanent right-of-way for the Huguenot Loop and the existing 25-foot permanent easement for the Millennium Pipeline. Where the Huguenot Loop and Millennium's mainline are not co-located, the operational footprint is based on a new 50-foot-wide permanent right-of-way.

5.1 Land Use

Open Land

Project construction would affect 67.0 acres of open land, defined as non-forested upland areas, pastures, and maintained utility right-of-way, including Millennium's existing right-of-way (see table B-10). Approximately 48.6 acres of the temporarily disturbed area would be allowed to revert to original conditions after construction. Impacts on most of the affected open land would be temporary and short term, and would be minimized by Millennium's implementation of the ECS and their restoration of open land areas to preconstruction conditions along the pipeline right-of-way. Because the permanent pipeline right-of-way would be maintained as open land, there would be no permanent change in land use for the 17.3 acres of open within the permanent right-of-way. A total of about 0.8 acre of open land at the Highland and Hancock Compressor Stations, the Ramapo Meter Station, and the pig launcher/receiver, would be permanently converted to industrial/commercial land for operation. Based on the limited acreage of open land subject to permanent maintenance or conversion, impacts on open land would be predominantly short term and minor.

Forested Land

About 84.0 acres of forested land would be within the construction workspace of the Project, including upland forest and PFO wetland. After construction, trees and shrubs would be allowed to grow within the temporary construction right-of-way and other temporary workspace areas. Impacts on forested land would be long-term or permanent, as it would likely take 20 years or more for mature trees to re-establish within the construction areas and forested vegetation would be permanently converted within the operational areas of the Project. The 27.6 acres required for operation of the pipeline would be permanently converted to open land, while 8.5 acres associated with the operation of aboveground facilities would be converted to industrial/commercial land. Impacts on forested vegetation are discussed in detail in section B.3.1 and visual impacts from clearing forested land are discussed in section B.5.4.

No areas of commercial timber production or sustainably managed forest areas have been identified along the proposed pipeline route through Millennium's search of public records and contact with landowners (Sustainable Forestry Initiative 2016, Forest Stewardship Council 2016, New York Tree Farm Program, Empire State Forest Products Association 2016). However, forested land designated as Significant Natural Communities by NYSDEC would be crossed by the proposed pipeline right-of-way and access roads. Section B.3.1 includes additional detail on these forest areas.

In addition, the parcel owned by Millennium and the site of the proposed Highland Compressor Station, is enrolled in a New York State program under provision of the 480-a Forest Tax Law. The program allows for a reduction on taxes of forested land if the

owner of a parcel that qualifies adhere to a Forestry Management Plan. To ensure that the parcel remains eligible for the program, Millennium would implement a forest management plan prepared by a certified forester and subject to approval by NYSDEC. Millennium has stated that it would submit the approved forest management plan to FERC upon completion. If Millennium identifies any additional parcels at a later date, it would consult with the landowner and management entity, as appropriate, to mitigate impacts.

Agricultural Land

Construction of the Huguenot Loop including access roads, contractor/pipe yards and staging areas would affect 30.9 acres of agricultural land, which includes active hayfields, grazing/pasture land, and active crop production. In addition, less than 0.1 acre of agricultural land would be within the construction workspace for the Westtown Meter Station and 0.2 acre would be within the proposed cathodic protection groundbed. No agricultural land would be affected by construction or operation of the other newly proposed or existing aboveground facilities. Crops produced in agricultural land crossed by the Project include hay and corn; no areas of specialty crop production would be crossed. Within actively cultivated or rotated cropland, managed pastures, and hayfields, topsoil would be stripped and stockpiled separately from the subsoil. Millennium would also comply with NYSDAM pipeline construction guidance, section 3.6, by not using excess rock for backfill within 24- to 30-inches from the final grade, depending on soil type. Topsoil segregation would not occur on the portions of the construction right-of-way over Millennium's existing pipeline. Millennium would protect the topsoil over the existing pipeline from the movement of equipment and construction activities by matting the areas where construction equipment would cross the existing pipeline.

Millennium has identified active livestock grazing pastures and one pig farm that would be crossed by the Huguenot Loop. Where fencing associated with these parcels would be cut during construction, Millennium would install temporary gates and steel plates to allow for safe passage. Millennium has also committed to working with each landowner on alternative grazing plans to allow sufficient revegetation of disturbed areas.

Millennium anticipates that about one growing season would be lost due to construction; however, landowners would be compensated for these production losses in accordance with the terms of individual landowner agreements. Following construction, Millennium would visually inspect agricultural land to ensure that crop density and vigor in areas affected by construction are similar to unaffected adjacent portions of the same field. Monitoring of this land would occur for a minimum of two growing seasons. Impacts on prime farmland and farmland of statewide importance are discussed in section B.1.2.

Operations would affect 6.2 acres of agricultural land within the proposed permanent pipeline right-of-way and the proposed cathodic protection groundbed. All

agricultural land affected by the pipeline would be restored in accordance with FERC's Plan following construction for use of crop production the following season. Less than 0.1 acre of agricultural land would be permanently converted to industrial/commercial land at the Westtown Meter Station; no other aboveground facilities would be located in agricultural land.

Construction of the Project, including the new and existing easements, would cross 26 parcels within Orange County Agricultural District No. 2, designated by Orange County and NYSDAM for protection from non-agricultural uses. Of these 26 parcels, only 6 parcels, in part or whole, are currently being used for agricultural purposes. Following construction, agricultural use of this land, including the parcels within the permanent pipeline right-of-way, could resume. Alternatively, 3.2 acres within the footprint of aboveground facilities (including the Huguenot Meter Station, Alternate Interconnect, and pig launcher/receiver) and permanent access roads would be converted to industrial/commercial land, however none of these are currently being used for agricultural purposes (see table B-11). For land affected by construction or within the permanent pipeline right-of-way, which would be returned to agricultural use, Millennium anticipates that the Project would comply with the purpose of the district's program.

Millennium would implement its ECS, which includes measures listed in the FERC Plan and NYSDAM's pipeline construction guidance (NYSDAM 2011). NYSDAM's pipeline construction guidance measures would include:

- burying pipelines in cropland, hayland, and improved pasture so that a minimum cover of 4 feet is obtained;
- providing temporary livestock crossings, temporary farm equipment crossings, and fencing around the open trench, where needed by the landowner;
- placing geotextile matting over subsoils prior to using gravel for access ramps placed in agricultural areas to prevent gravel from becoming embedded into the subsoil; and
- providing a phone number to farm owners/operations that can be used to directly contact Millennium staff through all stages of the Project.

No drain tile systems have been identified in the Project area during landowner discussions; however, if present within the right-of-way, Millennium would develop a set of specific mitigation measures with the landowner prior to beginning construction. Work in proximity to these systems would be conducted in accordance with Millennium's ECS and the easement agreements with individual landowners.

With implementation of Millennium's ECS, which incorporates the FERC Plan and certain measures from NYSDAM's pipeline construction guidance (NYSDAM 2011), impacts on agricultural land would be minor and temporary. All agricultural land uses on this land would be allowed following construction and restoration.

Table B-11
Orange County Agricultural District Parcels Within the Project's Permanent Easement[a]

Facility	Start MP	End MP	Crossing Length (feet) [b]	Permanent Operational Impact (acres)
Huguenot Loop	0.0	0.0	15	0.0
	0.0	0.0	54	0.1
	0.0	0.1	153	0.1
	0.1	0.2	847	0.5
	0.2	0.3	288	0.3
	0.3	0.4	323	0.4
	0.4	***0.4***	***505***	***0.6***
	0.4	***0.5***	***357***	***HDD***
	0.5	0.6	317	HDD
	0.6	0.6	279	HDD
	0.6	0.7	280	HDD
	0.7	0.9	572	HDD
	0.9	1.1	992	1.5
	3.8	4.0	987	1.1
	4.5	4.7	1,070	HDD
	4.7	***5.0***	***1,914***	***1.1***
	5.0	***5.1***	***564***	***0.3***
	5.1	5.3	553	0.3
	5.7	6.1	2,032	1.2
	6.1	6.1	316	0.3
	6.5	6.6	679	0.4
	6.6	6.9	1,667	0.9
	6.9	***7.6***	***3,212***	***1.9***
	7.6	7.6	366	0.5
Alternative Interconnect	N/A	N/A	N/A	0.2
Cathodic protection groundbed	***N/A***	***N/A***	***N/A***	***0.2***
Huguenot Meter Station	0.0	0.0	N/A	0.4
Pig launcher/receiver	0.1	0.1	N/A	0.4
PAR-0001	N/A	N/A	N/A	0.3
PAR-002A	N/A	N/A	N/A	0.1
PAR-0003	N/A	N/A	N/A	1.9
Project Total			**18,342**	**14.4**

[a] Bold, italic font entries indicate parcels, in part or whole, that are currently in agricultural use.
[b] N/A indicates non-linear crossings

Industrial/Commercial

Industrial/commercial land is defined as existing industrial plants, commercial facilities, landfills, paved areas, and existing roads and railroads. As presented in table B-10, the proposed Eastern System Upgrade Project would affect a total of 18.5 acres of industrial/commercial land during construction. A total of 14.1 acres of industrial/commercial land would be permanently encumbered by the operational right-of-way, aboveground facilities, or permanent access roads; the remaining 4.4 acres of affected land would be returned to original conditions after construction.

During construction, the proposed pipeline would cross 16 public roads and 2 private roads. Each of the road crossings would be conducted via trenchless construction methods (HDD or bore), thereby avoiding impacts. In addition, one active and one abandoned railroad would be crossed by conventional bore at MP 1.7 and MP 7.6. Transportation impacts are discussed in section B.6.2. The majority of impacts on industrial/commercial land would be temporary and minor.

Residential Land

A total of 5.1 acres of residential land would be affected by construction of the pipeline, including ATWS and access roads. A portion of this land, 0.5 acre, is within Millennium's existing right-of-way. No residential land would be affected by construction or operation of the aboveground facilities. One permanent access road, PAR-0001, would be about 35 feet from a residence and 30 feet from the swimming pool at the residence near MP 0.0. Millennium has provided a site-specific plan for this residence, as well as for all 7 occupied residences within 50 feet of work areas (see appendix D). We have reviewed these plans and find them to be acceptable. We encourage the affected landowners to review the site-specific plans for their property and provide us with any comments during the EA comment period.

Impacts on residential areas during the construction and use of the temporary access roads could include noise and dust from construction traffic and disturbance or removal of lawns, trees, landscaped shrubs, and structures such as sheds or fencing. Millennium would notify landowners of the approximate timelines of active construction and would restore disturbed areas to pre-construction conditions where possible, or as specified by the landowners.

Millennium is working with individual landowners to identify the location of wells, utilities, and septic systems. Currently one septic system (including tank and field) and two septic fields have been identified within proposed temporary work areas near MP 0.0, MP 0.1, and MP 5.6. To minimize impacts from construction, Millennium is proposing to relocate the septic system at MP 0.0 and would mat the septic fields at MP 0.1 and MP 5.6., however if impacts on these features, or other features subsequently identified, occur Millennium would repair or relocate the feature in consultation with

individual landowners. Overall impacts on residential areas would be negligible and temporary.

5.2 Planned Developments

Based on correspondence with county and town planning agencies in Delaware, Sullivan, Orange, and Rockland Counties in New York, and record reviews of permit applications, no commercial or residential developments were identified within 0.25 mile of the Project. Further, no "priority growth area(s)" designated by the Orange County Planning Department would be crossed by the Huguenot Loop or in proximity to other Project facilities in Orange County.

In comments provided during the scoping period, concerns were raised for impacts on the Chapin Estate. This development is located about 3.3 miles north of the Highland Compressor Station site; therefore, given the distance, adverse impacts are not expected. A motion to intervene on behalf of the Ozdan Development, LLC and Amytra Development, LLC was filed to the docket on August 29, 2016. In addition, we received comment letters raising concerns for impacts on these future developments, which to be located on lands adjacent to and bordering Millennium's existing pipeline and the proposed Highland Compressor Station. While the property owners have been consulting with the town of Highland regarding their plans and associated rezoning, publicly available version(s) of the developers' proposed site plans are not available. Since the compressor station would be located on a large parcel of land with natural buffers (trees and/or hills), the owners of the neighboring lands could configure the developments such that the natural buffers would mitigate noise and visual impacts on future residents. These developments are discussed further in section B.10. Potential impacts on residents in proximity to the Project and air and health effects are discussed in sections B.5.1 and B.8.1, respectively. Potential impacts on property values are discussed in section B.6.5.

5.3 Public Land, Recreation, and Special Interest Areas

No federally managed or owned land would be within 0.25 mile of the Project, including wildlife refuges, national parks, scenic byways or rivers, or preserves. Further, no privately-owned conservation easements managed under agreements with the USDA-NRCS (agricultural or wetland reserve program land) or the Farm Service Agency (conservation reserve program land), have been identified within 0.25 mile of the Project through a review of publicly available data and landowner consultation. The Farm Service Agency does not disclose the locations of easements under its purview in New York, therefore Millennium has consulted with landowners about the presence of this land and to date no land enrollment in the program has been identified. The Project would be within 0.25 mile of one state park, three county parks, three county parks or recreation areas, one municipal park, two preserves, two private land trusts, a New York state scenic byway, two recreation hiking trails, an abandoned railroad, an on-road bicycle route, and Excelsior Sportsman's Club as detailed in table B-12.

Table B-12
Public Land and Designated Recreation or Scenic Areas within 0.25 Mile of the Proposed Eastern System Upgrade Project

Facility	Name of Area	MP[a]	Land Ownership/ Land Management	Tract Number[b]	Distance from Project (mile)	Crossing Length (feet)[c]	Area Affected (acres)		Proposed Crossing Method
							Construction[d]	Operation[e]	
	Harriet E. Space Recreational Park	0.3-0.5	Orange County	04.03.00-RA-NY	0	863	7.6	0.6	HDD (includes ATWS for the HDD)
	Orange County Park	0.4	Orange County	04.04.00-RA-NY	0	0	1.1	0.0	N/A (HDD ATWS area)
	Neversink Preserve	0.4	The Nature Conservancy	04.05.00-RA-NY	0.2	0	0.0	0.0	N/A
	Limbardo Property	0.8-1.1	Private/Land Trust Conservation Restriction	05.00.00-RA-NY	0	1,691	7.5	1.5	HDD and open cut
	Ginseng Up Property	1.1-1.3	Private/ Land Trust Conservation Restriction	05.02.00-RA-NY	0	0	<0.1	0.0	TAWS
Huguenot Loop	Shawangunk Ridge Trail	1.7	Various	08.00.00-RA-NY	0	25	0.0	0.0	Conventional bore
	Ridgeview Preserve/ Huckleberry Ridge State Forest	1.9-3.0	Open Space Conservancy, Inc./NYSDEC	10.00.00-RA-NY	0	5,465	19.2	3.1	Open Cut and HDD
	Long Path	2.5	NYSDEC/Various	10.00.00-RA-NY	0	6	<0.1	0.0	Open cut
	Long Path	2.9	NYSDEC/Various	10.00.00-RA-NY	0	6	<0.1	0.0	Open cut
	NYS Bicycle Route 17	5.0	U.S. Highway	N/A	0	65	0.0	0.0	Conventional bore
	Greenville Town Park	5.2-5.5	Municipal	32.00.00-RA-NY	0	1,491	4.7	0.9	Open cut
	Abandoned Railroad	7.6-7.6	Orange County	43.00.00-RA-NY	0	73	<0.1	<0.1	Open cut

Table B-12 (continued)
Public Land and Designated Recreation or Scenic Areas within 0.25 Mile of the Proposed Eastern System Upgrade Project

Facility	Name of Area	MP[a]	Land Ownership/ Land Management	Tract Number[b]	Distance from Project (mile)	Crossing Length (feet)[c]	Area Affected (acres)		Proposed Crossing Method
							Construction[d]	Operation[e]	
Ramapo Meter Station	Kakiat County Park	N/A	Rockland County	66.00-CS	0	N/A	0.9	0.9	N/A
	Harriman State Park	N/A	State of New York	N/A	<0.1	0	N/A	N/A	N/A
Hancock Compressor Station	State Route 97/Upper Delaware Scenic Byway (lower section)	N/A	State of New York	N/A	0.2	N/A	N/A	N/A	N/A
Highland Compressor Station	Excelsior Sportsman's Club	N/A	Excelsior Sportsman's Club	N/A	0.3[f]	N/A	0.0	0.0	N/A
TAR-0002	Harriet E. Space Recreational Park	0.4	Orange County	04.03.00-RA-NY	0	768	03	0.0	N/A
TAR-0003	Limbardo Property	0.9	Private/Land Trust Conservation Restriction	05.00.00-RA-NY	0	1,393	0.2	0.0	N/A
TAR-0003	Ginseng Up Property	0.9	Private/Land Trust Conservation Restriction	05.02.00-RA-NY	0	0	<0.1	0.0	N/A
TAR-0009	Limbardo Property	0.9	Private/Land Trust Conservation Restriction	05.00.00-RA-NY	0	410	0.3	0.0	N/A

Table B-12 (continued)
Public Land and Designated Recreation or Scenic Areas within 0.25 Mile of the Proposed Eastern System Upgrade Project

Facility	Name of Area	MP[a]	Land Ownership/ Land Management	Tract Number[b]	Distance from Project (mile)	Crossing Length (feet)[c]	Area Affected (acres)		Proposed Crossing Method
							Construction[d]	Operation[e]	
TAR-0010	Limbardo Property	0.9	Private/Land Trust Conservation Restriction	05.00.00-RA-NY	0	115	0.1	0.0	N/A
TAR-0004	Ridgeview Preserve/ Huckleberry Ridge State Forest/Long Path	2.9	Open Space Conservancy, Inc./NYSDEC	10.00.00-RA-NY	0	135	<0.1	0.0	N/A

N/A = indicates there is no workspace proposed on the conservation parcel; however, the Project is located within 0.25 mile of the conservation land.

[a] Approximate milepost rounded to the nearest tenth.

[b] Parcels not directly crossed by the pipeline in any route design to date are not assigned a tract identification number.

[c] A crossing length of "0" indicates that the parcel is not crossed by the pipeline centerline, but is crossed by the construction workspace.

[d] Includes land to be used for construction, including any land that would be retained for operation of the new facilities. Excludes the area between HDD entry and exit points.

[e] Includes both new permanent easement for the Huguenot Loop (25-feet-wide) and existing permanent easement for the Millennium Pipeline (25-feet-wide). Includes land for operation of the proposed new and modified aboveground facilities and permanent access roads.

[f] The fenced-in area for the building and compressors at Highland Compressor Station is approximately 0.3 miles away from the Excelsior Sportsman's Club parcel; however, the parcel is adjacent to Millennium's property.

Pipeline Facilities

The proposed Huguenot Loop would cross the Neversink River Preserve, a floodplain forest managed by The Nature Conservancy. Millennium is proposing to cross the Neversink River Preserve and associated river at MP 0.4. This crossing would be achieved by the HDD method, which would minimize direct impacts on both the river and preserve. Surface water impacts from the proposed crossing of the Neversink River are discussed in section B.2.2, and impacts on floodplain forest within the Neversink River Preserve, a significant natural community as identified by the NYNHP, are discussed in section B.3.1.

The New York-New Jersey Trail Conference, the Open Space Institute, The Nature Conservancy, the Orange County Land Trust, and the NYSDEC are working together to protect state forest land along the Shawangunk Ridge in Orange County. These efforts have involved the acquisition of 435 acres on the ridge, the Ridgeview Preserve, which was conveyed to the NYSDEC and added to Huckleberry Ridge State Forest. The proposed Huguenot Loop would cross the Ridgeview Preserve/Huckleberry Ridge State Forest, as well as two trail systems (the Shawangunk Ridge Trail and Long Path). Table B-12, above, identifies the locations where Millennium is proposing to cross this preserve and these trails.

The first trail crossing would be of the Shawangunk Ridge Trail, a 71-mile-long trail connecting High Point State Park in New Jersey and Minnewaska State Park Preserve in New York. A portion of this trail was preserved with the acquisition of land along Shawangunk Ridge discussed above. The crossing of this trail would occur at MP 1.7 and corresponds to the crossing of an active railroad that Millennium would bore, which would eliminate direct impacts on both the trail and the railroad. However, indirect impacts at this location would include visual impacts associated with the presence of construction equipment and workers, as well as dust and noise from construction activities.

The second trail, Long Path Trail is within the Huckleberry Ridge State Forest and would be crossed by the pipeline twice, at MPs 2.5 and MP 2.9. The Long Path Trail is a 358-mile-long path that originates at 175th Street Subway Station in New York City and connects to the Shawangunk Ridge Trail. At these crossing locations, the Huguenot Loop would be collocated with Millennium's existing right-of-way. Construction at these locations would be conducted in a manner similar to conventional pipeline construction. Millennium is proposing the use of an existing road (temporary access road TAR-0004) within the Huckleberry Ridge State Forest to provide temporary access to work areas. This road would require clearing of trees to accommodate safe movement of construction equipment. A land purchase agreement would be obtained from NYSDEC prior to construction activity within the state forest (see table A-11 in section A.10).

Millennium is currently consulting with NYSDEC regarding the crossing of the preservation land and associated trails, therefore, **we recommend that:**

- **<u>Prior to construction</u>, Millennium should file with the Secretary of the Commission (Secretary) documentation of its consultation regarding Project construction and operation within the Huckleberry Ridge State Forest, including any specific procedures or permits identified by the NYSDEC.**

Collocating the Huguenot Loop with Millennium's existing right-of-way across Huckleberry Ridge State Forest would minimize the amount of new forested land that would be cleared, thereby minimizing visual impacts. Further, forested land would serve as a buffer, mitigating dust and noise from construction.

Two private parcels that are subject to conversation easements with The Nature Conservancy that are in proximity to the Project. While a conservation easement is entered into voluntarily, it is a legally binding agreement that restricts certain types of use or development of the land and may provide landowners with a tax benefit (The Nature Conservancy 2017). The terms of an easement are specific to the needs of each landowner and may include future development of the property, such as building a house for a family member. Amendments to easements, although rare, can occur in consultation with the landowner and The Nature Conservancy.

The Limbardo Property would be crossed by the proposed Huguenot Loop between MP 0.8 and 1.1. This property is the proposed location of the exit pit for the HDD of the Neversink River, and as such would require the clearing of forested land to accommodate construction equipment. The Ginseng Up Property, which is also subject to a conservation easement with The Nature Conservancy, would be within construction work areas between MP 1.1 and 1.3, resulting in less than 0.1 acre of impacts on the Ginseng Up Property. Millennium is also proposing the use of existing roads on these properties (temporary access roads TAR-0003, TAR-0009, and TAR-0010) to provide access to the HDD exit pit and the construction right-of-way. These roads would require trimming or clearing of trees to accommodate safe movement of construction equipment; in addition, TAR-0003 would be widened. Millennium has negotiated an easement with the Limbardo Property landowner. The existing conservation easements with The Nature Conservancy restrict tree clearing on these properties, therefore Millennium is further consulting with The Nature Conservancy. Because Millennium's proposed construction practices are not consistent with conservation easement restrictions, **we recommend that:**

- **<u>Prior to construction</u>, Millennium should file with the Secretary documentation of its consultation regarding Project construction and operation within private parcels protected under conservation easements,**

including any specific procedures identified in coordination with The Nature Conservancy.

Additional potential impacts associated with construction and operation near these properties would be limited to noise and visual impacts, which are discussed in sections B.8.2 and B.5.3, respectively.

The proposed Huguenot Loop would cross three parcels owned by Orange County, the Harriet E. Space Recreation Park, Orange County Park, and an abandoned railroad. Millennium is proposing the use of an existing road (temporary access road TAR-0002) within the Harriet E. Space Recreation Park to provide access to the HDD exit pit at MP 0.4, also located on park land, for the crossing of the Neversink River. The ATWS proposed to accommodate the pull string area for the HDD crossing of the Neversink River would extend into a paved parking lot for Orange County Park. Millennium has coordinated with county officials regarding the Project's use and post-construction restoration of these areas. Based on the timing of construction, which is anticipated to occur during winter months when use of the park areas would be limited, impacts from construction would be minor and temporary. The abandoned railroad would be crossed by conventional bore which would eliminate direct impacts at this location. Millennium continues to coordinate with county officials regarding contingency plans associated with the park areas with the goal of minimizing impacts from construction.

The proposed Huguenot Loop would also cross the Greenville Town Park between MP 5.2 and 5.5. No park facilities (e.g., playing fields, structures) are located at the proposed crossing locations. The closest playing field is about 460 feet northeast from proposed work areas. A forest buffer between the field and work areas would minimize visibility of construction activities for visual receptors at the park, as well as mitigate dust and noise from construction.

Bicycle Route 17 is a 442-mile-long, on-road bicycle route that crosses through Greenville as part of U.S Route 6. Millennium is proposing to cross U.S. Route 6 by conventional bore which would eliminate direct impacts on the roadway and corresponding bicycle route. However, traffic-related impacts on users of U.S Route 6 could occur as a result of the movement of construction equipment and personnel through the Project area.

In general, pipeline facility impacts on recreation special use areas occurring outside of forested land would be temporary, limited to the period of active construction and restoration, lasting a few weeks or months in any one area. These impacts would be mitigated by implementing the measures in Millennium's ECS. Further, collocating the proposed Huguenot Loop with Millennium's existing right-of-way would minimize development of new corridor. While Millennium's proposed crossing of the Neversink River would not be collocated, the deviation from the mainline to accommodate a trenchless crossing was selected to minimize impacts on the river and associated

floodplain. Alternatively, clearing of forested land within the construction right-of-way, and maintenance of the permanent right-of-way as herbaceous and scrub-shrub vegetation types would change the viewscape for visual receptors in the area. Transportation and noise impacts from the Project are discussed in sections B.6.2 and B.8.2, respectively.

Aboveground Facilities

No public land, recreation, special use areas are within 0.25 mile of the existing Huguenot and Westtown Meter Stations. The new Highland Compressor Station would not be within 0.25 mile of any recreation special use area; however, the Excelsior Sportsman's Club is adjacent to the parcel boundary on which the new compressor station would be located. The Excelsior Sportsman's Club is a private organization with 65 members with the mission of enforcing laws and regulation for preserving and protecting fish and game in the State of New York. According to the Excelsior Sportsman's Club's president[12], the Excelsior Sportsman's Club offers hunting opportunities, including big game such as deer and bear. The Excelsior Sportsman's Club also has a fishing preserve license with NYSDEC that allows members to fish the stocked lakes and ponds on the property without a license. Based on Millennium's site design, at the closest point, the new compressor station and associated fenced facilities would be about 0.3 mile from the Excelsior Sportsman's Club's property line. The distance to compressor station and the presence of forested land would minimize visibility of construction activities for Excelsior Sportsman's Club members and their guests, as well as mitigate dust and noise from construction. Operational impacts would be limited to noise, as it is unlikely that Excelsior Sportsman's Club members or their guests would be able to see the compressor station based on its location at the southeast end of the parcel, about 0.3 mile from the property boundary of the Excelsior Sportsman's Club. Impacts on wildlife and noise are discussed in sections B.3.3 and B.8.2, respectively.

The existing Ramapo Meter Station in Rockland County is within 0.25 mile of two parks: Kakiat County Park and Harriman State Park. Both parks are multi-use areas offering hiking, fishing, picnicking, and wildlife viewing opportunities. Harriman State Park, the second-largest park in the state, also has public camping areas. Expansion of the Ramapo Meter Station would not directly impact park facilities (e.g., trails, waterbodies, and structures) at either location, however a portion of the expansion is proposed to occur on land currently part of the Kakiat County Park about 640 feet from the nearest park facility. The park primarily comprises of forested land which would minimize visibility of construction work areas for visual receptors at the park, as well as

[12] Comment letter provided as part of the public record for Docket No. PF16-3-000 on the FERC website at http://www.ferc.gov/docs-filing/elibrary.asp, in accession 20160415-0009.

mitigate dust and noise from construction. Millennium is currently negotiating an easement with Rockland County for this land. Given the presence of an existing facility at this location, and because the Project would not directly affect park facilities, the operational impacts on park users would be limited to indirect impacts associated with changes in the existing viewshed. Visual impacts are discussed in B.5.3.

The existing Hancock Compressor Station in Sullivan County is within 0.25 mile of State Route 97, the lower section of the Upper Delaware Scenic Byway (NYSDOT 2016). Since State Route 97 is about 0.2 mile from the compressor station, direct impacts on this byway would not be expected. However, indirect impacts would include visual impacts associated with the presence of construction equipment and workers in the Project area.

Given the distance to the aboveground facilities, impacts on users of the recreation special use areas would be temporary, limited to the period of active construction, lasting a few months at any one facility. The presence of forest buffers between these areas and Millennium's existing facilities, as well as the newly proposed Highland Compressor Station, visual impacts would be limited to with the movement of construction equipment and workers through the project area, as well as dust and noise from construction activities. Following construction, most open land uses would be able to continue such that operational impacts would be limited to air, noise, and visual impacts. Visual impacts are discussed below, while transportation, air, and noise impacts are discussed in section B.6.2, B.8.1, and B.8.2, respectively.

We received comments regarding the potential for the Eastern System Upgrade Project to affect the Bethel Woods Center for the Arts, Catskills Park, and a Museum in Livingston Manor that hosts several events on its grounds. The closest of these facilities to the Project is the Bethel Woods Center for the Arts which is about 7 miles north of the Highland Compressor Station site. The other two facilities are more than 20 miles north of the Project. We also received comments stating that the Highland Compressor Station site was part of the Eldred Preserve. As stated above, Millennium owns all the land that would be affected by the new compressor station, therefore this land is no longer a part of the Eldred Preserve. Further, we found no evidence that any land associated with the former preserve is protected by a conservation easement or actively managed.

5.4 Visual Resources

Pipeline Facilities

Visual resources along the proposed pipeline route are a function of geology, climate, and historical processes, and include topographic relief, vegetation, water, wildlife, land use, and human uses and development. Much of the areas along the pipeline that would be disturbed by the Project would be within or adjacent to existing right-of-way, consisting of Millennium's pipeline right-of-way and public roadways. As

a result, the visual resources along the majority of the Project have been previously affected by pipeline or other operations.

Visual impacts associated with the Project construction right-of-way and ATWS would include the removal of existing vegetation and the exposure of bare soils, as well as earthwork and grading scars associated with heavy equipment tracks, trenching, blasting, and machinery and tool storage. Other visual effects could result from the removal of large individual trees that have intrinsic aesthetic value; the removal or alteration of vegetation that may currently provide a visual barrier; or other changes that introduce contrasts in visual scale, spatial characteristics, form, line, color, or texture. The significance of these visual impacts would primarily depend on the quality of the viewshed, the degree of alteration of that view, the sensitivity or concern of potential viewers, and the perspective of the viewer.

Visual impacts would be greatest where the pipeline route parallels or crosses roads and the pipeline right-of-way may visible to passing motorists, from residences where vegetation used for visual screening or for ornamental value is removed, and where the pipeline crosses forested areas. The duration of visual impacts would depend on the type of vegetation that is cleared or altered. The impact of vegetation clearing would be shortest in open areas where the re-establishment of vegetation following construction would be relatively fast (generally less than five years). The impact would be greater in forested land, which would take many years to regenerate. The greatest potential visual impact would result from the removal of large specimen trees, which would take longer than other vegetation to regenerate and, if located on the new permanent right-of-way, would be prevented from becoming re-established.

The Project vicinity is characterized by a mosaic of agricultural and open land, forested land, and developed areas. Additionally, as discussed above and presented in table A-3, a portion of the land that would be disturbed by the pipeline route would be within or adjacent to Millennium's existing right-of-way (29.3 acres). These factors would minimize the visual impact of construction. The visual effect of the pipeline would also be mitigated by the use of HDD construction methods at four locations where impacts on visual resources between the HDD entry and exit holes would be minimized (see section A.8.2).

After construction, most of the areas that would be disturbed by the pipeline would be restored and returned to preconstruction conditions in compliance with federal, state, and local permits; landowner agreements; and Millennium's easement requirements. The nominal 50-foot permanent right-of-way for the Huguenot Loop would overlap with Millennium's existing permanent easement about 25 feet along a majority of the Project route. The primary long-term visual effects associated with the pipeline would be the clearing of about 46.4 acres of forested vegetation. The permanent visual impacts of the pipeline would be limited to the 8.5 acres of forested vegetation that would be permanently cleared for the new permanent right-of-way.

Aboveground Facilities

The visual impacts associated with the new aboveground facilities would be minimized by their location adjacent to or within existing aboveground facilities, by utilizing existing tree buffers for visual shields, or by a combination of both. The proposed Highland Compressor Station would be located on an 81-acre parcel of predominantly forested, undeveloped land located in a rural area bounded by Route 12/55 to the west and Millennium's existing right-of-way to the north. Several buildings would be constructed at the site including the compressor building, auxiliary building, and a controls building; however, 63.3 acres of the site would remain in their natural state, undisturbed by construction or operation of the Project.

Millennium has designed these facilities to be located toward the back of the parcel, such that the compressor station would be located about 2,913 feet away from Route 12/55. The terrain of the site and forested land would serve as visual buffers to motorists on Route 12/55 and for visual receptors on neighboring parcels, including the Excelsior Sportsman's Club. As previously discussed, the distance to the compressor station and its position within the parcel, as well as the presence of forested land would minimize visibility of construction activities and operation. Millennium is not proposing any additional screening at this site. However, Millennium has committed to limit outdoor lighting to the amount required for safe and proper operation of station security, including outdoor security cameras. All lights would have directional lighting to be positioned in a direction to minimize visibility to nearby visual receptors. As discussed in section B.8.2, the closest residence to the proposed new compressor station is 2,900 feet to the southwest, or about 0.5 mile away. Given the rural location of the compressor station site, rolling topography and existing forest areas, the number of visual receptors is limited. Therefore, overall impacts from the compressor station would be minor.

The visual impacts associated with the modifications at aboveground facilities would be minimized by proximity to adjacent developed areas along Millennium's existing system. Upgrades at the existing Hancock Compressor Station would include addition a new compressor unit and re-staging of an existing compressor. Several buildings would be constructed at the site including the compressor building and auxiliary building.

The existing compressor station is located on a 76-acre parcel in a rural area with scattered forested areas surrounding the facility. These forested areas would help to minimize visibility of the upgrades proposed at this facility, therefore Millennium is not proposing any additional screening at this site. Existing lighting at the facility is limited to the amount required for safe and proper operation of station security, including outdoor security cameras. Any lighting required for the new compressor building would be positioned in a direction to minimize visibility to nearby visual receptors. Following construction, the new facilities associated with the modification of the Hancock Compressor Station would be consistent with the existing facilities at the site. Given the

existing developed nature of the existing compressor station and the presence of a natural visual screening, we find the upgrades proposed at this existing facility would be consistent with the existing landscape.

Modifications to the Wagoner Interconnect would occur within the footprint of the existing facility and would not result in visual impacts on surrounding receptors during operation. Alternatively, upgrades proposed for Millennium's existing meter stations would require expansion of the facility footprints, mostly on nearby industrial/commercial land. Expansion of the Ramapo Meter Station would include impacts on 1.7 acres of forested land during construction. After the completion of construction, these aboveground facilities would be consistent with the existing meter station site. The Alternate Interconnect would be constructed along the pipeline right-of-way, near the Westtown Meter Station. The Alternate Interconnect would be constructed within the pig launcher/receiver proposed for the Valley Lateral Project, and within property owned by Millennium that would be permanently maintained as open land. Similarly, the pigging facilities would be constructed at the existing Huguenot Meter Station. By locating these facilities near existing developed sites, impacts on visual resources are minimized.

Contractor/Pipe Yards and Storage Areas

Ground disturbance at contractor/pipe yards and staging areas would generally be limited to minor grading activities to stabilize the site for safe movement of vehicles and equipment, as well as safe placement of storage and office trailers. Two contractor/pipe yards would be located on land owned by Millennium and would be used for construction of Millennium's Eastern System Upgrade Project. Some forested land (0.9 acre) does occur within the proposed contractor/pipe yards, however, no tree clearing would be required for the Project. Following construction, contractor/pipe yards and staging areas would be restored to pre-construction conditions. As a result, there would be no permanent impacts on visual resources associated with the use of these yards. The only impacts at yards would be temporary during construction, when trailers, vehicles, pipe, and other construction-related material would be stored at these sites.

Access Roads

To the extent feasible, existing public and private roads along the Project route would be used as primary means of accessing the pipeline right-of-way and aboveground facilities. In addition to existing access available by the use of public roads, Millennium has identified 20 access roads (4 new and 16 existing) for use during construction the Project, which would impact a total of 19.3 acres. Impacts on 12.0 acres of forested land due to road widening would include tree trimming and removal. Following construction, eight access roads (four existing and four new access roads) would be used for operation of the Project. These permanent access roads would result in 15.3 acres of new roadway, of which 10.6 acres would be associated with new permanent access roads. The

trimming of trees and maintenance of four new access roads, generally located along or near existing roads and/or right-of-way, would result in a permanent but negligible impacts on visual resources.

6. Socioeconomics

Socioeconomic impacts resulting from the construction and operation of the proposed new Huguenot Loop, Highland Compressor Station, Alternate Interconnect, pigging facilities, and access roads would primarily impact Orange and Sullivan Counties in New York. The Project would also include upgrades at existing facilities Delaware and Rockland Counties in New York. Some of these potential effects are related to the number of construction workers that would work on the Project and their impact on population, public services, and employment during construction. Other potential effects include an increase in local traffic, available housing, and tax revenue, as well as potential changes in property values.

6.1 Employment

Table B-13 provides a summary of demographic and socioeconomic conditions for the affected counties in the Project area. Based on the U.S. Bureau of Labor Statistics, the current unemployment rate for New York is 4.7 percent, while the unemployment rates in the counties crossed by the Project ranged from 4.7 percent in Rockland County to 5.9 percent in Delaware County (U.S. Bureau of Labor Statistics 2016a).

Table B-13
Existing Economic Conditions by County/State for the Eastern System Upgrade Project

State/County	Unemployment Rate[a]	Vacant Housing Units[b]	Rental Vacancy Rates[b]	Hotels/ Motels[c]	RV Parks and Campgrounds[d]
New York	4.7	897,781	4.4	over 5,000	N/A
Delaware	5.9	11,852	6.0	65	70
Sullivan	5.3	20,478	8.8	82	94
Orange	4.8	13,540	4.8	160	87
Rockland	4.7	5,903	5.8	40	27

[a] U.S. Bureau of Labor Statistics 2016a.
[b] U.S. Census Bureau 2016a.
[c] HotelMotels 2016.
[d] Yellowbook 2016.

Construction of the Eastern System Upgrade Project would require an estimated peak workforce of 325 workers. Based on previous experience in the region, Millennium anticipates that about 60 and 40 percent, of workers for the Huguenot Loop and aboveground facilities, respectively, would be local, although specialists and supervisory positions may be filled by non-local workers. Local workers would likely be residents of

one of the four counties in the Project area and reside within commuting distance of the Project.

Due to the short duration of construction, it is anticipated that most non-local workers would not be accompanied by their families. Construction of the Huguenot Loop would occur over a 12-month period, while construction of the new compressor station would last 8-10 months, and upgrades at existing facilities would be limited to a 4- to 8-month period. The introduction of non-local workers would be temporary and limited to, at most, a 12-month period. Based on the estimated peak workforce, at most, 154 workers would be hired locally; however, only about 72 of these positions would occur over the 12-month period associated with construction of the Huguenot Loop. Overall construction of the Project would result in a temporary and negligible impact on unemployment in the Project area.

Millennium would hire two full-time staff for operation of the Highland Compressor Station. These positions would represent a negligible long-term increase in employment in Sullivan County. No other operational staff would be required for operation of the Project.

6.2 Transportation

Construction of the Project may result in minor, temporary impacts on roadways due to construction and the movement of heavy equipment and workers. The Project would cross 18 paved roads, including 16 public roads and 2 private roads. All public roads crossed by the Project and one private road (Tufano Lane) would be crossed by trenchless methods (either bore or HDD), thereby avoiding direct impacts on traffic; one private road (Mi Bar Lane at MP 5.1) would be crossed by open cut in accordance with a site-specific residential construction plan (see appendix D). One active railroad (MP 1.7) and one abandoned railroad (MP 7.6) would also be crossed by conventional bore. Construction at public road crossings would be done in compliance with applicable permits. Because public roads would not be open-cut, traffic delays due to road crossings are not expected.

A minor increase in traffic would occur during the 12-month construction period from the temporary influx of workers moving to and from the Project area; however, Millennium anticipates that much of this travel would occur outside of peak traffic times. Minimal traffic delays would also occur during the transportation of construction materials, specifically oversized equipment, on public roadways. Millennium would obtain all permits necessary to transport construction materials on public roadways. Overall, we conclude impacts on transportation would be temporary, minor, and not significant.

6.3 Housing

As previously indicated, Millennium anticipates that about half of the 325 workers required for construction would already reside in the Project area. Non-local workers, however, would relocate to the Project area for at most a 12-month period. As of 2010, there were over 50,000 vacant housing units in Project counties (U.S. Census Bureau 2016b). The five-year average rental vacancy rate in the Project area ranges from a low 4.8 percent in Orange County to a high of 8.8 percent in Sullivan County (U.S. Census Bureau 2016b). In addition, there are 347 hotels, motels, and bed and breakfasts, and 278 recreational vehicle parks and campgrounds in the Project area (HotelMotels 2016, Yellowbook 2016). Based on the number of available rental units, hotels/motels, recreational vehicle parks, and campgrounds in the Project counties, we conclude that there would be sufficient housing available for the anticipated Project workforce.

Operation of the Project would require two new full-time workers at the Highland Compressor Station; therefore, impacts on public housing during operation of the Project would be negligible. Overall, impacts on housing in the vicinity of the Project area would be minor and limited to the construction phase.

6.4 Tax Revenue

Millennium projected that $1.6 million of the $41 million in construction workforce payroll would be spent on local amenities such as food, housing, and other living expenses (see table B-14). As such, sales and state taxes would be paid by local and non-local workers on goods and services bought locally with money earned from the Project. In addition, Millennium would locally procure some materials needed for construction of the Project. Therefore, during construction, the Project would benefit the economies of Delaware, Sullivan, Orange, and Rockland Counties, New York.

Table B-14
Socioeconomic Impact Resulting from Construction and Operation of the Eastern System Upgrade Project

Facility	Total Construction Payroll	Local Workforce Construction Payroll	Goods and Services Purchased Locally	Operational Payroll
Huguenot Loop	$18,000,000	$11,000,000	$700,000	N/A
Highland Compressor Station	$9,500,000	$4,000,000	$400,000	$100,000
Hancock Compressor Station	$7,500,000	$3,000,000	$300,000	N/A
Ramapo Meter Station	$6,000,000	$2,500,000	$200,000	N/A
Project Total	**$41,000,000**	**$20,500,000**	**$1,600,000**	**$100,000**

During operation, the proposed Eastern System Upgrade Project would become a new source of tax revenue that could be used to finance public school districts, local city

and county governments, and public safety services such as police and fire departments. Millennium's payment of local taxes would result in a long-term, positive impact on the local municipalities in the Project area.

6.5 Property Values and Insurance

The potential impact of a pipeline on the value of a property is related to many property-specific variables, including the size, current value of the land, available utilities and services, current land use, and value of adjacent properties. Land values are determined by appraisals that would take into account objective characteristics of the property, such as size, location, and any improvements. While there is recently published literature indicating that there is no identifiable or consistent link between the presence of natural gas pipeline easements and residential property values (Diskin *et al.* 2011, Wilde *et al.* 2012, INGAA Foundation 2016), valuation is subjective and is generally not considered in appraisals. The presence of a pipeline, and the restrictions associated with a pipeline easement, could influence a potential buyer's decision to purchase a property. If a buyer is looking for a property for a specific use that the presence of the pipeline renders infeasible, then the buyer may decide to purchase another property more suitable to their objectives. For example, a buyer wanting to develop the land for a commercial property with sub-surface structures would likely not find the property suitable, but farmers looking for land for grazing or additional cropland could find it suitable for their needs. This would be similar to other buyer-specific preferences that not all homes have, such as close proximity to shopping or access to high quality school districts.

Millennium's existing permanent easement gives them the right to maintain the existing right-of-way as necessary for pipeline operation. Where the proposed Huguenot Loop construction activities occur within Millennium's existing right-of-way, they would not need to acquire new easements or property to operate those proposed facilities. However, Millennium would need to acquire new easements or acquire land to construct and operate the pipeline where the proposed activities require workspace outside of or deviate from the existing right-of-way. Millennium would acquire easements for both the temporary (construction) and permanent right-of-way where applicable.

The upgrades proposed at Millennium's existing aboveground facilities would be situated on previously disturbed industrial properties that are owned by Millennium, or on land currently under negotiation for establishment of a permanent easement. These facilities would be located adjacent to existing facilities that are similar in nature, and while they would introduce a new visual element at the respective site, they would not significantly increase the noise at any noise sensitive area, alter the visual character of the area, significantly increase the safety risk in the surrounding communities, or result in other impacts that would significantly impact adjacent property values.

The existing property values in these areas account for the presence of the existing pipeline and/or aboveground facility (meter station or compressor station) infrastructure.

As such, these pipeline and aboveground facilities would not result in any long-term changes that would negatively impact property values outside of the pipeline right-of-way or aboveground facility sites.

The Highland Compressor Station would be a new facility situated on a predominately forested parcel that is currently owned Millennium; therefore, potential impacts on property values would be on adjacent or nearby properties and would likely be attributable to noise, visual impacts, and/or negative public perception. To minimize noise and visual impacts, the compressor station would be located at the back of the parcel about 2,900 feet from the roadway and nearest residence, as such the compressor station would not be visible to these receptors. The location of this parcel along State Route 55 represents a form of industrialized activity, even though daily traffic may be low. Given the existing vegetative screening, operation of Highland Compressor Station would not significantly increase the noise at any noise sensitive area, significantly increase the safety risk in the surrounding communities, or result in other impacts that would significantly impact adjacent property values. However, any current landowners who believe that their property values have been negatively impacted could appeal to the local tax agency for reappraisal and potential reduction of taxes.

Due to negative public perception sometimes associated with energy infrastructure, certain prospective homebuyers may find the compressor station to be a detractor and could influence a potential buyer to not purchase a property. Nevertheless, each potential purchaser would make a decision to purchase based on his or her planned use of the property in question (e.g., principal residence, vacation home, agriculture or grazing, business, and/or future subdivision), with each purchaser considering differing factors that affect the purchasing decision. This statement is supported by the results of a 2015 case study prepared by Real Property Service, LLC for National Fuel Gas Supply Corporation, which assessed historical property sales data for residences in proximity to one of seven compressor stations located in New York[13], including Millennium's Hancock Compressor Station (Griebner 2015). The authors found no quantifiable impact on property values or appreciation rates for homes close proximity to a compressor station. Further, sales of homes in proximity to a compressor station, as well as construction of one new home within 0.26 mile of a compressor station, support the willingness of the certain buyers to purchase homes in proximity to these facilities. The authors state their findings are consistent with compressor stations that are located on large parcels of land with natural buffers (trees and/or hills), in rural communities, set-back off of roadways, which is consistent with the location of the proposed Highland Compressor Station.

We received a comment expressing concern that, once constructed, the Project would result in higher homeowner insurance rates on residential properties. FERC staff

[13] Each facility was evaluated on an individual basis.

conducted independent research on this matter for another natural gas project in New York under Docket No. CP13-499-000 (FERC 2014). FERC representatives called a number of insurance agencies to inquire whether the presence of a utility could change the terms of an existing or new residential insurance policy. FERC asked the insurance agency contacts to identify those factors that would influence a change in a policy (e.g., the type of utility and proximity of the residence to the utility), how the policy would change, and if there was potential for a policy to be cancelled. While the results of this investigation suggested that there was potential for a residential insurance policy to be affected by the presence of a utility, the extent of the effect would be dependent on the terms of the individual landowner's policy and the terms of the policy held by the utility company. Therefore, the insurance agency contacts were not able to quantify (in dollars or percent) the change in a policy premium. A 2016 study conducted by the Integra Reality Resources based on correspondence with State Farm, Allstate, and Farmers insurance corporate offices, found that presence of a pipeline would not hinder the ability for the homeowner to acquire property insurance or impact the cost of such a policy.

6.6 Environmental Justice

In accordance with EO 12898, Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations, we address the potential for disproportionately high and adverse health or environmental effects of the Project on minority and low income populations. NYSDEC's New York State Office of Environmental Justice (NYSOEJ) (2016) defines a potential environmental justice area as a Census Block Group of 250 to 500 households with populations that meet at least one of the following three criteria according to the 2000 Census:

1. "At least 51.1 percent of the population in an urban area reported themselves to be members of minority groups; or

2. At least 33.8 percent of the population in a rural area reported themselves to be members of minority groups; or

3. At least 23.59 percent of the population in an urban or rural area had household incomes below the federal poverty level."

Based on available mapping provided by the NYSOEJ, no potential environmental justice areas would be crossed. According to the NYSOEJ maps, which are based on U.S. Census data from 2000, the nearest potential environmental justice areas are: Sidney about 31.3 miles southeast of the Hancock Compressor Station in Delaware County, Bethel about 6.8 miles south of the Highland Compressor Station in Sullivan County, Mount Hope about 5.8 miles southwest of MP 0.5 of the Huguenot Loop, and Hillburn about 2.2 miles northeast of the Ramapo Meter Station in Rockland County (NYSOEJ 2016). We also reviewed more recent demographic data reported by the U.S Census Bureau (U.S Census Bureau 2016a). Specifically, we considered block groups that

would be crossed by the Huguenot Loop and block groups within 0.5 mile of the Highland Compressor Station, Hancock Compressor Station, and Ramapo Meter Station. None of the counties (Delaware, Orange, Rockland, and Sullivan) or the block groups considered have minority populations exceeding 50 percent. Further, all of the block groups considered had poverty rates that were similar or lower than the respective county.

Because of the Project's location outside of a potential environmental justice area, it is unlikely that the potential environmental justice area would be negatively affected by the Project. Millennium would comply with all regulatory requirements associated with noise and the storage and use of hazardous chemicals such as fuel. Lastly, the Project area would be far enough way that it would not be visual from the nearest potential environmental justice area. As such, we find that the Project would not disproportionately affect minority or low income populations.

7. Cultural Resources

Section 106 of the NHPA, as amended, requires the FERC to take into account the effects of its undertakings (including issuance of Certificates) on properties listed in, or eligible for listing in, the National Register of Historic Places (NRHP), and to afford the Advisory Council on Historic Preservation an opportunity to comment on the undertaking. Millennium, as a non-federal party, is assisting the Commission in meeting our obligations under Section 106 and the implementing regulations by preparing the necessary information, analyses, and recommendations, as authorized by 36 CFR 800.2(a)(3).

7.1 Cultural Resource Investigations

Millennium completed cultural resources survey investigations of the Project areas to determine if construction activities associated with the Eastern System Upgrade Project would have the potential to affect previously identified cultural resources within the Project's area of potential effects (APE). The APE for archaeological resources includes all surface and subsurface areas affected by construction, operation, and maintenance of the proposed facilities. More specifically, the archaeological APE typically includes a 200-foot-wide survey corridor over the proposed pipeline right-of-way. The archaeological APE also includes access roads, which were surveyed within an approximately 50-foot-wide survey corridor. In addition, any areas outside of the 200-foot-wide survey corridor, such as the contractor/pipe yards, staging areas, and meter stations, were also included within the archaeological APE and were subject to field survey.

The architectural APE includes project areas where direct effects on NRHP-listed or eligible architectural historic resources may occur, including within the 200-foot-wide survey corridor and within all areas proposed for the construction and operation of aboveground facilities. In addition to direct effects, Millennium assessed the

architectural APE for indirect effects, which includes historic architectural resources located adjacent to the proposed pipeline and existing aboveground facilities and within a 0.5-mile radius of the new proposed Highland Compressor Station site.

Summary of Consultations

On January 28, 2016, Millennium submitted a request for Section 106 consultations with the New York State Historic Preservation Officer (SHPO). On March 1, 2016, Millennium's initial archaeological survey report was submitted to the SHPO describing all accessible areas surveyed at that time; a revised survey report was submitted for SHPO review in July 2016 for the remaining areas. The SHPO concurred with Millennium's findings and recommendations on March 9 and August 9, 2016, respectively.

On April 14, 2016, the SHPO requested an historic architectural survey be conducted for the Project. On July 29, 2016, Millennium submitted a letter report to the SHPO for the historic architectural resources survey completed for the Project. SHPO concurrence with the letter report was received on December 8, 2016.

7.2 Survey Results

Prior to initiating the archaeological field survey, background research indicated that 10 previously recorded archaeological resources were located within or adjacent to the archaeological APE. Of these, only one known resource, Site 07110.000043 (an abandoned historic railroad bed), was re-identified during survey within the APE. Millennium proposes to avoid this resource by installing the pipeline beneath the railroad bed using the conventional bore technique. None of the other previously recorded sites were identified within the archaeological APE during the field survey.

As a result of the field surveys, Millennium recorded seven new archaeological sites described below:

- No. 07105.000147 – precontact site composed of buried lithic debris and ceramic fragments dated between circa A.D. 1000 and 1600;
- No. 07105.000142 – precontact site composed of a buried lithic scatter of unknown temporal affiliation; also contained a single whiteware ceramic sherd of unknown historic period affiliation;
- No. 07107.000042 – precontact site buried lithic scatter of unknown temporal affiliation; also contained a single whiteware ceramic sherd of unknown historic period affiliation;
- No. 07107.000041 – historic site comprised of a late nineteenth-century farmstead;

- No. 07107.000043 – historic site composed of a mid-nineteenth through late twentieth-century historic farmstead;

- No. 07105.000146 – historic site composed of an early twentieth-century residence constructed from mortared stone; and

- No. 07105.000148 – multicomponent site including a precontact lithic scatter of unknown temporal affiliation and a nineteenth century bank barn.

Based on low research potential, no further work was recommended at two of the precontact sites (07105.000142 and 07107.000042) and one of the historic sites (07105.000146). The New York SHPO concurred with these recommendations. Four of the newly identified sites (07105.000147, 07107.000041, 07107.000043, and 07105.000148) were recommended for avoidance or additional testing would be necessary to determine the eligibility of the resources for listing on the NRHP. Site 07105.000147 and Site 07107.000043 are located outside of the Project workspace and would be avoided by Project construction.

Prior to construction, Millennium would install protective fencing at the edge of the workspace to avoid Site 07107.000041. Similarly, prior to construction near multicomponent Site 07105.000148, a mechanical excavator would be used to place surface matting composed of timber and composite materials over the site. All Project construction work in the vicinity of the site would be done on top of the mats. Following construction, the mats would be removed. As such, disturbance of Site 07105.000148 would be avoided by Project construction activities.

The Project, as designed, would have no effect on historic properties. Should Project plans change and impacts on Sites 07105.000147 and 07105.000148 were deemed unavoidable, additional testing would be necessary to determine their NRHP eligibility. The New York SHPO concurred with these recommendations and the use of protective measures. We agree.

In addition, 36 segments of stone walls/fences were recorded within the archaeological APE. Of these, six segments of walls/fences would be avoided during construction by using the HDD construction method. Millennium would use existing openings in stone walls/fences to construct the Huguenot Loop. Where openings are not present, each wall would be photographed and mapped prior to removal by a cultural resources monitor. Following construction, Millennium would restore most removed sections, although some rock wall sections would be left open for future access along the right-of-way. All activity in the vicinity of stone walls would be monitored by a cultural resources monitor. The New York SHPO concurred with these recommendations and the use of protective measures. We agree.

Prior to conducting the architectural field survey, background research revealed one previously recorded historic resources located within the architectural APE. The Hulet Clark Farmstead was listed on the NRHP in 1998 and is located on a 75-acre tract adjacent to Millennium's existing pipeline right-of-way and the proposed pipeline. The field survey indicated that the structures associated with the farmstead including a dwelling, barn, and chicken house, are set back approximately 0.25 mile from the Project area. Because the pipeline would be buried, not visible and would have no impact on the integrity of the Hulet Clark Farmstead. In addition, there are no proposed or existing aboveground facilities are located within the viewshed of the Hulet Clark Farmstead. The field survey also identified 18 new resources within the architectural APE. Of these, 10 are located adjacent to the proposed pipeline and 8 are located within 0.5 mile of the proposed Highland Compressor Station, none of which would be visible to or from the new compressor station due to the presence of dense vegetation. The SHPO concurred with these findings and recommendations in the architectural survey report on December 8, 2016. We agree.

7.3 Tribal Consultation

Millennium sent letters to four federally recognized tribes (Tribes) on January 8, 2016: the St. Regis Mohawk Tribe, the Delaware Tribe of Indians, the Stockbridge-Munsee Band of Mohicans, and the Delaware Nation. The Delaware Tribe of Indians and the Stockbridge-Munsee Band of Mohicans acknowledged receipt of the consultation letter and requested copies of the archaeological survey report. As described in section A.4, the Delaware Tribe of Indians and the Stockbridge-Munsee Band of Mohicans participated as cooperating agencies in the preparation of this EA. Millennium provided copies of the archaeological survey reports to both Tribes. The Stockbridge-Munsee Band of Mohicans concurred with the recommendations in the original survey report on March 7, 2016. On December 6, 2016, the Stockbridge-Munsee Band of Mohicans concurred with the archaeological resource management recommendations outlined in the revised survey report. No other comments have been filed.

7.4 Unanticipated Discoveries

In consultation with the SHPO in March and July 2016, Millennium developed *Procedures Guiding the Discovery of Unanticipated Cultural Resources and Human Remains*, a plan that would be implemented in the event that previously unreported archaeological sites or human remains were encountered during construction. The plan provides for the notification of interested parties, including Tribes, in the event of any discovery. The New York SHPO concurred with the plan. We also find the plan to be acceptable.

7.5 Compliance with the National Historic Preservation Act

Based on the results of the cultural resources surveys, and through consultation with the New York SHPO and Tribes, we conclude that the Project, as designed, would have no effect on historic properties. The SHPO has concurred with the results of the cultural surveys and therefore Section 106 consultation is complete. Should Project plans change, additional cultural resources investigations would be required.

8. Air and Noise

8.1 Air Quality

Air quality would be affected by construction and operation of the Project. Temporary air emissions associated with construction activities involving the proposed pipeline and aboveground facilities would include fugitive dust from soil disruption and combustion emissions from construction equipment. However, the majority of the air emissions associated with the Project would result from long-term operation of the new Highland Compressor Station, the addition of a new compressor engine at the existing Hancock Compressor Station, and the addition of a new heater at the Ramapo Meter Station.

Existing Air Quality

The Project area is in southeastern New York, where the climate is characterized as continental. Winters are cold to moderately cold and summers are warm to hot. Maximum average daily temperatures peak at 81.9 degrees in July and minimum average daily temperatures are typically lowest in January at 18.5 degrees. Precipitation in the Project area varies, with an average monthly high of 4.1 inches in September and 2.0 inches in February (NOAA 2015).

Ambient air quality is protected by federal and state air quality standards. The EPA establishes National Ambient Air Quality Standards (NAAQS) for seven air contaminants designated "criteria air pollutants," including nitrogen dioxide (NO_2), carbon monoxide (CO), ozone, sulfur dioxide (SO_2), lead, inhalable particulate matter (PM) with an aerodynamic diameter less than or equal to 2.5 microns ($PM_{2.5}$), and PM with an aerodynamic diameter less than or equal to 10 microns (PM_{10})[14]. The NAAQS include primary standards to protect human health, including sensitive populations such as children, the elderly, and asthmatics, and secondary standards to protect public welfare, including protection against reduced visibility and damage to crops, vegetation, animals, and buildings.

[14] The current NAAQS are listed on EPA's website at https://www.epa.gov/criteria-air-pollutants/naaqs-table.

Under the Clean Air Act, each state prepares a State Implementation Plan (SIP) to demonstrate the state's air quality management program to attain or maintain the primary and secondary NAAQS. The SIP may also include stricter standards than the NAAQS. NYSDEC implements the SIP in New York and has established more stringent air quality standards for SO_2, NO_2, CO, PM, hydrogen sulfide, beryllium, fluorides, and non-methane hydrocarbons.

The EPA now defines air pollution to include GHGs, finding that the presence of GHGs in the atmosphere may endanger public health and welfare through climate change. As with any fossil fuel-fired project or activity, the Project would contribute GHG emissions. The primary GHGs that would be emitted by the Project are carbon dioxide (CO_2), methane, and nitrous oxide (NO_x). Emissions of GHGs are typically quantified in terms of carbon dioxide equivalents (CO_2e) by multiplying emissions of each GHG by its respective global warming potential (GWP). The GWP is a ratio relative to CO_2 regarding each GHG's ability to absorb solar radiation and its residence time in the atmosphere. Accordingly, CO_2 has a GWP of 1 while methane has a GWP of 25, and NO_x has a GWP of 298.[15] There are no federal regulations at this time limiting the emissions of CO_2. Also, CO_2 reporting requirements for stationary sources do not apply to construction emissions. However, to be consistent with EPA's definition of air pollution to include GHGs, estimates of GHG emissions for construction and operation are provided below. Impacts from GHG emissions (i.e. climate change) are discussed in more detail in section B.10.7.

The EPA has established Air Quality Control Regions (AQCR), defined as contiguous areas considered to have relatively uniform ambient air quality, and treated as single geographical units for reducing emissions and determining compliance with the NAAQS. The AQCRs are intra- and interstate regions, such as large metropolitan areas, where improvement of the air quality in one portion of the AQCR requires emission reductions throughout the AQCR. Each AQCR, or portion thereof, is designated based on compliance with the NAAQS, for each pollutant. Designations fall under three main categories as follows: "attainment" (areas in compliance with the NAAQS); "nonattainment" (areas not in compliance with the NAAQS); or "unclassifiable" (areas lacking data to determine attainment). Areas formerly designated as nonattainment that have since demonstrated compliance with the NAAQS are considered "maintenance areas". Maintenance areas may be subject to more stringent regulatory requirements similar to nonattainment areas, to ensure continued attainment of the NAAQS. The SIP

[15] The GWPs are based on a 100-year time period. We have selected their use over other published GWPs for other timeframes because these are the GWPs that the EPA has established for reporting GHG emissions and air permitting requirements. This allows for a consistent comparison with these regulatory requirements.

must include measures identifying how applicable air quality standards are achieved as well as maintained in each AQCR.

The entire Project area is designated as attainment for SO_2, CO, NO_2, PM_{10}, and lead; however, Orange and Rockland Counties are within the designated New York-N. New Jersey-Long Island, NY-NJ-CT $PM_{2.5}$ maintenance area, and Rockland County is within the designated New York-N. New Jersey-Long Island, NY-NJ-CT ozone nonattainment area. New York is also within the Northeast Ozone Transport Region which includes 11 northeastern states in which ozone transports from one or more states and contributes to a violation of the ozone NAAQS in one or more other states. States in this region are required to submit a SIP, stationary sources are subject to more stringent permitting requirements, and various regulatory thresholds are lower for the pollutants that form ozone, even if they meet the ozone NAAQS.

The EPA and state and local agencies have established a network of ambient air quality monitoring stations to measure and track the background concentrations of criteria pollutants across the United States. This data is then used by regulatory agencies to compare the air quality of an area to the NAAQS. Background air quality data in the region surrounding each compressor station were obtained from representative air quality monitoring stations.

Federal Air Quality Requirements

The Clean Air Act, and its amendments, provide the federal statutes and regulations governing air pollution in the United States. The provisions of the Clean Air Act that are applicable to the Project are discussed below.

Air Permitting

New Source Review (NSR) is a pre-construction air permit program designed to protect air quality when air pollutant emissions are increased either through the construction of new stationary sources or modifications to existing stationary sources. In areas with good air quality, NSR ensures that the new emissions do not degrade the air quality, which is achieved through the implementation of the Prevention of Significant Deterioration (PSD) permitting program for major sources or state permit programs for minor sources. In areas with poor air quality, Nonattainment NSR ensures that the new emissions do not inhibit progress toward cleaner air. In addition, NSR ensures that any large, new, or modified industrial source employs appropriate air pollution control technologies. The NYSDEC administers minor source NSR program and the major source Nonattainment NSR and PSD program in New York.

Based on the estimated operating emissions presented in table B-17, below, major source NSR permits would not be required, but minor source air permits would be needed from the NYSDEC for construction and operation of the proposed new Highland

Compressor Station and modification of the Hancock Compressor Station. Any permits required for work at the Ramapo Meter Station would be obtained by Algonquin, in accordance with agreements between Millennium and Algonquin regarding operation and ownership responsibilities at the Ramapo Meter Station. The planned new heater at the Ramapo Meter Station is unlikely to require major source permitting, and operational emissions are not further quantified. All initial permit applications were submitted for these facilities as described in table A-11 (see section A.10).

Title V is an operating air permit program run by each state. Based on the potential emission rates for each stationary source facility presented in table B-17 below, the new Highland Compressor Station and proposed modified Ramapo Meter Station would not require Title V major source permits. However, the Hancock Compressor Station would be required to obtain a Title V permit.

New Source Performance Standards

The EPA promulgates New Source Performance Standards (NSPS) to establish emission limits and fuel, monitoring, notification, reporting, and recordkeeping requirements for stationary source types or categories. These regulations apply to new, modified, or reconstructed sources. NSPS Subpart JJJJ sets emission standards for NO_X, CO, and VOCs from new stationary spark ignition internal combustion engines. Subpart JJJJ would apply to the new emergency engines at the Highland and Hancock Compressor Stations. NSPS Subpart KKKK sets emission standards for NO_X and SO_2 from new stationary combustion turbines, and would apply to the new turbines at the Highland and Hancock Compressor Stations. NSPS Subpart OOOOa implements the requirement of periodic surveys using optical gas imaging with the intent to reduce methane emissions from equipment leaks at compressor stations. Subpart OOOOa would apply to the Highland and Hancock Compressor Stations. Millennium has stated that it would comply with all applicable requirements of these NSPS.

National Emission Standards for Hazardous Air Pollutants

The 1990 Clean Air Act amendments established a list of 189 hazardous air pollutants (HAP), resulting in the promulgation of National Emission Standards for Hazardous Air Pollutants (NESHAP). The NESHAPs regulate HAP emissions from specific source types located at major or area sources of HAPs by setting emission limits, monitoring, testing, record keeping, and notification requirements. The proposed new Highland Compressor Station and modifications to the Hancock Compressor Station both include the addition of a new emergency stationary internal combustion engine, which would require compliance with subpart ZZZZ. Millennium would comply with Subpart ZZZZ by meeting the requirements of NSPS JJJJ.

General Conformity

The General Conformity Rule was developed to ensure that federal actions in nonattainment and maintenance areas do not impede states' attainment of the NAAQS. The lead federal agency must conduct a conformity analysis if a federal action would result in the generation of direct and indirect emissions that would exceed the general conformity applicability threshold levels of the pollutant(s) for which an air basin is designated nonattainment or maintenance.

Conforming activities or actions should not, through additional air pollutant emissions:

- cause or contribute to new violations of the NAAQS in any area;
- increase the frequency or severity of any existing violation of any NAAQS; or
- delay timely attainment of any NAAQS or interim emission reductions.

The General Conformity Rule entails both an applicability analysis and a subsequent conformity determination, if applicable. A General Conformity Determination must be completed when the total direct and indirect emissions of a project would equal or exceed specified pollutant thresholds on a calendar year basis for each nonattainment or maintenance area.

The operational emissions that would be permitted or otherwise covered by major or minor NSR permitting programs are not subject to the general conformity applicability analysis. Estimated emissions for the Project subject to review under the General Conformity thresholds (construction emissions and operational emissions not subject to major or minor NSR permitting), along with a comparison to the applicable general conformity threshold are presented in table B-15. Detailed emission calculations for the emission estimates identified in table B-15 were filed in appendix 9B of Millennium's July 20, 2016 application.

As shown in table B-15, during both construction and operation, emission estimates would not exceed general conformity applicability thresholds. Based upon this evaluation, a general conformity determination is not required.

Table B-15
Comparison of Emissions for the Eastern System Upgrade Project to General Conformity Thresholds

Air Pollutant	Designated Area	Threshold (tpy)	Pollutant or Precursor	2017 Construction Emissions (tpy)	2018 Construction Emissions (tpy)	Ongoing Operational Emissions (tpy)
Ozone	Rockland County	50	VOC	0.0	0.34	-- [b]
		100	NOx	0.0	0.33	-- [b]
$PM_{2.5}$	Orange County	100	$PM_{2.5}$	2.14	4.08	0.0
	Delaware County	100	$PM_{2.5}$	0.29	0.96	0.66

tpy = metric tons per year.

[a] General Conformity is only applicable to nonattainment or maintenance areas. Thresholds for each pollutant are based on the severity of the nonattainment areas or maintenance area where the Project is located. Pollutants and counties for which the Project would not require a General Conformity determination are not shown.

[b] Operational emissions for the proposed fuel gas heater at the Ramapo Meter Station have not been quantified; however, the planned new heater is unlikely to require major source permitting or exceed general conformity thresholds.

Greenhouse Gas Mandatory Reporting Rule

The EPA's Mandatory Reporting of Greenhouse Gases Rule requires reporting from applicable sources of GHG emissions if they emit greater than or equal to 25,000 metric tons of GHG (as CO_2e) in one year. The Mandatory Reporting Rule is not a permit, does not require emission control devices, and is strictly a reporting requirement for stationary sources based on actual emissions. Although the rule does not apply to construction emissions, we have provided GHG construction emission estimates, as CO_2e, for accounting and disclosure purposes below. Operational GHG emission estimates for the Project are also presented, as CO_2e. Based on the emission estimates presented, actual GHG emissions from operation of the Hancock and Highland Compressor Stations, each of which would be considered separate stationary sources, have the potential to exceed the 25,000-metric tons per year (tpy) reporting threshold for the Mandatory Reporting Rule. Recent additions to the Mandatory Reporting Rule effective for calendar year 2016 require reporting of GHG emissions generated during operation of natural gas pipeline transmission system, which would include blowdown emissions, equipment leaks, and vent emissions at compressor stations, as well as blowdown emissions between compressor stations (40 CFR 98, Subpart W). Therefore, if the actual emissions during operations from any of the compressor stations are equal to or greater than 25,000 metric tpy, Millennium would be required to report GHG emissions under this rule.

State Air Quality Regulations

This section discusses the potentially applicable state air regulations for the Project. Within Title 6 New York Codes, Rules, and Regulations (NYCRR) Parts 217 and 248, NYSDEC has implemented programs that are relevant to heavy construction

equipment and passenger vehicles for transport of workers to the Project site. These standards impose idling restrictions (6 NYCRR 217-3) and diesel engine retrofitting (6 NYCRR 248). The Project would be subject to these programs. The New York Vehicle Inspection Program is designed for light-duty vehicles. The Heavy Duty Diesel Vehicle Program is for on-road diesel powered vehicles greater than 8,500 pounds gross vehicle weight rating. Both of these programs require annual inspections for air emissions.

Construction Emissions Impacts and Mitigation

Emissions associated with construction activities generally include: 1) fuel combustion exhaust emissions from operation of construction equipment, 2) fugitive dust emissions associated with construction vehicle movement on unpaved surfaces, and 3) fugitive dust associated with grading, trenching, backfilling, and other earth-moving activities. The exhaust emissions depend on variety of factors including the number and types of equipment, fuel burned, and hours of operation. Fugitive dust emission levels vary in relation to moisture content, composition, and volume of soils disrupted during construction. Estimated construction emissions for the Project are shown in table B-16.[16]

Millennium would use busses or vans to transport construction workers to the work site as practicable, thereby reducing the number of vehicles on unpaved roads. Fugitive dust and other emissions from construction activities generally do not result in a significant increase in regional pollutant levels, although local pollutant levels could increase temporarily. Millennium would implement the measures in its Fugitive Dust Control Plan to reduce fugitive emissions through the application of dust suppressants (such as water) to disturbed work areas, avoiding excessive vehicle speeds on unpaved roads, covering open-body haul trucks, maintaining construction entrances at road access points, and providing wash stations at problem areas. Millennium's Chief Inspector and EI would be responsible for identification of areas where dust control measures are needed, and for ensuring that measures are effective. We have reviewed the Fugitive Dust Control Plan and find it acceptable.

[16] Detailed emission calculations were provided in Millennium's application filed on July 20, 2016 and supplemental filings data on August 4, 2016. These emission calculations can be found on the FERC eLibrary website using Accession Numbers 20160729-5231, 20160804-5104, and 20160804-5117.

Table B-16
Summary of Estimated Emissions from Construction of the Eastern System Upgrade Project[a]

Source	2017 Construction Emissions (tpy)							2018 Construction Emissions (tpy)						
	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	VOC	CO_2e	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	VOC	CO_2e
Huguenot Loop, Huguenot Meter Station, Westtown Meter Station, and Wagoner Interconnect														
Commuter transit	0.40	<0.01	2.47	<0.01	<0.01	0.05	243	0.79	<0.01	5.34	0.02	0.02	0.09	544
On-road vehicles	0.18	<0.01	0.04	<0.01	<0.01	<0.01	48	0.35	<0.01	0.08	0.01	<0.01	0.01	107
Off-road vehicles	11.89	0.02	9.06	0.68	0.68	1.18	3,019	19.70	0.05	17.80	1.15	1.15	2.20	6,360
Fugitive dust	0.0	0.0	0.0	13.55	1.43	0.0	0.0	0.0	0.0	0.0	23.92	2.86	0.0	0.0
Subtotal	***12.46***	***0.02***	***11.57***	***14.24***	***2.12***	***1.24***	***3,309***	***20.84***	***0.05***	***23.22***	***25.10***	***4.04***	***2.30***	***7,011***
Highland Compressor Station														
Commuter Transit	0.22	<0.01	1.25	<0.01	<0.01	0.03	131	0.45	<0.01	2.70	0.01	0.01	0.05	294
On-road vehicles	0.05	<0.01	0.06	<0.01	<0.01	<0.01	15	0.35	<0.01	0.08	0.01	<0.01	0.01	107
Off-road vehicles	0.61	<0.01	0.27	0.05	0.05	0.07	189	3.24	<0.01	3.04	0.32	0.32	1.03	921
Fugitive dust	0.0	0.0	0.0	2.43	0.24	0.0	0.0	0.0	0.0	0.0	5.99	0.62	0.0	0.0
Subtotal	***0.88***	***<0.01***	***1.58***	***2.49***	***0.29***	***0.10***	***335***	***4.03***	***0.01***	***5.82***	***6.33***	***0.96***	***1.10***	***1,322***
Hancock Compressor Station														
Commuter transit	0.08	<0.01	0.46	<0.01	<0.01	0.01	48	0.30	<0.01	1.84	<0.01	<0.01	0.04	200
On-road vehicles	0.02	<0.01	0.02	<0.01	<0.01	<0.01	6	0.32	<0.01	0.30	<0.01	<0.01	0.01	107
Off-road vehicles	0.32	<0.01	0.13	0.02	0.02	0.03	91	2.20	<0.01	2.06	0.22	0.22	0.70	626
Fugitive dust	0.0	0.0	0.0	1.68	0.17	0.0	0.0	0.0	0.0	0.0	4.15	0.43	0.0	0.0
Subtotal	***0.42***	***<0.01***	***0.61***	***1.71***	***0.19***	***0.05***	***144***	***2.83***	***<0.013***	***4.20***	***4.38***	***0.66***	***0.75***	***933***

Table B-16 (continued)
Summary of Estimated Emissions from Construction of the Eastern System Upgrade Project[a]

Source	2017 Construction Emissions (tpy)							2018 Construction Emissions (tpy)						
	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	VOC	CO_2e	NO_X	SO_2	CO	PM_{10}	$PM_{2.5}$	VOC	CO_2e
Ramapo Meter Station														
Commuter Transit	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.13	<0.01	0.71	<0.01	<0.01	0.01	78
On-road vehicles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<0.01	<0.01	<0.01	<0.01	<0.01	<0.01	2
Off-road vehicles	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.19	<0.01	0.62	0.01	0.01	0.32	39
Fugitive dust	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	1.17	0.12	0.0	0.0
Subtotal	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.0***	***0.33***	***<0.01***	***1.33***	***1.19***	***0.14***	***0.34***	***120***

[a] The numbers in this table have been rounded for presentation purposes. As a result, the totals may not reflect the sum of the addends.

Gasoline and diesel engines used during construction would be operated and maintained in a manner consistent with the manufacturers' specifications and the applicable EPA mobile source emission regulations (40 CFR 85), thus minimizing construction equipment emissions. Low-sulfur diesel fuel would also contribute to minimizing emissions from construction equipment. The construction equipment would be operated on an as-needed basis, and primarily during the daytime hours.

Once construction activities are completed, fugitive dust and construction equipment emissions would return to current levels. Emissions associated with the construction-related activities would be temporary in nature, and we conclude they would not cause, or significantly contribute to, a violation of any applicable ambient air quality standard.

Operational Emissions Impacts and Mitigation

Sources of air emissions during the operation of the Project include combustion emissions at the Highland Compressor Station, Hancock Compressor Station, and Ramapo Meter Station as well as fugitive and vented emissions at the compressor stations and pipeline facilities. Table B-17 presents an estimate of representative potential emissions from the new and modified sources associated with the Project.

Operational emissions along the Huguenot Loop and at the Huguenot and Westtown Meter Stations would be limited to non-combustion-related fugitive emissions (see table B-17). In addition to fugitive emissions from natural gas leaks, the Hancock and Highland Compressor Stations would release vented emissions. These vented emissions would include maintenance, startup, and shutdown associated with the new compressor station and modifications to the existing Hancock Station, as well as compressor station blowdowns[17] for maintenance or in the event of an emergency. Full blowdown events releasing vented emissions for the Hancock and Highland Compressor Stations would occur a maximum of twice per year. Fugitive and vented emissions would be transmission-quality natural gas. Transmission-quality natural gas transported through the Project would be required to meet the quality requirements of Millennium's tariff to ensure that contaminants and hydrocarbons are within acceptable levels to ensure safe pipeline operation.

[17] A blowdown event is a planned or unplanned venting of pressurized natural gas from pipelines or facilities to the atmosphere. Planned gas venting may be performed during operations and maintenance activities to ensure proper operation of safety systems as well as the equipment, or to release gas prior to performing work on the facilities. Unscheduled gas venting of the emergency shutdown system is an unplanned event and can occur at any time under an abnormal operating condition.

Table B-17
Summary of Annual Operational Emissions (tpy)[a]

Facility	NOx	SO_2	CO	PM_{10}	$PM_{2.5}$	VOC	CO_2e	Total HAPs
Huguenot Loop								
Fugitive emissions	N/A	N/A	N/A	N/A	N/A	4.6E-06	1.5	N/A
Huguenot Meter Station								
Fugitive emissions	N/A	N/A	N/A	N/A	N/A	1.9E-04	6.3	N/A
Westtown Meter Station								
Fugitive emissions	N/A	N/A	N/A	N/A	N/A	1.9E-04	6.3	N/A
Highland Compressor Station								
Proposed compressor	48.59	4.57	78.08	12.27	12.27	5.53	95,690	2.48
Proposed emergency generator	1.36	0.00	2.71	0.02	0.02	0.68	285	0.18
Proposed fuel gas heater	0.53	0.03	0.44	0.04	0.04	0.03	631	0.01
Fugitive and vented emissions	N/A	N/A	N/A	N/A	N/A	0.53	8,466.2	N/A
Subtotal	***50.48***	***4.60***	***81.23***	***12.33***	***12.33***	***6.77***	***105,086.2***	***2.67***
Hancock Compressor Station								
Existing PTE	35.21	8.26	49.56	12.49	12.49	4.43	69,718	0.74
Proposed compressor	47.92	4.51	77.28	12.10	12.10	5.45	94,373	2.45
Proposed emergency generator	1.36	0.00	2.71	0.02	0.02	0.68	285	0.18
Proposed fuel gas heater	0.53	0.03	0.44	0.04	0.04	0.03	631	0.01
Fugitive and vented emissions	N/A	N/A	N/A	N/A	N/A	0.54	8,652	N/A
Subtotal	***85.02***	***12.80***	***129.99***	***24.65***	***24.65***	***11.13***	***173,659***	***3.38***
Ramapo Meter Station[b]								
Existing PTE	12.89	0.08	19.65	1.00	1.00	3.93	15,788	1.35
Fugitive emissions	N/A	N/A	N/A	N/A	N/A	1.9E-04	6.3	N/A
Subtotal[b]	***12.89***	***.08***	***19.65***	***1.00***	***1.00***	***3.93***	***15,794.3***	***1.35***

PTE = potential to emit

[a] The numbers in this table have been rounded for presentation purposes. As a result, the totals may not reflect the sum of the addends.

[b] Operational emissions for the proposed fuel gas heater at the Ramapo Meter Station have not been quantified; however, the planned new heater is unlikely to require major source permitting.

Millennium would implement measures to reduce fugitive emissions, including the use of dry seals instead of wet seals on compressors, using electric starters, and conducting periodic testing for leaks. In addition, Millennium's operating company, Columbia, participates in the EPA's Natural Gas Star Program to share best practices for reducing methane emissions. To minimize vented emissions, Millennium would install valves on the station blowdown piping for both the Hancock and Highland Compressor Stations, which would enable the proposed facilities to contain the majority of the gas typically vented to the atmosphere during blowdown events. Millennium also proposes to implement a new design for the gas seal compression system that uses electric pumps in place of pneumatic pumps to reduce the number of needed blowdowns. Additionally, Millennium would comply with the EPA's 40 CFR Part 60, Subpart OOOOa standards, which require the implementation of a leak detection and repair program.

Each compressor station would also be equipped with a Solar dry low NO_X emissions combustion system designed to reduce emissions of NO_2, CO, and unburned hydrocarbons from the new turbines. As part of the process to obtain a minor source NSR Permit for the new Highland Compressor Station and to assess air quality impacts from the modifications to the Hancock Compressor Station, Millennium conducted an ambient air quality analysis for NO_2, $PM_{2.5}$, PM_{10}, CO, and SO_2 using the EPA's AERMOD program. As shown in table B-18, the modeling analyses for all modeled pollutants shows that both the existing Hancock Compressor Station, with the proposed modifications, and the proposed new Highland Compressor Station, combined with applicable background pollutant levels, would not contribute to a violation of the NAAQS. We reviewed the modeling analyses and agree with these conclusions.

Based on the identified estimated emissions from operation of the proposed Project facilities and review of the modeling analyses, we find that the Project would result in continued compliance with the NAAQS, which are protective of human health, including children, the elderly, and sensitive populations.

We received comments claiming that compressor stations release large quantities of toxic pollutants. Some commenters also cited reports from the Pennsylvania Department of Environmental Protection and Southwest Pennsylvania Environmental Health Project linking compressor station emissions to health impacts. The majority of the reports/studies that were referenced by commenters are based on natural gas production facilities that transport and process raw field gas, which typically contains more pollutants than transmission-quality natural gas. Therefore, we do not find the referenced studies applicable for relating health impacts from operation of the Highland and Hancock Compressor Stations. At a transmission compressor station using gas-driven compressors, the overwhelming majority of operational emissions are criteria pollutants, particularly NO_X and CO. The modeling that was performed, and is discussed above, indicates that emissions of these pollutants would be within the levels established by EPA to be protective of human health.

Table B-18
Summary of Predicted Air Quality Impacts for the Eastern System Upgrade Project

Facility/ Pollutant	Average Period	NAAQS (µg/m^3)	Facility Impact (µg/m^3)	Background Concentration (µg/m^3)	Facility Impact + Background (µg/m^3)
Highland Compressor Station (New)					
CO	1-Hour	40,000	312	2,070	2,382
	8-Hour	10,000	89	1,495	1,584
SO_2	1-Hour	196	1.8	21.0	22.8
	3-Hour	1,300	1.7	23.6[a]	25.3
	24-Hour	260	0.8	13.9	14.7
	Annual	60	0.1	2.1	2.2
PM_{10}	24-Hour	150	2.1	45.0	47.1
$PM_{2.5}$	24-Hour	35	0.7	22.3	23.0
	Annual	12	0.1	9.5	9.6
NO_2	1-Hour[b]	188	20.9[b]	75.8	96.7
	Annual[c]	100	1.6[c]	20.0	21.6
Hancock Compressor Station (Existing and Proposed)					
CO	1-Hour	40,000	452	2,070	2,522
	8-Hour	10,000	192	1,495	1,687
SO_2	1-Hour	196	9.2	21.0	30.2
	3-Hour	1,300	8.9	23.6[a]	32.5
	24-Hour	260	5.2	13.9	19.1
	Annual	60	0.4	2.1	2.5
PM_{10}	24-Hour	150	7.8	45.0	52.8
$PM_{2.5}$	24-Hour	35	3.8	22.3	26.1
	Annual	12	0.5	9.5	10.0
NO_2	1-Hour[b]	188	34.9[b]	75.8	110.7
	Annual[c]	100	5.0[c]	20.0	25.0

[a] Background concentrations for 3-hour SO_2 were based upon the maximum 1-hour SO_2 monitored concentration.
[b] Hourly NO_2 emissions were assumed to be equal to 80% of maximum hourly NOx emissions, as per guidance by the EPA.
[c] Annual NO_2 emissions were assumed to be equal to 75% of annual NOx emissions, as per guidance by the EPA.

Small quantities of a number of HAPs can form from combustion of natural gas and blowdown events. However, the applicable NESHAP requirements would limit these emissions. Further, a toxic ambient air contaminant analysis was conducted as part of Millennium's air permit applications submitted to NYSDEC for the Highland and Hancock Compressor Stations. All maximum modeled toxic air pollutants assessed were below NYSDEC's annual and short-term guideline concentrations at both the Highland and Hancock Compressor Stations. Therefore, we find that the health risks from operation of the Project would not be significant.

8.2 Noise

The ambient sound level of a region is defined by the total noise generated within the specific environment, over varying land use types, and is usually comprised of natural and artificial sounds. The land use in the Project area is primarily open and agricultural land, upland forest, or industrial/commercial land. At any location, both the magnitude and frequency of environmental sounds may vary considerably over the course of a day and throughout the week. This variation is caused in part by changing weather conditions, the effect of seasonal vegetation cover, and human activities.

Ambient sound quality can be affected during construction and operation of the Project, and the magnitude and frequency of sound levels can vary considerably during the day, week, or the seasons, changing weather conditions, vegetative cover, and non-Project sources of noise (i.e., unwanted sound). Two measures that associate the time-varying quality of sound to its effect on people are the 24-hour equivalent sound level (L_{eq}) and day-night sound level (L_{dn}). The L_{eq} is the level of steady sound with the same total (equivalent) energy as the time-varying sound of interest, averaged over a 24-hour period. The L_{dn} is the L_{eq} plus 10 decibels on the A-weighted scale (dBA), added to account for people's greater sensitivity to nighttime sound (between the hours of 10:00 pm and 7:00 am). The A-weighted scale is used as human hearing is less sensitive to low and high frequencies than mid-range frequencies. The human ear's threshold of perceptible sound level change is considered to be 3 dBA; 6 dBA is clearly noticeable to the human ear, and 9 dBA is perceived as a doubling of sound.

Noise sensitive areas (NSAs) within the vicinity of a project may include residences, schools, churches, or any location where people reside or gather and may be affected by construction and operation of the Project. Construction equipment would contribute to ambient sound levels during construction of the Eastern System Upgrade Project. Once construction is complete, sound would return to pre-construction levels with the exception of NSAs near the Hancock and Highland Compressor Stations and the Ramapo and Huguenot Meter Stations, where ongoing operations would contribute to an increase in ambient sound levels.

Regulatory Noise Requirements

In 1974, the EPA published its *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* providing information for state and local regulators to use when developing their own ambient noise standards. The EPA has determined that an L_{dn} of 55 dBA protects the public from indoor and outdoor activity noise interference. An L_{dn} of 55 dBA is equivalent to a continuous sound level of 48.6 dBA. For comparison, normal speech at a distance of 3 feet averages 60 to 70 dBA L_{eq}. We have adopted this 55 dBA L_{dn} criterion and use it to evaluate the potential noise impact from operation of compressor facilities and certain construction-related activities.

The State of New York does not have any noise regulations or ordinances applicable to the Project facilities. The Town of Deerpark and Town of Ramapo have ordinances in place designed to restrict noise. The Town of Deerpark noise ordinances apply to non-transportation operations or facilities, and require that sound levels at the property line not exceed a variable limit based on the octave band range, character of the noise, and time/duration of activity. Portions of the Project that may emit noise within the Town of Deerpark includes the Huguenot Meter Station.

The Town of Ramapo has an ordinance in place that prevents sound that disrupts normal activities within noise sensitive zones (such as hospitals, nursing homes, schools, courts, libraries, or houses of worship), and limits construction between the hours of 10:00 pm and 8:00 am that would create noise that would affect the comfort of a reasonable person. In addition, the ordinance states that no commercial business or industrial operation that produces an unreasonable sound level shall be operated. The Ramapo Meter Station would be located in the town of Ramapo.

Impacts and Mitigation

Construction

Construction of the Project would result in temporary increases in ambient sound levels. Construction sound would be primarily limited to daytime hours, except during 24-hour HDD operations, and could be highly variable due to intermittent equipment operation. The type of equipment operating at any location changes with each construction phase. The sound level impacts on NSAs near the Project sites would depend upon the duration of use for each piece of equipment, the number of construction vehicles and equipment used simultaneously, and the distance between the sound source and receptor. The Project would utilize conventional construction techniques and equipment, including graders, clearers, heavy trucks, and similar heavy construction equipment.

Millennium proposes to use the HDD construction method at three locations and each of these HDDs would require about 10 weeks to complete. Each HDD could be installed using the intersect method, and NSAs on each side of the drill could experience noise impacts from entry site equipment. Table B-19 summarizes the sound level impacts on the nearest NSA associated with each side of the HDD. Where Millennium could implement the intersect method at the Neversink River and Interstate Highway 84 HDDs, the acoustical assessment was conducted assuming that the drill rig and other noise sources associated with drilling operations would be present at each side of the HDD crossing. The noise analysis provided by Millennium for the Mountain Road/Bedell Drive HDD did not assume the drilling rig and other entry site equipment would be present at the site at MP 3.8, and is not representative of noise impacts that would occur using the intersect method. Therefore, **we recommend that:**

- **<u>Prior to construction using any drilling equipment or performing entry-side activity at MP 3.8 of the Mountain Road/Bedell Drive HDD</u>, Millennium should file with the Secretary for review and written approval by the Director of the OEP, a revised HDD noise assessment for entry-side activity at MP 3.8 and an estimate of the number of days/weeks/months required to complete the HDD. If the results of the assessment show that noise levels would exceed 55 dBA L_{dn} at any NSA, Millennium should file a noise mitigation plan that identifies all reasonable measures Millennium commits to implementing to reduce noise levels attributable to the proposed drilling operations at NSAs, and the resulting noise levels at each NSA with mitigation.**

Without mitigation, preliminary estimates suggest that sound levels from HDD construction alone could exceed 55 dBA L_{dn} at three NSAs if no sound control measures are implemented. HDD activities may occur over a 24-hour per day timeframe. Additional NSAs are also present farther from the sound-generating sources at the proposed HDD entrance/exit points; however, Project sound levels at farther NSAs in each direction would be lower than presented in table B-19 due to additional attenuation provided by the greater distance from the sound generating activity/source. To reduce sound level impacts at these three locations, Millennium has committed to implementing site-specific noise mitigation including installation of temporary noise-reduction barriers around HDD area workspaces (including hydraulic power units, engine-driven pumps, engine jacket-water coolers, and the mud mixing/cleaning system).

Table B-19 includes the estimated noise impacts from HDD activities inclusive of these mitigation measures. Based on the acoustical analysis, sound levels at these NSAs would not be impacted by sound from HDD construction that could exceed 55 dBA L_{dn} with the implementation of proposed noise control measures.

We reviewed Millennium's noise assessment and agree that the mitigation measures committed to by Millennium should result in noise levels in compliance with the FERC's noise criterion of 55 dBA L_{dn} at nearby NSAs for all HDD entry/exit positions assessed.

Based on the analyses conducted and the mitigation measures proposed, we believe that construction of the Project would not result in significant noise impacts on residents, and the surrounding communities.

Table B-19
Acoustical Survey and Analysis Summary for Horizontal Directional Drills [a]

Closest NSA	Distance and Direction of NSA from HDD Location	Estimated L_{dn} due to Project Construction, No Noise Control (dBA)	Estimated L_{dn} due to Project Construction, Noise Control (dBA)	Existing Ambient L_{dn} (dBA)	L_{dn} of Construction plus Ambient L_{dn} (dBA)	Potential Increase Above Ambient (dB) [b]
Neversink River						
HDD Side A, residence (MP 0.9)	1,000 feet SW	53.2	40.8	40.1	43.5	3.4
HDD Side B, residence (MP 0.4)	600 feet SW	62.4	49.3	56.2	57.0	0.8
Mountain Road/Bedell Drive						
Entry, residence (MP 2.9)	500 feet E to SE	63.2	50.1	48.5	52.4	3.8
Exit, residence (MP 3.8)	450 feet W to N	52.5	N/A	44.6	53.2	8.6
Interstate Highway 84						
HDD Side A, residence (MP 3.9)	950 feet NW	56.8	43.9	44.6	47.3	2.7
HDD Side B, residence (MP 4.7)	1,100 feet SE	52.2	N/A	53.7	56.0	2.3

NSA = noise sensitive area; SW = southwest; SE = southeast; NE = northeast; W = west; N = north; NW = northwest.

[a] The noise analysis presented in this tables assumes the use of the intersect method for the Neversink and Interstate Highway 84 HDDs, and includes the presence of a drilling rig and other entry side equipment on each side of the HDD. The Mountain Road/Bedell Drive HDD assumes noise impacts associated with the different equipment present for entry and exit sites.

[b] Potential increase above ambient (dB) uses the estimated peak noise impact with noise control measures implemented, where applicable.

Operation

The new and modified compressor stations would generate sound on a continuous basis (i.e., up to 24 hours per day) when operating. Some sound would also be generated by the operation of the modified meter stations. Noise impacts associated with the operation of these aboveground facilities would be limited to the vicinity of the facilities. The specific operational noise sources associated with these facilities and their estimated impact at the nearest NSAs are described below.

Millennium conducted ambient sound surveys and acoustical impact assessments for the nearest NSAs to the proposed new Highland Compressor Station and modified Hancock Compressor Station. In addition, Millennium conducted ambient sound surveys and acoustical analyses for the Huguenot and Ramapo Meter Stations, both of which are located in areas with local noise ordinances. The distances and directions to the nearest NSAs from the existing or proposed compressor station buildings are presented in table B-20 and shown in appendix G. Millennium completed an acoustical analysis to identify the estimated sound level impacts at the nearest NSAs from the proposed new Highland Compressor Station and modified Hancock Compressor Station. The results of these acoustical analyses are presented in table B-20 and include various assumed noise control measures that Millennium would implement, including:

- enclosing the new turbine(s) and compressor(s) within a compressor building, including the use of appropriate building materials;
- installation of an adequate muffler system for each turbine exhaust system;
- installation of a low-noise lube oil cooler for each compressor unit and a low-noise gas cooler for each new gas cooler;
- use of acoustical pipe insulation for outdoor aboveground gas piping if necessary;
- use of an adequate silencer for gas blowdowns;
- installation of low noise control/recycle valves; and
- use of a horizontal stand by generator with hospital grade silencer.

Table B-20
Acoustical Analysis of the Highland and Hancock Compressor Stations

NSA	Distance and Direction of NSA	Existing Ambient L_{dn} (dBA)	L_{dn} Attributable to New Station or Station Modifications (dBA)	Existing L_{dn} + L_{dn} of Proposed Changes (dBA)[a]	Potential Increase Above Ambient (dB)
Highland Compressor Station					
NSA #1, residences	3,300 feet NW	41.0	29.0	42.0	1.0
NSA #2, residences	3,000 feet W	41.0	29.8	42.2	1.2
NSA #3, residence	2,900 feet SW	41.0	30.1	42.3	1.3
NSA #4, residence	3,750 feet N-NW	41.0	27.9	41.8	0.8
Modifications to Hancock Compressor Station					
NSA #1, residence	675 feet E	42.6	44.7	47.8	5.2
NSA #2, residence	1,550 feet W-SW	41.5	37.9	43.7	2.2
NSA #3, residence	2,175 feet NE	41.1	33.6	42.1	1.0
NSA #4, residence	3,775 feet S-SE	41.6	29.0	42.0	0.4
NSA #5, residences	3,475 feet N-NE	41.4	29.4	41.8	0.4

N-NW = north-northwest; W-SW = south-southwest; S-SE = south-south east; N-NW = north-northwest.

[a] For the modified Hancock Compressor Station, values represent the total L_{dn} of the existing ambient sound levels, the existing station at full load operation, and the proposed new facilities.

Millennium's noise control measures would also minimize vibration from operation of the compressor stations. Based on these results, the sound generated by the new compressor station and modifications to the existing station would meet FERC's sound level requirements at the nearest NSAs. With the exception of NSA #1 near the Hancock Compressor Station, the increase in noise at all NSAs during operation of the compressor stations would be less than 3 dBA, which is the level of change detectable to the human ear. The predicted sound level increase for NSA #1 at the Hancock Compressor Station is 5.2 dBA, however this increase combined with existing ambient sound and sound from operation of the existing compressor station would remain well below the 55 dBA L_{dn} threshold. To ensure that Project-related sound level impacts do not exceed our criterion, **we recommend that:**

- **Millennium should make all reasonable efforts to ensure its predicted noise levels from the new Highland Compressor Station and modified Hancock Compressor Station are not exceeded at nearby NSAs, and file noise surveys showing this with the Secretary no later than 60 days after placing each station into service. If a full load condition noise survey of the entire station is not possible, Millennium should file an interim survey**

at the maximum possible horsepower load and file the full load survey within 6 months. If the noise attributable to the operation of all of the equipment at either compressor station under interim or full horsepower load conditions exceeds an L_{dn} of 55 dBA at any nearby NSA, Millennium should file a report on what changes are needed and should install additional noise controls to meet the level within 1 year of the in-service date. Millennium should confirm compliance with this requirement by filing a second noise survey with the Secretary no later than 60 days after it installs the additional noise controls.

In addition to the operational sound level impacts discussed above, there would also be blowdown events during which the compressor stations would generate additional sound for short periods of time. Millennium has indicated that the new compressor units would each be outfitted with a blowdown silencer, and that the sound level from blowdowns would be below the FERC guidance level at the nearest NSAs. Given the non-routine nature and short-term duration of these blowdown events, we do not believe that there would be a significant contributor to operational sound levels from the Project.

To ensure compliance with local noise ordinances, Millennium also completed acoustical analyses for the Huguenot and Ramapo Meter Stations where modifications would result in additional sound. Table B-21 provides the estimated noise sound level impacts resulting from the operation of these stations at the nearest NSAs, and appendix G depicts each NSA.

Based on these results, the sound level impacts generated by the modifications to the Huguenot and Ramapo Meter Stations existing facilities would not exceed 55 dBA L_{dn} for five out of the six nearest NSAs. At NSA #1 near the Ramapo Meter Station, predicted ambient sound levels would exceed 55 dBA L_{dn}, but the increase in predicted sound level at this NSA due to operation of the modified Ramapo Meter Station would be 0.1 dBA. This increase is below the level of human perception.

Millennium determined that the Town of Deerpark ordinance requirements could be exceeded by operation of the Huguenot Meter Station at the boundary of one adjacent property currently in industrial use. Millennium consulted with the landowner, who did not object to the potential sound level impacts that would be associated with the Huguenot Meter Station. At the Ramapo Meter Station, the FERC guidance levels establish more stringent noise requirements than the local ordinance; thus, the impacts discussed are based on the FERC standards.

Table B-21 Acoustical Analysis of the Ramapo and Huguenot Meter Stations					
NSA	**Distance and Direction of NSA**	**Existing Ambient L_{dn} (dBA)**	**L_{dn} Attributable to Meter Station Modifications (dBA)**	**Existing L_{dn} + L_{dn} of Proposed Changes (dBA)**	**Potential Increase Above Ambient (dB)**
Ramapo Meter Station					
NSA #1, residences	975 feet E to SE	58.7	42.3	58.8	0.1
NSA #2, residences	1,900 feet N-NE to NE	45.4	35.1	45.8	0.4
NSA #3, county park	1,900 feet S-SW	43.3	34.9	43.9	0.6
Huguenot Meter Station					
NSA #1, residences	250 feet S to NE	48.9	43.3	52.1	3.2
NSA #2, residences	475 feet NE to NW	48.8	43.3	49.9	1.1
NSA #3, residences	700 feet NW to W-NW	46.5	39.5	47.3	0.9

Millennium would implement noise control measures to minimize impacts at the meter stations, including:

- placing all flow and pressure control valves below grade;
- using a low-noise burner for the water bath heater; and
- using acoustical pipe insulation for outdoor aboveground gas piping if necessary.

It is our experience that meter stations can vary widely in terms of actual sound level impacts after being placed in service relative to the predicted impacts from these stations. In addition, the number of residences in proximity to meter stations further justifies the need for post-construction sound level surveys.

To verify the accuracy of Millennium's acoustical analyses and ensure sound levels do not exceed our criterion, **we recommend that**:

- **Millennium should file noise surveys with the Secretary no later than 60 days after placing the modified Ramapo and Huguenot Meter Stations in service. If the noise attributable to the operation of either meter station exceeds the previously existing noise levels at any nearby NSAs that are currently at or above an L_{dn} of 55 dBA, or exceeds 55 dBA L_{dn} at any nearby NSAs that are currently below 55 dBA L_{dn}, Millennium should file a report on what changes are needed and should install the additional noise controls to meet the requirements within 1 year of the in-service date. Millennium should confirm compliance with the above requirement**

by filing a second sound level survey with the Secretary no later than 60 days after it installs the additional noise controls.

Based on the analyses conducted, Millennium's proposed mitigation measures, and our recommendation, we believe that operation of the Eastern System Upgrade Project would not result in significant noise or vibration impacts on residents or the surrounding communities.

9. Reliability and Safety

The transportation of natural gas by pipeline involves some incremental risk to the public due to the potential for accidental release of natural gas. The greatest hazard is a fire or explosion following a major pipeline rupture.

Methane, the primary component of natural gas, is colorless, odorless, and tasteless. It is not toxic, but is classified as a simple asphyxiate, possessing a slight inhalation hazard. If inhaled in high concentrations, oxygen deficiency can result in serious injury or death. Methane has an auto-ignition temperature of over 1,000 degrees Fahrenheit and is flammable at concentrations between 5 and 15 percent in air. An unconfined mixture of methane and air is not explosive; however, it may ignite if there is an ignition source present. A flammable concentration within an enclosed space in the presence of an ignition source can explode. Methane is buoyant at atmospheric temperatures and disperses upward rapidly in air.

9.1 Safety Standards

The DOT is mandated to provide pipeline safety under 49 U.S.C. Chapter 601. The DOT's Pipeline and Hazardous Materials Safety Administration (PHMSA) administers the national regulatory program to ensure the safe transportation of natural gas and other hazardous materials by pipeline. It develops safety regulations and other approaches to risk management that ensure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities. Many of the regulations are written as performance standards that set the level of safety to be attained and require the pipeline operator to use various technologies to achieve safety. PHMSA ensures that people and the environment are protected from the risk of pipeline incidents. This work is shared with state agency partners and others at the federal, state, and local levels.

Section 5(a) of the Natural Gas Pipeline Safety Act provides for a state agency to assume all aspects of the safety program for intrastate facilities by adoption and enforcing the federal standards, while Section 5(b) permits a state agency that does not qualify under Section 5(a) to perform certain inspection and monitoring functions. A state may also act as DOT's agent to inspect interstate facilities within its boundaries; however, the DOT is responsible for enforcement actions. New York is authorized by PHMSA under

Section 5(a) to assume all aspects of the safety program intrastate, but not interstate, facilities (PHMSA 2016a).

The DOT pipeline standards are published in 49 CFR 190 - 199. Part 192 specifically addresses natural gas pipeline safety issues. Under a MOU on Natural Gas Transportation Facilities, dated January 15, 1993, between the DOT and the FERC, the DOT has the exclusive authority to promulgate federal safety standards used in the transportation of natural gas. Section 157.12(a)(9)(vi) of the FERC's regulations require that an applicant certify that it would design, install, inspect, test, construct, operate, replace, and maintain the facility for which a Certificate is requested in accordance with federal safety standards and plans for maintenance and inspection. Alternatively, an applicant must certify that is has been granted a waiver of the requirements of the safety standards by the DOT in accordance with Section 3(e) of the Natural Gas Pipeline Safety Act. The FERC accepts this certification and does not impose additional safety standards. If the FERC becomes aware of an existing or potential safety problem, there is a provision within the MOU to promptly alert the DOT. The MOU also provides for referring complaints and inquiries made by state and local governments and the general public involving safety matters related to pipelines under the FERC's jurisdiction. The FERC also participates as a member of the DOT's Technical Pipeline Safety Standards Committee, which determines if proposed safety regulations are reasonable, feasible, and practicable.

The pipeline and aboveground facilities associated with the Project must be designed, constructed, operated, and maintained in accordance with the DOT Minimum Federal Safety Standards in 49 CFR 192. The regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. The DOT specifies material selection and qualification, minimum design requirements; and protection from internal, external, and atmospheric corrosion.

The DOT also defines area classifications, based on population density near the pipeline and specifies more rigorous safety requirements for populated areas. The class location unit is an area that extends 220 yards on either side of the centerline of any continuous 1-mile length of pipeline. The four area classifications are defined below:

- Class 1: Location with 10 or fewer buildings intended for human occupancy;

- Class 2: Location with more than 10, but less than 46 buildings intended for human occupancy;

- Class 3: Location with 46 or more buildings intended for human occupancy, or where the pipeline lies within 100 yards of any building, or small well-defined outside area occupied by 20 or more people on at least 5 days a week for 10 weeks during any 12-month period; and

- Class 4: Location where buildings with four or more stories aboveground are prevalent.

Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. For instance, pipelines constructed on land in Class 1 locations must be installed with a minimum depth of cover of 18 inches in consolidated rock and 30 inches in normal soil. Class 2, 3, and 4 locations, as well as drainage ditches of public roads and railroad crossings, require a minimum cover of 36 inches in normal soil and 24 inches in consolidated rock.

Class locations also specify the maximum distance to a sectionalizing block valve (e.g., 10.0 miles in Class 1, 7.5 miles in Class 2, 4.0 miles in Class 3, and 2.5 miles in Class 4). Pipe wall thickness and pipeline design pressures; hydrostatic test pressures; MAOP; inspection and testing of welds; and the frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas. The Project would be constructed through Class 1, 2, and 3 areas. However, Millennium would comply with the minimum depth requirements for Class 2, 3, and 4 areas in those areas identified as Class 1 and would install the pipeline with a minimum depth of cover of 4 feet in agricultural land. Throughout the life of the pipeline, Millennium would monitor population changes in accordance with CFR 49, Title 192, Subpart L (Section 192.609 and 192.611) to determine whether the pipeline requires upgrades to meet changes in population.

The Pipeline Safety Improvement Act of 2002 requires operators to develop and follow a written integrity management program that contains all the elements described in 49 CFR 192.911 and addresses the risks on each transmission pipeline segment. More specifically, the law establishes an integrity management program that applies to all high consequence areas (HCAs).

The DOT has published rules that define HCAs as areas where a gas pipeline accident could considerably harm people and their property and that require an integrity management program to minimize the potential for an accident. This definition satisfies, in part, the Congressional mandate for the DOT to prescribe standards that establish criteria for identifying each gas pipeline facility in a high-density population area.

The HCAs may be defined in one of two ways. In the first method, an HCA includes:

- current Class 3 and 4 locations;

- any area in Class 1 or 2 locations where the potential impact radius[18] is greater than 660 feet and there are 20 or more buildings intended for human occupancy within the potential impact circle;[19] or

- any area in Class 1 or 2 locations where the potential impact circle includes an identified site (as described below).

An identified site is an outside area or open structure that is occupied by 20 or more persons on at least 50 days in any 12-month period; a building that is occupied by 20 or more persons on at least 5 days per week for any 10 weeks in any 12-month period; or a facility that is occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate.

In the second method, an HCA includes any area within a potential impact circle that contains:

- 20 or more buildings intended for human occupancy; or

- an identified site.

Once a pipeline operator has determined the HCAs along its pipeline, it must apply the elements of its integrity management program to those segments of pipeline within HCAs. The DOT regulations specify the requirements for the integrity management plan in Section 192.91. The pipeline would cross one HCA from MP 0.0 to MP 0.3 in the town of Deerpark, New York. Millennium would implement all elements of its integrity management plan for the pipeline HCA. Key elements include data gathering, risk assessments, integrity assessments, response and remediation, and continual evaluation and assessment. The pipeline integrity management rule for HCAs requires inspection of pipeline HCAs at a rate of once every seven years. Millennium would be subject to criteria specified by the DOT to identify additional HCAs if conditions change along the proposed pipeline.

The DOT prescribes the minimum standards for operating and maintaining pipeline facilities, including the requirement to establish a written plan governing these activities. Each pipeline operator is required to establish an emergency plan that includes procedures to minimize the hazards of natural gas pipeline emergency. Key elements of the plan include procedures for:

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[18] The potential impact radius is calculated as the product of 0.69 and the square root of: the MAOP of the pipeline in pounds per square inch gauge multiplied by the square of the pipeline diameter in inches.

[19] The potential impact circle is a circle of radius equal to the potential impact radius.

- receiving, identifying, and classifying emergency events, gas leakage, fires, explosions, and natural disasters;

- establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response;

- emergency system shutdown and safe restoration of service;

- making personnel, equipment, tools, and materials available at the scene of an emergency; and

- protecting people first and then property, and making them safe from actual or potential hazards.

Under 49 CFR 192.615, each pipeline operator must also establish an Emergency Plan that provides written procedures to minimize hazards from a natural gas pipeline emergency. Millennium is operated by Columbia Pipeline Group (Columbia Pipeline), which would implement procedures in its site-specific Emergency Plan to enable the public and officials to recognize and report a natural gas emergency. Columbia would establish and maintain a liaison with public officials to coordinate emergency response planning, to notify officials of Columbia's emergency response capabilities, and to facilitate communication during emergencies. We received public comments requesting that Millennium participate in the code red community notification system; however, Millennium does not plan to implement the code red system at the Hancock and Highland Compressor Stations. Millennium would implement the measures in its site-specific Emergency Plan as described above to facilitate communication during emergencies.

The DOT requires that each operator establish and maintain liaison with appropriate fire, police, and public officials to learn the resources and responsibilities of each organization that may respond to a natural gas pipeline emergency, and to coordinate mutual assistance. The operator must also establish a continuing education program to enable customers, the public, government officials, and those engaged in excavation activities to recognize a gas pipeline emergency and report it to appropriate public officials. Millennium maintains an ongoing liaison with the appropriate fire, police, and public officials to coordinate mutual assistance during emergencies.

9.2 Pipeline Accident Data

The DOT requires that all operators of natural gas transmission pipelines notify the DOT of any significant incident and submit an incident report within 20 days. Significant incidents are defined as any leaks that:

- caused a death or personal injury requiring hospitalization; or

- involved property damage of more than $50,000 (1984 dollars).[20]

During the 20-year period from 1996 through 2015, a total of 1,309 significant incidents were reported on more than 301,000 total miles of natural gas transmission pipelines nationwide (PHMSA 2016b). Additional insight into the nature of service may be found by examining the primary factors that caused the failures. Table B-22 provides a distribution of the causal factors as well as the number of each incident by cause.

Table B-22
Natural Gas Transmission Pipeline Significant Incidents by Cause 1996-2015

Cause	Number of Incidents	Percentage[a]
Corrosion	311	23.7
Excavation[b]	210	16.0
Pipeline material, weld, or equipment failure	361	27.5
Natural force damage	147	11.2
Outside forces[c]	85	6.5
Incorrect operation	42	3.2
All other causes[d]	159	12.1
Total	**1,315**	--

Source: PHMSA 2016b.
[a] Due to rounding, column does not total 100 percent.
[b] Includes third party damage.
[c] Fire, explosion, vehicle damage, previous damage, intentional damage, electrical arcing from other equipment/facilities, fishing or maritime activity, maritime equipment or vessel adrift, and unspecified or other outside force damage.
[d] Miscellaneous causes or unknown causes.

The dominant causes of pipeline incidents are corrosion, pipeline material and weld or equipment failure, constituting 50.7 percent of all significant incidents. The pipelines included in the dataset in table B-22 above, vary widely in terms of age, diameter, and level of corrosion control. Each variable influences the incident frequency that may be expected for a specific segment of the pipeline.

The frequency of significant incidents is strongly dependent upon pipeline age. Older pipelines have a higher frequency of corrosion incidents, since corrosion is a time-dependent process. The use of both an external protective coating and a cathodic

[20] $50,000 in 1984 is approximately $115,807 as of September 2016 (U.S. Census Bureau 2016c).

protection system[21] required on all pipelines installed after July 1971, significantly reduces the corrosion rate compared to unprotected or partially protected pipe.

Outside forces, excavation, and natural forces are the cause of 33.6 percent of significant pipeline incidents. These result from the encroachment of mechanical equipment such as bulldozers and backhoes; earth movements due to soil settlement, washouts, or geologic hazards; and weather effects such as winds, storms, and thermal strains and willful damage. Older pipelines have a higher frequency of outside forces incidents, partly because their location may be less well known and less well marked as compared to newer pipelines. In addition, the older pipelines contain a disproportionate number of smaller-diameter pipelines, which have a greater rate of outside forces incidents. Small diameter pipelines are more easily crushed or broken by mechanical equipment or earth movement. Table B-23 provides a breakdown of outside force incidents by cause.

Since 1982, operators have been required to participate in "One Call" public utility programs in populated areas to minimize unauthorized excavation activities near pipelines. The "One Call" program is a service used by public utilities and some private sector companies (for example oil pipelines and cable television) to provide preconstruction information to contractors or other maintenance workers on the underground location of pipes, cables, and culverts.

Millennium would construct in close proximity to other utility lines and its existing mainline pipeline (see table A-9). It would monitor excavations, avoid mechanical excavations within 3 feet of existing pipelines, and give other operators the opportunity to be present during work around their pipelines.

9.3 Impact on Public Safety

As stated in section B.9.1, Millennium would comply with all applicable DOT pipeline safety standards as well as regular monitoring and testing of the pipeline. While pipeline failures are rare, the potential for pipeline systems to rupture and the risk to nearby residents is discussed below.

[21] Cathodic protection is a technique to reduce corrosion (rust) of the natural gas pipeline through the use of an induced current or a sacrificial anode (like zinc or manganese) that corrodes at a faster rate to reduce corrosion.

Table B-23 Outside Forces Incidents by Cause[a] 1996-2015		
Cause	**Number of Incidents[b]**	**Percent of Outside Force Incidents[c]**
Third party excavation damage	172	38.8
Operator excavation damage	25	5.6
Unspecified excavation damage/previous damage	13	2.9
Heavy rain/floods	76	17.2
Earth movement	32	7.2
Lightning/temperature/high winds	27	6.1
Natural force (unspecified or other)	13	2.9
Vehicle (not engaged with excavation)	49	11.1
Fire/explosion	9	2.0
Previous mechanical damage	6	1.4
Fishing or maritime activity	7	1.6
Maritime equipment or vessel adrift	2	0.5
Intentional damage	1	0.2
Electrical arcing from other equipment/facility	1	0.2
Unspecified/other outside force	10	2.3
Total	**443**	-

Source: PHMSA 2016b.

[a] Excavation, Outside Force, and Natural Force from table B-22.

[b] The numbers in this table have been rounded for presentation purposes. As a result, the totals may not reflect the sum of the addends.

[c] Due to rounding, column does not total 100 percent.

The service incidents data summarized above in table B-23 included pipeline failures of all magnitudes with widely varying consequences. Table B-24 presents the average annual injuries and fatalities that occurred on natural gas transmission pipelines in the 5-year period between 2011 and 2015. The majority of fatalities from pipelines are due to incidents with local distribution pipelines not regulated by the FERC. These are natural gas pipelines that distribute natural gas to homes and businesses after transportation through interstate natural gas transmission pipelines. In general, these distribution lines are smaller diameter pipes and/or plastic pipes, which are more susceptible to damage. Local distribution systems do not have large rights-of-way and pipeline markers common to the FERC-regulated natural gas transmission pipelines.

Table B-24
Injuries and Fatalities - Natural Gas Transmission Pipelines

Year	Injuries	Fatalities
2011	1	0
2012	7	0
2013	2	0
2014	1	1
2015 [a]	14	6

Source: PHMSA 2016b.

[a] The majority of injuries and fatalities in 2015 resulted from two incidents. One incident resulting from third-party excavation damage resulted in 11 injuries and 1 fatality in 2015 in California. One incident from incorrect operation and pipeline damage resulted in four fatalities and 1 injury in Louisiana.

The nationwide totals of accident fatalities from various anthropogenic and natural hazards are listed in table B-25 to provide a relative measure of industry-wide safety of natural gas transmission pipelines. Direct comparisons between accident categories should be made cautiously, however, because individual exposures to hazards are not uniform among all categories. The data nonetheless indicate a low risk of death due to incidents involving natural gas transmission pipelines compared to other hazard categories. Furthermore, the fatality rate associated with natural gas distribution lines is much lower than the fatalities from natural hazards such as lightning, tornadoes, or floods.

Table B-25
Nationwide Accidental Deaths[a]

Type of Accident	Annual No. of Deaths
All accidents	123,706
Motor vehicle	456,844
Poisoning	29,846
Falls	22,631
Injury at work	4,551
Drowning	3,443
Fire, smoke inhalation, burns	3,286
Floods	56
Lightning	34
Tornadoes[b]	74
Natural gas distribution pipelines[c]	14
Natural gas transmission pipelines[c]	2

[a] All data, unless otherwise noted, reflect 2007 or 2009 statistics from the U.S. Census Bureau 2012.

[b] Data are sourced from National Oceanic and Atmospheric Administration 2015.

[c] Data are sourced from PHMSA 2016b.

The available data show that natural gas transmission pipelines continue to be a safe, reliable means of energy transportation. From 1996 to 2015, there were an average

of 66 significant incidents, 9 injuries, and 2 fatalities per year (PHMSA 2016b). The operation of the Project would represent a slight increase in risk to the nearby public; however, the number of significant incidents over more than 301,000 miles of natural gas transmission lines indicates that the risk is low for an incident at any given location.

10. Cumulative Impacts

The eastern United States has been affected by human activity for over 15,000 years beginning with indigenous peoples who lived in large settlements and associated satellite villages. Today about 19.7 million people reside in New York. This includes over 0.8 million people that live in the four counties where the Eastern System Upgrade Project would be constructed (U.S. Census Bureau 2016a).

In accordance with NEPA and FERC policy, we evaluated the potential for cumulative impacts of the Project on the environment. Cumulative impacts are considered as impacts on the environment that result from the incremental effects of the Project when added to other past, present, or reasonably foreseeable future actions, regardless of the agency or party undertaking such actions. Cumulative effects generally refer to impacts that are additive or synergistic in nature and result from the construction of multiple projects in the same vicinity and time frame. Cumulative impacts can result from individually minor, but collectively significant actions, taking place over a period of time. In general, small-scale projects with minimal impacts of short duration do not significantly contribute to cumulative impacts.

The Project's cumulative impact analysis generally follows the methodology set forth in relevant guidance (CEQ 2005, EPA 1999). Under these guidelines, inclusion of other projects in the analysis is based on identification of impacts on environmental resources from other projects that would directly or indirectly result in similar effects as the Project. The cumulative impacts analysis includes those past, present, and reasonably foreseeable projects meeting the following three criteria:

- impact a resource area potentially affected by the Project;
- cause this impact within all, or part of, the Project area; and
- cause this impact within all, or part of, the timespan for the potential impact for the Project.

Construction and operation of the Eastern System Upgrade Project would affect a confined corridor in Orange County, New York, as well as discrete areas within Delaware, Sullivan, Orange and Rockland Counties, New York. In this cumulative impact analysis we considered past, present, or reasonably foreseeable actions expected to affect similar resources during similar timeframes with the Project. Information on past, present, and relatively foreseeable future projects were identified through

Millennium's consultation with local authorities and through our own research. A geographic scope was identified for each specific environmental resource that would be affected by the Project.

Millennium consulted public sources to obtain information on planned future developments. To date, no planned commercial or other developments have been identified that may be located within 0.25 mile of the Project facilities; however, we received comments from Ozdan Development, LLC and Amytra Development, LLC regarding future residential developments that would be located on lands adjacent to and bordering Millennium's existing pipeline and the proposed Highland Compressor Station (see section B.5.2). While specific details on the configuration and timing of these developments are not known, based on their proximity to the proposed Highland Compressor Station, we analyze potential cumulative impacts associated with the general development of these projects.

Potential cumulative impacts associated with recently completed, current, proposed, or reasonably foreseeable future actions within the Project area are described in table B-26. This area accounts for the largest extent defined by the resource specific geographic scopes, specifically the sub-watersheds (HUC-12) crossed by the Project. The geographic scope for each resource is described in the resource-specific assessments, below. The projects identified include 14 energy projects, including the non-jurisdictional project associated with the Eastern System Upgrade Project (see section A.8), and 1 major transportation projects. In addition, future developments by Ozdan Development, LLC and Amytra Development, LLC would be located in the vicinity of the Highland Compressor Station. Millennium identified additional transportation projects, as well as other small projects including: 15 minor roadway reconstruction projects, 9 water and sewer projects, 16 residential projects, 8 recreation projects, 17 commercial projects, 2 restoration/mitigation projects, 1 drainage restoration project, and 1 retaining wall replacement project that are not included in table B-26. None of these projects would be crossed by or are immediately adjacent to the Eastern System Upgrade Project, and most were identified as being in proximity to the Ramapo Meter Station. We feel these types of projects are typical of ongoing urban development, would have minimal impacts of short duration, and may result in positive (e.g., tax revenue, employment) or negative (e.g., traffic) socioeconomic effects that do not require further assessment. Also not included in table B-26 but discussed in section B.1.1, is one reclaimed aboveground sand and gravel mining operation in proximity to the Eastern System Upgrade Project.

Table B-26
Existing or Proposed Projects with Potential Cumulative Impacts in the Region of Influence

Project and Proponent	Status	Potential Impact Area	Closest Known Distance to Project	Description	Sources
Energy and Pipeline Projects[a]					
Minisink Compressor Station (Millennium)	Existing	10.6 acres	0.5 mile	A natural gas compressor station including two 6,130 hp gas compressor units. Construction was completed in 2013 (Docket No. CP11-515-000).	Millennium 2016; FERC 2012
Hancock Compressor Station (Millennium)	Existing	76 acres	0.0 mile	A natural gas compressor station including one 15,900 hp gas compressor unit. Construction was completed in 2014 (Docket No. CP13-14-000).	FERC 2013
Valley Lateral Project (Millennium)	Current	117.1 acres	0.0 mile	7.8-mile-long, 16-inch-diamter pipeline with one delivery meter station, one launcher facility, and one receiver facility (Docket No. CP16-17-000).	Millennium 2016; FERC 2016
Northeast Energy Direct Pipeline Project (Tennessee Gas Pipeline Company)	Suspended	4,398.07 acres	22 miles	PA to Wright Pipeline segment Broome, Chenango, Delaware and Schoharie Counties, new compression and meter stations.	Millennium 2016, FERC 2015a
Constitution Pipeline Project (Constitution)	Current	1,871.5 acres (642.8 acres in Delaware County)	28 miles	124-mile-long natural gas pipeline in Susquehanna County, Pennsylvania and in Broome, Chenango, and Delaware Counties, and Schoharie counties, New York	Millennium 2016
Access Northeast Project (Algonquin)	Current	1.24 miles	0.0 mile	Hanover 42-inch-diameter Take-up and Relay (Ramapo, Rockland County) 1.24 miles removal and replacement of 26-inch pipeline with 42-inch-diamter pipeline upstream of existing Ramapo Meter Station. Additional regulation at the existing Ramapo Meter Station. (Docket No. PF16-1-000).	Millennium 2016

Table B-26 (continued)
Existing or Proposed Projects with Potential Cumulative Impacts in the Region of Influence

Project and Proponent	Status	Potential Impact Area	Closest Known Distance to Project	Description	Sources
Algonquin Incremental Market Project (Algonquin)	Existing	575.6 acres (105.6 in Rockland County)	4.7 miles	Construction of approximately 20.1 miles of 42-inch-diameter pipeline in Connecticut and New York; additional pipeline in Connecticut and Massachusetts; Six new compressor units at 5 existing compressor stations in New York, Connecticut, and Rhode Island; modification to an existing Compressor Station in Connecticut; Construction of one new meter station in Connecticut and two new meter stations in Massachusetts; modifications to existing meter stations in New York, Connecticut, and Massachusetts. In-service October 2016 (Docket No. CP14-96-000).	Millennium 2016; FERC 2015b
East Side Expansion Project (Columbia)	Current	248.9 acres (0.8 acre in Orange County)	7.5 miles	Modification to a meter station in Orange County, New York associated with construction of 19.1 miles of 20- and 26-inch-diameter pipeline loop to provide 312,000 Dth/d of natural gas transportation capacity. In-service October 2015 (Docket No. CP14-17-000).	Millennium 2016, FERC 2014
President Container	Existing	Unknown	5.5 miles	Construction of a solar electric generator plant at an existing facility.	Millennium 2016
Edic to Fraser Project (New York Transmission)	Proposed	Unknown	25.7 miles	New 345 kilovolt electric transmission line.	Millennium 2016
Oakdale to Fraser Project (NextEra Energy Transmission New York, Inc.)	Proposed	57 miles	26.7 miles	New 345 kilovolt electric transmission line.	Millennium 2016

Table B-26 (continued)
Existing or Proposed Projects with Potential Cumulative Impacts in the Region of Influence

Project and Proponent	Status	Potential Impact Area	Closest Known Distance to Project	Description	Sources
CPV Valley to Rock Tavern (Boundless Energy NE, LLC)	Proposed	29 miles	7 miles	Electric transmission replacement project. Replacing 29 miles of conductors with new technology, and adding underground transmission under the Hudson River.	Millennium 2016
CPV Valley Energy Center	Existing	35 acres	6.6 miles	Construction of a new 650 megawatt natural gas combined cycle power generation facility and associated electrical interconnect right-of-way. Construction commenced in August 2015.	Millennium 2016, FERC 2016
Non-Jurisdictional Projects					
Overhead Electric Transmission (New York State Electric and Gas Corporation)	Proposed	1.5 miles	0.0 mile	Construction of an overhead medium or high voltage electric transmission line along Route 15/22 to power Millennium's proposed Highland Compressor Station.	Millennium 2016
Modifications of Existing Transformers (New York State Electric and Gas Corporation)	Proposed	Unknown	0.0 mile	Minor upgrades to an existing transformer at the Hancock Compressor Station and relocation or replacement of an existing transformer at the Ramapo Meter Station.	Millennium 2016
Infrastructure Projects[b]					
US 17 Transportation Corridor Study (NYSDOT)	Proposed	Unknown	11.0 miles	Corridor study completed in 2013; road improvements to be considered as funding is available.	Millennium 2016

[a] Projects identified by Millennium (Millennium 2016) that include renewable of existing permits were not included in the cumulative impacts assessment, such as Alliance Energy's Shoemaker and Hillburn Gas Turbine Facilities.

[b] Projects identified by Millennium (Millennium 2016) that include renovation or replacement of existing infrastructure and no new ground disturbance were not included in the cumulative impacts assessment, such as the NYSDOT reconstruction projects.

Potential impacts most likely to be cumulative with the Project's impacts are related to geology and soils, water resources and wetlands, vegetation and wildlife (including federally and state listed endangered and threatened species), land use and visual resources, air quality, and noise. The proposed pipeline facilities could contribute to these cumulative impacts; however, Millennium would minimize adverse Project impacts by implementing mitigation measures identified in section B of this EA, and has collocated the Huguenot Loop with its existing right-of-way.

10.1 Geology and Soils

The Project occurs within a region of relatively low historical earthquake activity and in an area of low, rolling topography with a low to moderate susceptibility and incidence of landslides, soil liquefaction, and land subsidence hazards. Because direct effects of geologic hazards would be highly localized and limited primarily to the period of construction, cumulative impacts from geologic hazard impacts would only occur if other projects are constructed at the same time and place as the proposed facilities. Therefore, the geographic scope for cumulative impacts on geology and soils is the construction footprint of the Project. The Project, in addition to other projects within the geographic scope of the cumulative impact assessment, may have cumulative impacts on geology since projects may be subject to natural geological hazards and soil resources resulting in soil erosion and compaction.

Five projects identified in table B-26 fall within the area of geographic scope for geology and soils, including: Millennium's existing Hancock Compressor Station, the Valley Lateral Project (Docket No. CP16-17-000), the East Side Expansion Project (Docket No. CP14-17-000), Algonquin's Access Northeast Project (Docket No. PF16-1-000), and the non-jurisdictional electric transmission line expansion. Each of these projects would overlap with portions of the Project. As discussed, the geologic setting of the Project poses minimal geologic hazards. In addition, applicants for the other FERC permitted projects would employ best management practices to limit effects on soils, and would implement NYSDAM guidelines for agricultural soil removal and restoration during construction the respective projects. Permanent impacts would occur where soils are encumbered by the applicants' aboveground facilities.

While the construction footprints for projects would overlap, only Algonquin's Access Northeast Project and the non-jurisdictional electric transmission line expansion would be constructed at the same time as the Project. Algonquin and Millennium would implement measures in the FERC Plan, to minimize impacts associated with the projects. Further, these applicants would minimize incremental impacts on soils through implementation of the respective ECS; soil impacts would be short term as revegetation would occur quickly. Therefore, we conclude that cumulative impacts on geology and soils from the Project in consideration with other projects would be minor.

10.2 Water Resources and Wetlands

Because impacts on surface waters and wetlands can result in downstream contamination or turbidity, the geographic scope for assessing cumulative impacts on water resources and wetlands includes each HUC-12 subwatershed crossed by the Project. HUCs define the source area that contributes surface water to a specified outlet point, and are delineated based on surface water flow along natural topographic and hydrologic breaks. HUC-12 subwatersheds typically define the drainage area upstream of tributaries to major rivers, and range from 10,000 to 40,000 acres in size. The Project would cross seven subwatersheds: Pea Brook-Delaware River, Halfway Brook, Lower Neversink River, Rutgers Creek, Headwaters to Shawangunk Kill, Indigot Creek, and Mahwah River (see table B-4).

The Project, in addition to other projects within the geographic scope, may have cumulative impacts on water resources and wetlands including changes in groundwater recharge; impacts on surface and groundwater quality; sedimentation and increased turbidity due to erosion or construction within surface waters; and temporary and permanent impacts on wetlands. Construction of the Project would result in temporary and minor impacts on groundwater, surface water resources, and PEM wetlands. Impacts on PFO wetlands would be long-term within the temporary construction right-of-way. Permanent impacts on PFO wetlands would include conversion to PEM and PSS wetlands within the maintained portion of the permanent right-of-way (a 10-foot-wide maintenance corridor centered over the pipeline), and a minor loss of PFO wetlands associated with the access road proposed for the Highland Compressor Station.

Many of the projects identified in table B-26, and the Ozdan and Amytra Developments, are within the same subwatersheds that would be crossed by the Eastern System Upgrade Project, including the Valley Lateral Project, East Side Expansion Project, Access Northeast Project. Some of these projects would result in direct and indirect impacts on wetlands and waterbodies during construction and operation. Therefore, the Project, when considered with other projects in the vicinity, would result in cumulative impacts on water resources and wetlands. However, impacts on surface waters associated with the Project would be temporary, including sedimentation from construction areas. Similarly, while the Eastern System Upgrade Project would result in temporary impacts on three PEM wetlands that would also be affected by construction of the Valley Lateral Project, these wetlands would be restored such that no permanent impacts would occur.

Because the Project and other projects would be required to comply with any mitigation requirements and permit conditions in their CWA Section 404 and state wetland permits for any permanent wetland impacts, and the incremental impacts of the Project would be temporary and minor, we conclude that cumulative impacts would not be significant.

10.3 Vegetation and Wildlife

Cumulative effects on vegetation and wildlife, including threatened and endangered species, affected by the Project could occur in the HUC-12 watersheds crossed by the Project. Most of the projects in table B-26, and the Ozdan and Amytra Developments, are within the HUC-12 watersheds crossed by the Project. Eleven of these projects (including the two residential developments) could be under construction at the same time as the Eastern System Upgrade Project, based on available information regarding construction timeframes. Many of the commercial developments and infrastructure projects are in areas of developed land and would not affect natural vegetation communities or wildlife habitat. However, the Valley Lateral Project would result in combined temporary and permanent impacts on open and agricultural land (71.3 acres), forested land (24.8 acres), open land (7.1 acres), and wetland (1.9 acres) areas. A portion of this land would also be used during construction of the Project; however together, the Project and the Valley Lateral Project would affect a total of about 249.5 acres of vegetation during construction and 91.3 acres during operation.

Residential subdivisions would result in some loss of vegetative cover from the addition of impervious surfaces (e.g., building footprint, driveways, sidewalks). Since the details of the Ozdan and Amytra developments are not known, we are unable to determine the amount of vegetation that would be lost. However, cumulative impacts on vegetation resulting from these types of projects are generally expected to be minor, considering the limited area impacted within the HUC-12 watersheds crossed by the Project. For aesthetic reasons, residential areas outside of impervious surfaces would be restored following its construction.

Cumulative impacts, such as those on vegetative cover types and wildlife habitat, are additive. Many wildlife species depend on mature contiguous tracts of forest to sustain their migratory and reproduction cycles. These species include songbirds and terrestrial mammals that require large tracts of forest to support their home ranges. Similar habitats are adjacent to and near construction activities that are expected to be sufficient to support wildlife displaced during construction. Millennium would minimize impacts on vegetation and wildlife habitat by collocating the Project with existing right-of-way where practicable and by implementing the measures in its ECS.

Cumulative impacts on federally and state listed threatened and endangered species and federal species of concern could occur if other projects were to affect the same habitats as the Project. However, the ESA consultation process includes a consideration of the current status of affected species and cumulative impacts would be minimized. We conclude that the cumulative impacts on vegetation and wildlife resources, including threatened and endangered species, would not be significant based on the addition of the Project's impacts on these resources.

10.4 Land Use and Visual Resources

The Project could contribute to cumulative impacts on land use with other projects within 1 mile to encompass any large areas with specialized or recreational uses, as well as potential visual impacts. Of the projects identified in table B-26 above, eight are within this 1 mile area, as well as the Ozdan and Amytra developments. The construction and operation of the Project and other projects could result in temporary and permanent cumulative impacts on land use. While many of the impacts of the Project would be temporary, construction of the proposed facilities would result in some permanent land use changes, including forest conversion to maintained rights-of-way and conversion of agricultural land and upland forest for aboveground facilities and access roads to developed, industrial land.

Millennium would minimize impacts on land use by implementing its ECS, which includes provisions from the NYSDAM pipeline construction guidance document and our Plan and Procedures, and by collocating with existing right-of-way where practicable to minimize forest fragmentation and reduce the visual impacts associated with a new corridor. The Huguenot Loop alignment is not proposed to be collocated with the existing mainline along the HDD crossing of the Neversink River (MP 0.2 to 1.1). HDD construction is discussed in section A.8.2. However, we recognize that collocation with existing utility corridors may, in some cases, also have negative consequences to particular tracts such as small privately held properties. Although collocation may reduce cumulative impacts overall, the cumulative impacts of two or more rights-of-way at individual properties or managed sites may be magnified.

As discussed in section B.10.3, several commercial developments and infrastructure projects within the area of geographic scope are located in areas of developed land and would not likely result in noticeable changes in land use. The Valley Lateral, East Side Expansion, Access Northeast projects, as well as the non-jurisdictional facilities, and the Ozdan and Amytra developments would result in the conversion of open, agricultural, and forested land to developed land. However, most of the land use impacts associated with these projects would be temporary and most land would revert to its prior uses following construction. Alternatively, according to the town of Highland's Deputy Supervisor, the planned Ozdan development would include construction of a golf course. Depending on the specific configuration of the golf course and existing land use types, portions or all of these lands would be permanently converted to open land.

The only project listed in table B-26 above that appears to cross the same recreation areas (Kakiat County Park) as the Project is the Access Northeast Project. While this project is currently on hold, the draft resource reports filed with FERC in December of 2015 state that activities near the park would be associated with pipeline removal and replacement within an existing right-of-way and the addition of regulation at the existing Ramapo Station. As discussed in section B.5.2, Millennium's expansion of the Ramapo Meter Station is proposed to occur on 0.9 acre of land currently part of the

Kakiat County Park. However, the terrain and forested land at this site would minimize the visibility of construction and operation of the projects for park users, as well as mitigate dust and noise from construction. Overall the collective impacts from these projects on the 376-acre park are expected to be limited to a few acres. Therefore, we conclude that cumulative impacts would not be significant.

Visual resources are a function of geology, climate, and historical processes, and include topographic relief, vegetation, water, wildlife, land use, and human uses and development. Temporary visual impacts would be evident during Project construction due to clearing, grading, and the presence of construction equipment and personnel. Much of the construction workspace along the Huguenot Loop that would be disturbed by the Project would be within or adjacent to existing right-of-way (88 percent), consisting of Millennium's pipeline right-of-way and public roadways. Further, the modifications to Millennium's existing facilities would be constructed within or adjacent to the existing facility boundaries. As a result, the visual resources along the majority of the Project have been previously affected by pipeline or other operations. Alternatively, the newly proposed compressor station would be built on land that does not have existing infrastructure, however, Millennium has designed the facility to be located toward the back of the parcel, thereby minimizing visibility of construction activities and the new facility.

Of the projects listed in table B-26 above, the Valley Lateral, East Side Expansion, Access Northeast, as well as the Ozdan and Amytra residential development projects would have the greatest impact on visual resources in the Project area. The majority of Millennium's and Algonquin's projects would be buried and Columbia's project would be constructed at an existing aboveground facility, the Wagoner Meter Station. These projects would add incrementally to visual impacts in the Project area, but overall the contribution would be relatively minor given the majority of the facilities would be buried (i.e., pipeline) or adjacent to existing facilities, in industrial settings. Most of the area disturbed during construction of the projects would be restored, including revegetation where appropriate, which would limit permanent visual impacts to forested land that would not be allowed to reestablish within pipeline rights-of-way or within the fence line of an aboveground facility. Residential projects would generally occur over a short construction period and these developers could configure the projects such that the existing natural buffers (trees and/or hills) would mitigate visual impacts on future residents. Minor long-term and permanent cumulative impacts on visual resources could result from the clearing of forested land for construction and maintenance of the permanent right-of-way for the proposed Eastern System Upgrade Project and other projects. However, we conclude these impacts would not be significant.

10.5 Air Quality

Construction of the Project and other projects were considered for cumulative impacts on air quality if they occur within 0.25 mile of the pipeline and aboveground

facilities, because construction emissions are highly localized. Operation of the Project and other projects were considered for cumulative impacts on air quality if they occurred within 50 kilometers (31 miles) of the Eastern System Upgrade Project.

Air emissions from projects in the vicinity of the Project would be additive. Each project listed in table B-26 above would be required to meet applicable state and federal air quality standards to avoid significant impacts on air quality. Construction of Algonquin's Access Northeast Project was anticipated to begin early in 2018, and is anticipated to be completed in time for a November 2018 in-service date; however, that project is currently on hold and it is possible that construction of the Access Northeast Project would be delayed. Cumulative construction emissions from the Access Northeast Project and concurrent construction of the Ramapo Meter Station in Rockland County, New York would not be expected to result in an exceedance of applicable general conformity thresholds; table B-15, in section 8.1, shows the construction emissions anticipated for the Ramapo Meter Station compared with applicable general conformity thresholds. If the residential developments were constructed at the same time as the proposed Highland Compressor Station, the combined construction vehicles and equipment would result in temporary, localized emissions that would last for the duration of the construction period but not be expected to result in an exceedance of applicable general conformity thresholds. As discussed in section B.8.1, impacts from construction and operation of the Eastern System Upgrade Project would not result in any violation of applicable ambient air quality standards, and impacts from construction would be temporary. Any potential cumulative impacts from construction would be limited to the duration of the construction period, and would be temporary and minor.

Construction of the CPV Valley Energy Center began in August 2015, and is anticipated to be completed in December 2017. In addition, the Valley Lateral Project is expected to be under construction in 2017. Although cumulative emissions are not subject to General Conformity, the cumulative construction emissions from the CPV Valley Energy Center, Valley Lateral Project, and concurrent construction of the Eastern System Upgrade Project in Orange County, New York would be below the applicable general conformity thresholds, as shown in table B-27. Concurrent construction of these projects would occur during 2017; construction of the Valley Lateral Project and CPV Valley Energy Center is anticipated to be complete in 2017. As discussed in section B.8.1, impacts from construction and operation of the Eastern System Upgrade Project would not result in an exceedance of applicable general conformity thresholds. The Project would not result in any violation of applicable ambient air quality standards, and impacts from construction would be temporary. Any potential cumulative impacts from construction would be limited to the duration of the construction period, and would be temporary and minor.

Table B-27
Summary of Estimated Emissions from Construction of the Eastern System Upgrade Project, Valley Lateral Project, and CPV Valley Energy Center in Orange County, New York

Source	NO_X	CO	SO_2	VOC	PM_{10}	$PM_{2.5}$
			2017 Construction Emissions			
Eastern System Upgrade Project	12.46	11.57	0.02	1.24	14.24	2.12
Valley Lateral Project	12.72	6.48	0.03	1.36	49.65	7.31
CPV Valley Energy Center	16.71	101.11	0.05	3.06	13.92	2.17
Total	41.89	119.16	0.1	5.66	29.08	5.2
General Conformity Threshold [a]	**N/A**	**N/A**	**N/A**	**N/A**	**N/A**	**100**

[a] General Conformity is only applicable to nonattainment or maintenance areas and does not apply to cumulative projects. Thresholds for each pollutant are based on the severity of the nonattainment areas or maintenance area where the Project is located and are presented for a frame of reference. N/A = not applicable.

During operation, emissions from the Highland and Hancock Compressor Stations and Ramapo Meter Station would contribute to ongoing air emissions throughout the life of the Project. Project emissions during operation would not contribute to a violation of the NAAQS. Cumulative impacts from combustion emissions could occur where modification of the Stony Point Compressor Station would result in operational emissions in the vicinity of the Ramapo Meter Station in Rockland County, New York. Due to the location of Algonquin's existing Stony Point Compressor Station within a designated moderate nonattainment area for ozone, it is subject to non-attainment NSR regulations for emissions of NO_X and VOCs and is required to demonstrate compliance with the NAAQS. Other projects would also contribute ongoing, operational emissions of air pollutants; however, each of the projects identified in table B-26 above would be required to meet all applicable federal and state air quality standards that are designed to avoid significant impacts on air quality. Therefore, we conclude that the Project would not result in significant cumulative impacts on regional air quality.

Operation of the non-jurisdictional CPV Valley Energy Center would impact regional air quality. The CPV Valley Energy Center has been issued the following air quality permits required for its operation: NYSDEC Air State Facility Permit and Title IV (Phase II Acid Rain) Permit. During operation, emissions from the Valley Lateral Project and Eastern System Upgrade Project in Orange County, New York would be limited to fugitive emissions of CO_2e and VOCs.

10.6 Noise

The analysis in section B.8.2 quantifies future sound levels, which include Project-related and ambient sound levels. Sound level impacts were analyzed by looking at NSAs nearest to the proposed Highland Compressor Station, existing Hancock Compressor Station, Huguenot and Ramapo Meter Stations, and HDD sites. Sound level impacts during construction would be highly localized and attenuate quickly as the distance from the sound source increases, except at HDD construction locations. The one exception to this would be certain HDD activities at the crossings of the Neversink River, Interstate 84, and Mountain Road/Bedell Drive. Millennium would implement mitigation where necessary to reduce the predicted noise generated by the HDD operations below the FERC noise level guideline (of 55 dBA L_{dn}) at the nearest NSAs. The Eastern System Upgrade Project, together with the other projects listed in table B-26, would all produce sound during construction; however, this sound would be temporary in the vicinity of each of the proposed projects.

Concurrent construction and operation of the Project and other projects in the vicinity of the same NSA could result in cumulative sound level impacts. Construction of the pipeline facilities associated with Algonquin's Access Northeast Project and the two residential development projects that are within the area of geographic scope for noise could have construction phases that are concurrent with the Eastern System Upgrade Project. Millennium's existing compressor and meter stations (Hancock, Huguenot, Westtown, and Ramapo) would also be operating at the same time as construction of Algonquin's project. Millennium's sound level assessment for the Project included background noise and operational noise associated with the existing facilities. While the sound level increase associated with the construction or modification of aboveground facilities and operation of these facilities would generate perceptible sound level changes, the mitigation measures discussed in section B.8.2 and committed to by Millennium would ensure that the FERC noise criterion of 55 dBA would not be exceeded. We anticipate that the Access Northeast Project would result in sound level impacts similar to the Eastern System Upgrade Project during construction, and Algonquin would be required, like Millennium is for this Project, to propose and apply appropriate mitigation for construction activities occurring at the station site to ensure that the total noise from the construction is below the 55 dBA L_{dn}. Following construction Algonquin's facilities (i.e., pipeline) would be buried. Overlapping construction of the Ozdan and Amytra Developments and construction and/or operation of the proposed Highland Compressor Station could result in noise disturbances on nearby receptors. Cumulative impacts would be greatest where construction equipment for each project are in close proximity to generate an increase in perceptible noise but would be temporary and localized. For these reasons, we do not anticipate significant noise impacts associated with construction and operation of the Eastern System Upgrade Project, when considered together with the other projects.

10.7 Climate Change

Climate change is the change in climate over time, whether due to natural variability or as a result of human activity, and cannot be represented by single annual events or individual anomalies. For example, a single large flood event or particularly hot summer are not indications of climate change, while a series of floods or warm years that statistically change the average precipitation or temperature over years or decades may indicate climate change.

The Intergovernmental Panel on Climate Change (IPCC) is the leading international, multi-governmental scientific body for the assessment of climate change. The United States is a member of the IPCC and participates in the IPCC working groups to develop reports. The leading scientific body in the United States on climate change is the U.S. Global Change Research Program (USGCRP). Thirteen federal departments and agencies participate in the USGCRP, which began as a presidential initiative in 1989 and was mandated by Congress in the Global Change Research Act of 1990. The IPCC and USGCRP have recognized that:

- globally, GHGs have been accumulating in the atmosphere since the beginning of the industrial era (circa 1750);
- combustion of fossil fuels (coal, petroleum, and natural gas), combined with agriculture and clearing of forests is primarily responsible for this accumulation of GHG;
- these anthropogenic GHG emissions are the primary contributing factor to climate change; and
- impacts extend beyond atmospheric climate change alone, and include changes to water resources, transportation, agriculture, ecosystems, and human health.

In May 2014, the USGCRP issued a report, *Climate Change Impacts in the United States*, summarizing the impacts that climate change has already had on the United States and what projected impacts climate change may have in the future (USGCRP 2014). The report includes a breakdown of overall impacts by resource and impacts described for various regions of the United States. Although climate change is a global concern, for this cumulative analysis, we focus on the potential cumulative impacts of climate change in the Project area. The USGCRP's report notes the following observations of environmental impacts that may be attributed to climate change in the Northeast region:

- average temperatures have risen about 2 degrees Fahrenheit between 1895 and 2011 and are projected to increase another 1 to 8 degrees Fahrenheit over the next several decades with more frequent days above 90 degrees Fahrenheit;

- areas that currently experience ozone pollution problems are projected to experience an increase in the number of days that fail to meet the federal air quality standards;

- an increase in health risks and costs for vulnerable populations due to projected additional heat stress and poor air quality;

- precipitation has increased by about 5 inches and winter precipitation is projected to increase 5 to 20 percent by the end of the century;

- extreme/heavy precipitation events have increased more than 70 percent between 1958 and 2010 and are projected to continue to increase;

- sea levels have risen about 1 foot since 1900 and are projected to continue increasing 1 to 4 feet by 2100 stressing infrastructure (e.g., communications, energy, transportation, water, and wastewater);

- severe flooding due to sea-level rise and heavy downpours is likely to occur more frequently;

- crop damage from intense precipitation events, delays in crop plantings and harvest, and heat stress negatively affect crop yields;

- invasive weeds are projected to become more aggressive due to their benefit of higher CO_2 levels;

- a change in range, elevation, and intra-annual life cycle events of vegetation and wildlife species; and

- an increase in carrier habitat and human exposure to vector-borne diseases (e.g., Lyme disease or West Nile virus).

Our analysis presents the direct and indirect GHG emissions associated with construction and operation of the projects and the potential impacts of GHG emissions in relation to climate change, to the extent practicable.

The GHG emissions associated with construction and operation of the Eastern System Upgrade Project are discussed in section B.8.1. While upstream and downstream emissions are not causally connected to the Project, we recognize the availability of a reasonable, EPA-developed methodology to estimate the downstream GHG emissions from a project, assuming all of the gas to be transported is eventually combusted. As such, we estimated the GHG emissions from the end-use combustion of the natural gas to be transported by the Project. The Project can deliver up to 223,000 Dth/d of new volumes, which can produce 4.3 million metric tons of CO_2 per year from end-use

combustion. However, this value may represent a significant overestimation of emissions because it assumes the total maximum capacity is transported 365 days per year. Many projects in front of the Commission are designed for peak use. As such, it is unlikely that this total amount of GHG emissions would occur. Currently, there is no scientifically-accepted methodology available to correlate specific amounts of GHG emissions to discrete changes in average temperature rise, annual precipitation fluctuations, surface water temperature changes, or other physical effects on the environment in the Northeast region. However, contributions to GHG emissions globally results in the climate impacts discussed above for the Northeast region.

As discussed above, we have disclosed the potential GHG emissions from the Project, mitigation measures to minimize GHG emissions, and climate change impacts in the Northeast region associated with global GHG emissions. Additionally, burning natural gas emits less CO_2 compared to other fuel sources (e.g., fuel, oil, or coal). Therefore, we find that GHG emissions have been sufficiently minimized.

10.8 Conclusions on Cumulative Impacts

We conclude that impacts associated with the Eastern System Upgrade Project would be relatively minor, and we are recommending additional measures to further reduce the environmental impacts associated with the Project. We anticipate that the Project would contribute to a negligible to minor cumulative impact when the effects of the Project are added to past, present, and reasonably foreseeable projects in the region of influence and would not be significant.

C. ALTERNATIVES

In accordance with NEPA and FERC policy, we evaluated alternatives to the Project to determine whether they would be reasonable and environmentally preferable to the proposed action. These alternatives included the no action alternative, system alternatives, major pipeline route alternatives, minor route variations, and aboveground facility alternative sites. The evaluation criteria used for developing and reviewing alternatives were:

- ability to meet the Project's stated objective;
- technical and economic feasibility and practicality; and
- significant environmental advantage over the proposed action.

With regard to the first criteria and for the purposes of NEPA, the applicant's stated objectives for the Project is to provide 223,000 Dth/d of firm natural gas transportation capacity from Millennium's Corning Compressor Station to an existing interconnect with Algonquin in Ramapo, New York. Millennium states that the Project facilities would also ensure that current customer demand along Millennium's system is met during the summer months and that current deliveries to interconnecting pipelines continue.

It is important to note that not all conceivable alternatives are technically feasible or practical. Some alternatives may be limited by the extent of existing technologies or by system capacities, while others may not be practical because sites are unavailable or cannot be developed for the proposed use. Also it is important to consider the environmental advantages and disadvantages of the proposed action, as some alternatives may reduce impacts on resources that are not relevant to the analysis, while others may reduce impacts on one resource but increase impacts on others.

Our analysis that follows is based on information used to evaluate alternatives to the Project including review of area maps, comments and suggestions from regulatory agencies, comments from the public, data provided by Millennium in its application, and our independent research. Unless otherwise noted, we used the same desktop sources of information to standardize comparisons between the Project and corresponding alternative. Therefore, data presented in our analysis may differ from that presented elsewhere in this environmental assessment, which included Project-specific data collected during field surveys and based on engineer drawings.

In addition to these adopted route variations, minor alignment shifts may be required prior to and during construction to accommodate currently unforeseeable site-specific constraints related to engineering, landowner, and environmental concerns. All

such alignment shifts that occur outside of the permanent right-of-way would be subject to review and approval by the FERC.

1. No-Action Alternative

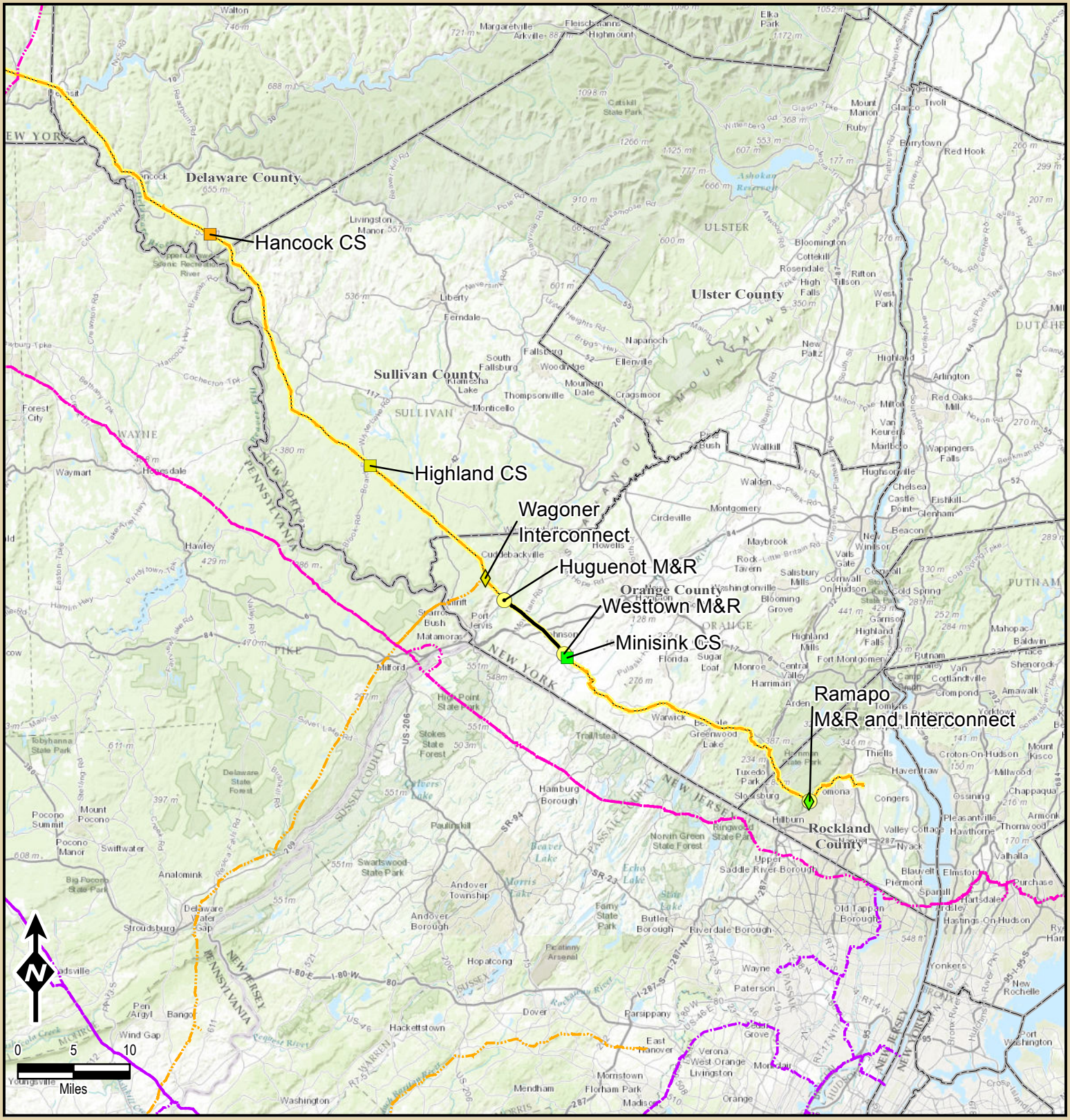
Under the no-action alternative, the Project would not be built so the environmental impacts identified in this EA would not occur. Other natural gas transmission companies could propose to construct similar facilities to supply Algonquin with additional natural gas. As discussed below, such actions could result in impacts similar to or greater than the Project, and might not meet the Project's purpose and need within the proposed time frames. Therefore, we have concluded that the no-action alternative would not satisfy the Project objectives.

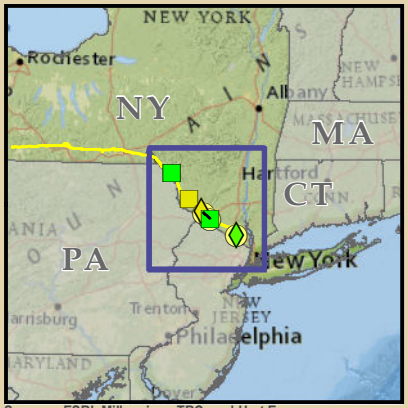
2. System Alternatives

System alternatives would use existing, modified, or proposed pipeline systems to meet the purpose and need of the Eastern System Upgrade Project. Although modifications or additions to existing or proposed pipeline systems may be required, implementation of a system alternative would deem it unnecessary to construct all or part of the Project. These modifications or additions could result in environmental impacts that are less than, similar to, or greater than those associated with construction and operation of the Project.

The purpose of identifying and evaluating system alternatives is to determine whether the environmental impacts associated with construction and operation of the Project could be avoided or reduced by using another pipeline system, while still meeting the objectives of the Project. The remainder of this section includes a discussion of the feasibility of using existing natural gas pipeline systems or looping alternatives to achieve the Project objectives.

We evaluated the use of four existing natural gas distribution pipeline systems in the proximity to Millennium's interconnection with the Algonquin System, including Millennium's existing mainline, that could serve as a system alternative to the Eastern System Upgrade Project. These existing systems and their relative proximity to Millennium's interconnection with the Algonquin System are depicted on figure 4.





- Existing CS (Modifications)
- Proposed CS
- Existing CS
- Existing Interconnect
- Interconnect (Modifications)
- Existing MS (Modifications)
- Proposed Loop
- Existing Transco Pipeline System
- Existing Tennessee Pipeline System
- Existing Columbia Pipeline System
- Existing Millennium Pipeline

Existing System Alternatives to the Eastern System Upgrade Project

Figure 4

Sources: ESRI, Millennium, TRC, and Hart Energy

Millennium evaluated the option of replacing its existing 24-inch-diameter mainline with a new 36-inch-diamater pipeline to accommodate the additional 233,000 Dth/d. This would require replacement of about 7.2 miles of pipe and a 125-foot-wide construction right-of-way, which would result in temporary impacts on about 109 acres. Additional impacts would occur from the need for access roads, contractor/pipe yards and storage areas, and additional temporary workspace to accommodate construction through sensitive resources, across roadways, and for topsoil segregation. While this system alternative would minimize the need for establishment of new, permanent right-of-way, it would require Millennium to take the existing system out of service for about three months, thus interrupting service for residences and businesses throughout the southern portion of New York State. Further, this option would still require additional compression similar to that of the Project.

About 5 miles south of the desired interconnect is an existing system that delivers natural gas to the northeast via an approximate 11,900-mile-long pipeline system operated by Tennessee Gas Pipeline Company (Tennessee), a subsidiary of Kinder Morgan (Kinder Morgan 2016). A second system operated by Columbia, a subsidiary of TransCanada Corporation, is located about 20 miles south of the desired interconnect. This 12,000-mile system delivers natural gas to the northeast, mid-Atlantic, and southern states. The third system is about 60 miles south of the desired interconnect. The 10,200-mile system is operated by Transcontinental Gas Pipeline Company (Transco), a subsidiary of William Companies, Inc. and delivers natural gas to the Atlantic Coast and southeast states.

Millennium stated that based on the current projects approved by FERC and recent applications filed by Tennessee, Columbia, and Transco with FERC, all three of these systems are operating at or near capacity. Consequently, for any of these systems to transport an additional 223,000 Dth/d, modifications such as adding new piping to reach the desired interconnect, as well as additional compression and other alterations to the systems would likely be required.

Each of the four existing systems would require upgrades or modifications that would result in similar or greater environmental impacts than those proposed for the Eastern System Upgrade Project. Therefore, we do not consider expansions of the existing Tennessee, Columbia, or Transco systems or replacement of Millennium's mainline to be reasonable alternatives that would provide a significant environmental advantage over the Project.

3. Major Route Alternatives

A route alternative deviates from a relatively large segment of a proposed pipeline alignment for a substantial length and distance in an effort to reduce overall environmental impacts. Route alternatives would involve construction of a new pipeline

route that interconnects with Millennium's mainline, but would ultimately interconnect with the Algonquin System.

Primary criteria in evaluating route alternatives included following existing rights-of-way wherever possible to minimize impacts, as well as avoiding impacts on residences, wetlands, forested land, known cultural sites, and other resources. Millennium designed the Huguenot Loop to be collocated with its mainline to the extent practicable, resulting in a nominal 12 percent of the proposed route being greenfield. The 0.9 mile that would not be collocated with the existing mainline would be to accommodate the HDD crossing of the Neversink River as identified in table A-4 in section A.6.1.

Based on the design of the proposed route, and its collocation with Millennium's existing right-of-way, no major route alternatives were identified by Millennium. Further, we received no comments regarding potential major pipeline route alternatives (see section A.4). Therefore, an analysis of major route alternatives was dismissed and not considered further.

4. Looping Only Alternative

A looping only alternative was evaluated that would eliminate the need for additional compression at the Hancock Compressor Station, as well as the new Highland Compressor Station. Based on hydraulic modeling, it was estimated that an additional 54.0 miles of pipeline looping facilities would be required to meet the needs of the Project without additional compression. This 61.8-mile-long alternative would include the 7.8-mile-long Huguenot Loop, as well as 30.9 miles and 23.1 miles of 36-inch-diameter loop upstream and downstream, respectively, of the Hancock Compressor Station.

While this alternative would be collocated along existing Millennium rights-of-way for about 98 percent of its length, it would be 54.0 miles longer than the proposed route, and would result in greater construction and operation impacts (see table C-1). Although impacts on specific resources are not quantified in table C-1, because the alternative route would be significantly longer than the Huguenot Loop it would result in greater impacts on wetlands and forested land than the Project route, and would likely be within 50 feet of many more residences. The Looping Only Alternative does not show a significant environmental advantage, and is not considered further.

Table C-1 Looping Only Alternative to the Eastern System Upgrade Project		
Resource	**Proposed Route**	**Looping Only Alternative**
Pipeline Facilities		
Pipeline length (miles)	7.8	61.8
Operation acres[a]	35.2	347.7
Construction acres[b]	82.1	903.9
Length of adjacent right-of-way (miles)	6.9	61.0
Aboveground Facilities		
Compression required (hp)	44,800	None
Construction acres	41.0	0.0
Operation acres	21.6	0.0

[a] Operation acres estimated based on an assumed 50-foot-wide easement.

[b] Construction acres estimated based on an assumed 125-foot-wide construction corridor for the alternative and the temporary workspace and permanent easements for the proposed route.

5. Minor Route Variations

Route variations are identified to reduce construction impacts on localized, specific resources such as waterbodies, wetlands, cultural resource sites, and residences; route variations are also identified to address landowner concerns. While route variations may be a few miles in length, most are relatively short and in close proximity to the proposed route. Route variations are identified in response to specific local concerns and may not always clearly display an environmental advantage other than to reduce impacts on a localized level. Table C-2 lists the two variations we have taken into consideration in our analysis, the associated segment along the proposed route that they would replace, and the rationale for the variation. Millennium worked with affected landowners during development of the application and during the pre-filing process, and incorporated three variations into the proposed pipeline route. These variations are included in the proposed route evaluated in section B of this EA.

Additionally, prior to filing its Application, Millennium had identified four staging areas to support construction of the Project. As a result of the completion of field surveys in April 2016, Millennium identified a sensitive resource within the staging area planned for use at MP 2.8. To avoid impacts on this resource, Millennium removed this staging area from the Project, and added Contractor/Pipe Yard 4 (about 0.7 miles northwest of MP 0.0) to accommodate construction needs for the Project.

Table C-2
Neversink River Route Variations

Resource	Proposed Route[a] (HDD)	Route Variation 1 (HDD)	Route Variation 2 (Conventional Bore)
Pipeline length (miles)	1.3	0.6	1.3
Operation acres[b]	4.5	0.6	6.8
Construction acres[c]	26.9	4.0	23.3
Length of adjacent right-of-way (miles)[d]	0.3	0.5	0.4
Number of roads crossed	3	1	3
Residential structures within 50 feet of the construction right-of-way[e]	3	2	4
NYSDEC Protected Stream Buffer impacted (construction/operation)	1.0/0.0	0.0/00	0.9/0.3
Number of forested wetlands crossed	1	1	1
Acres of forested wetland impacted (construction/operation)	0.0/0.0	0.3/.1	0.0/0.0
Acres of forested land impacted (construction/operation)	11.2/2.6	1.9/0.2	11.3/3.1
Acres of agricultural land impacted (construction/operation)	8.2/0.6	0.0/0.0	0.0/0.0
Number of waterbodies crossed	1	1	2
Number of public lands crossed and crossing length (miles)	2/1,680	0/0	1/2,438
Length of shallow depth to bedrock (miles)	0.3	<0.1	0.5

[a] The data provided for the proposed route is based on desktop data to allow for consistent comparison of data types between the proposed route and variations.

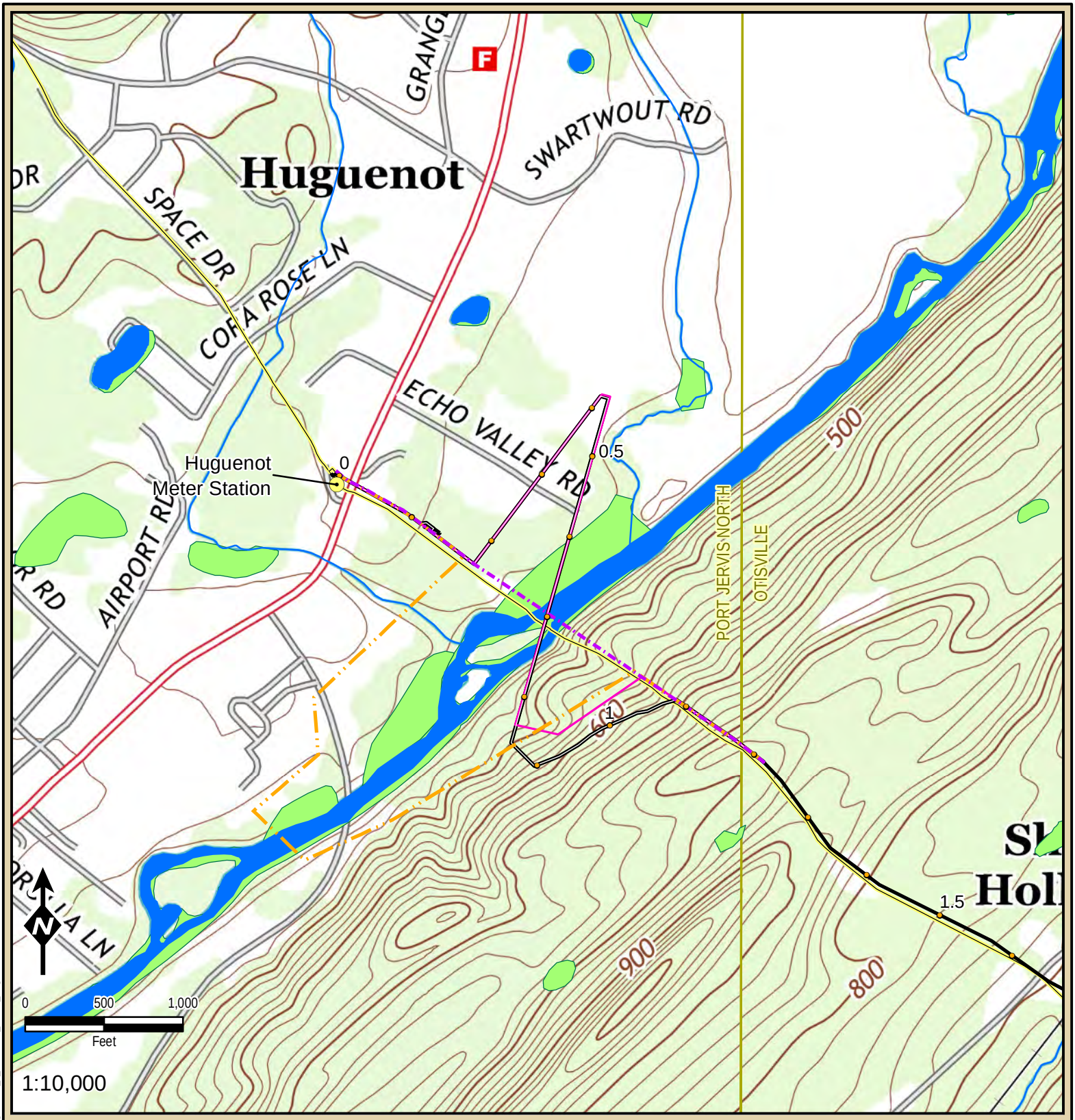
[b] Operation acres estimated based on an assumed 50-foot-wide easement.

[c] Construction acres estimated based on an assumed 75-foot-wide construction corridor and 100-foot-wide corridor in agricultural lands.

[d] Estimated from 2013 aerial photography, and utility and transportation layers. Based on an assumed 50-foot-wide permanent easement centered on the route.

[e] Estimated based on an assumed 110-foot-wide construction right-of-way centered on the Proposed Route and System Alternative lateral lines. Accessory structures such as sheds not included.

Route Variation 1, like the proposed route, would involve an HDD of the Neversink River, however it would be collocated with Millennium's mainline, allowing for a perpendicular crossing (see figure 5). This route variation would be about 0.6 mile shorter than the corresponding portion of the proposed route, thereby reducing construction and operational impacts by 22.9 and 3.9 acres, respectively. This route variation would be collocated for an additional 0.2 mile, would avoid impacts on two parks (see section B.5.3) and the NYSDEC Protected Stream Buffer. Route Variation 1 would also have less impacts on forested land, including forested wetlands, and prime farmland soils as compared to the proposed route (see table C-2).



- Existing Meter Station (Modifications)
- Milepost (0.1 mile)
- Route Variation 1
- Route Variation 2
- Route April 2016
- Preferred Route July 2016
- Proposed Loop
- Existing Millennium Pipeline
- US Topo 7.5 Minute Quadrangle
- NHD Stream
- NHD Waterbody
- NWI Wetland

Route Variations for the Neversink River Crossing

Figure 5

Sources: USGS National Map 2013 (accessed December 2015), ESRI, Millennium, and TRC

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However, the change in elevation between the entry and exit pits is about 375 feet, representing a 16.5 percent slope, which increases the potential for an inadvertent return of drilling fluids during construction. A release of these fluids into the waters of the Neversink River would impact water quality, which, depending on the severity of the release, could result in impacts on the dwarf wedgemussel. Therefore, we do not recommend incorporation of Route Variation 1 into the proposed route.

A conventional bore crossing of the river was also evaluated. The conventional bore, like HDD, is a trenchless crossing method; however, the crossing distance is generally limited to about 300 feet. As depicted in figure 5, Route Variation 2 would deviate from the proposed route near MP 0.1, taking a predominately southwest path for about 0.4 mile, crossing a horse farm before turning southeast for 0.1 mile to the crossing the river. This route variation would be less than 0.1 mile longer than the corresponding portion of the proposed route and would have slightly more collocation (less than 0.1 mile).

While the conventional bore method would result in a smaller construction footprint compared to the proposed route, permanent impacts would be greater, including impacts on NYSDEC Protected Stream Buffer and farmland soils. Also, while Route Variation 2 would only cross one park, the total crossing distance would be 758 feet longer than the proposed route's crossing of parks. Finally, this route variation would affect a forested wetland and a horse farm, both of which would be avoided by the proposed route. Therefore, we do not recommend incorporation of Route Variation 2 into the proposed route.

6. Aboveground Facility Alternatives

Millennium would construct one new compressor station (Highland), add compression at the existing Hancock Compressor Station, modify or upgrade three existing meter stations (Huguenot, Westtown, and Ramapo), modify an existing interconnect (Wagoner Interconnect), and install a new interconnect (Alternate Interconnect). Millennium owns the property where the proposed Highland Compressor Station would be located, as well as the existing facility sites. All updates or modifications would occur within or immediately adjacent to the existing sites. Therefore, our assessment of alternative sites was limited to the new compression facilities.

6.1 New Compressor Station Site Alternative

As part of the design process, Millennium preformed hydraulic modeling to identify the optimal location for a new compressor station with a goal of minimizing the amount of compression required for the Project and to maintain operational pressure on the system. The results of the hydraulic modeling identified the optimal placement of a new compressor station between MPs 134 and 136 of Millennium's mainline. Within

this area, we evaluated the proposed site and one alternative site: Compressor Station Alternative Site.

The Compressor Station Alternative Site would be located about 600 feet northwest of the proposed site on the west side Millennium's existing pipeline (see figure 6). The 44-acre parcel is composed mostly of forested land, with some open land. The alternative site would have a smaller construction and operational footprint as compared to the proposed site and does not contain any prime farmland soils, however, there are 16 residences within 0.5 mile of the alternative site. In addition, Halfway Brook and an associated NYSDEC-regulated wetland system are located on the northeast side of the parcel. For these reasons, we conclude that Compressor Station Alternative Site provides no significant environmental advantage over the proposed site.

6.2 Compression Design Alternatives

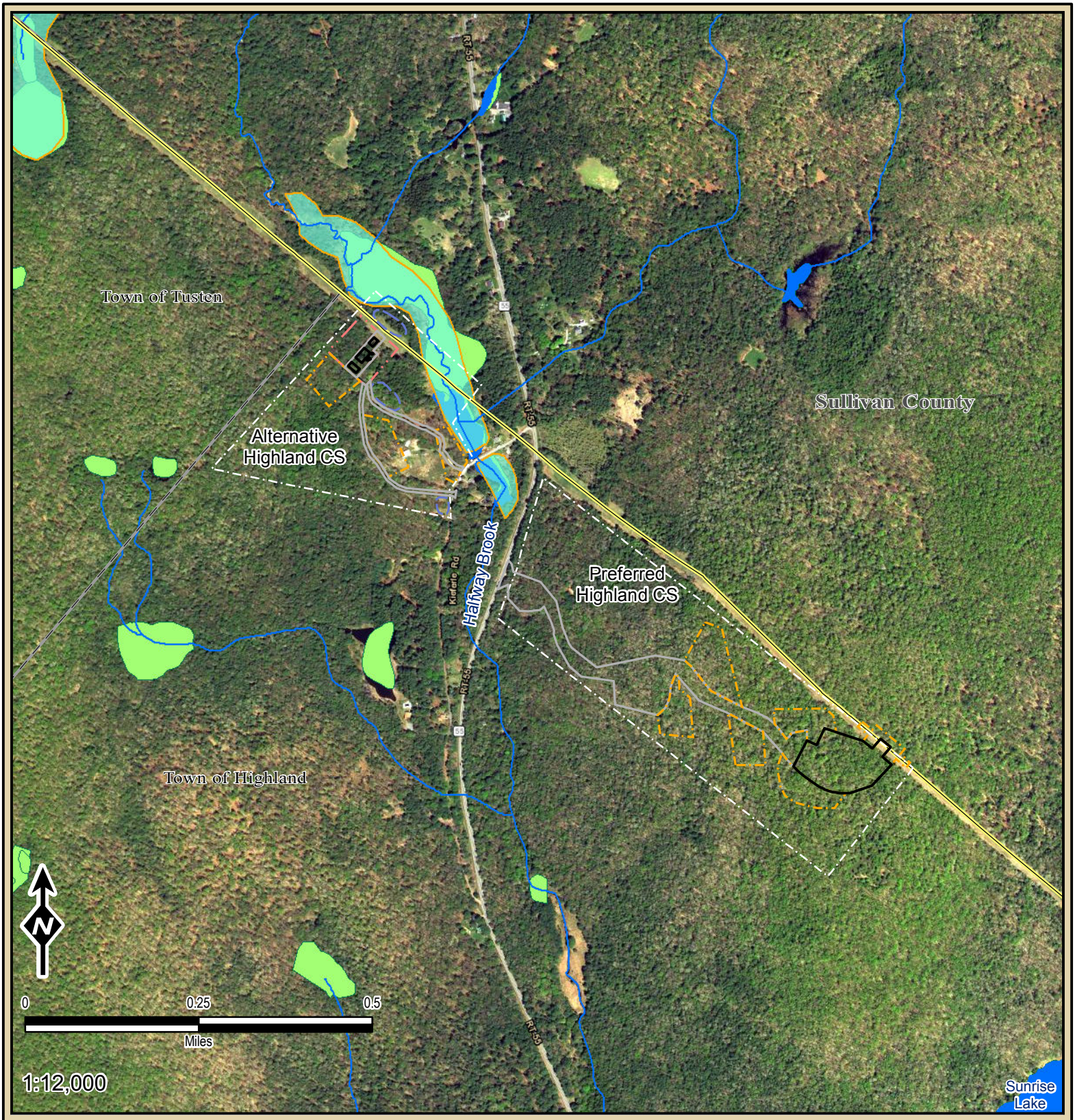
Additional Compression Only

To eliminate the need for a new compressor station, we evaluated the possibility of additional compression at Millennium's facilities sufficient to support the Project. This Additional Compression Only Alternative would require a total of 66,600 hp be added to Millennium's system at three existing facilities: 4,700 hp at the Wagoner Interconnect, 22,400 hp at the Hancock Compressor Station, and 39,500 hp at the Minisink Compressor Station. The additional 21,800 hp as compared to the Project would cause significant costs for the Project. The closest residence to the Minisink Compressor Station is 540 feet from the station, as compared to 2,900 feet for the proposed Highland Compressor Station. Given the residential setting of the Minisink Compressor Station impacts such as increased noise and air emissions would affect 95 new residences that are located within 0.5 mile of this facility.

In consideration of these factors, we conclude the Additional Compression Only Alternative would not be preferable to or provide significant environmental advantage over the Project.

Electric Compressors

In order to minimize air emissions, we evaluated the feasibility of using electric motor-driven compressor units in lieu of the proposed natural gas-fired compressor units at the Highland Compressor Station. Several factors were considered in evaluating the type of unit to install, including: proximity to existing electric power sources; the need for new or modified electric power sources or transmission facilities; the need for additional ancillary facilities, such as substations; the ability of power companies to design, permit, and construct new facilities in a timeframe reasonably close to the Project; additional environmental impacts associated with construction of new facilities; and the ability to comply with emissions standards during operations at each site.



PERM
PAR
TWS
ATWS
Stormwater
Property Boundary
Existing Millennium Pipeline
NHD Stream
NHD Waterbody
NYDEC Wetland
NWI Wetland

Highland
Compressor
Station Alternative

Figure 6

Sources: ESRI, Millennium, and TRC. Basemap: USDA NAIP 2015 5 m

Although technically feasible, Millennium stated the use of electric units would fail to meet the Project's purpose and need due to the following: 1) the amount of time required to install required electrical supply to the area; 2) the increase in acres of impact to install 7 miles of high voltage line, a substation and transformer, and 3) the greater Project costs required for installation of these electric facilities.

Millennium researched the potential for the existing electrical service along Route 12/55 to supply power required to operate a 22,400-hp compressor and found the existing power line was not sufficient. The closest existing high voltage line was identified about 7 miles southeast of the proposed site. In order to connect the compressor unit to this power line, a new 7-mile-long medium or high voltage line within a 75- to 200-foot-wide permanent right-of-way would be required, as well as a substation and transformer at the Highland Compressor Station site. A new power line would cause significant costs for the Project, while the proposed gas-driven compressor station could be supported with only minor upgrades for the existing electrical service that runs along Route 12/55. The cost of establishing electric power for the compressor would increase the construction cost of compressor station. Also, the New York Independent System Operator would have to conduct a load study to ensure the electric grid could even accommodate the unit, which could take up to one year to complete.

Finally, gas-driven turbines are generally preferred over electric compression for providing reliable, uninterrupted natural gas transmission because the fuel supply does not require a third party for operation. Gas-driven emergency generators with capacity to power electric compressors would be infeasible, and would be significantly larger than the proposed turbines. Gas-driven turbines would not be affected by an electrical outage at the Highland Compressor Station. For these reasons, we concluded that an electric-driven compressor unit at the proposed Highland Compressor Station would not offer a significant environmental advantage over the proposed gas-driven turbines.

D. STAFF CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis contained within this EA, we have determined that if Millennium constructs and operates the proposed facilities in accordance with its application and supplements and our recommended mitigation measures, approval of this proposal would not constitute a major federal action significantly affecting the quality of the human environment. We recommend that the Order contain a finding of no significant impact and include the following mitigation measures listed below as conditions to any Certificate the Commission may issue.

1. Millennium shall follow the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests) and as identified in the EA, unless modified by the Order. Millennium must:

    a. request any modification to these procedures, measures, or conditions in a filing with the Secretary;

    b. justify each modification relative to site-specific conditions;

    c. explain how that modification provides an equal or greater level of environmental protection than the original measure; and

    d. receive approval in writing from the Director of the OEP **before using that modification**.

2. The Director of OEP has delegated authority to take whatever steps are necessary to ensure the protection of all environmental resources during construction and operation of the Project. This authority shall allow:

    a. the modification of conditions of the Order; and

    b. the design and implementation of any additional measures deemed necessary (including stop-work authority) to assure continued compliance with the intent of the environmental conditions as well as the avoidance or mitigation of adverse environmental impact resulting from Project construction and operation.

3. **Prior to any construction,** Millennium shall file an affirmative statement with the Secretary, certified by a senior company official, that all company personnel, EIs, and contractor personnel would be informed of the EIs' authority and have been or would be trained on the implementation of the environmental mitigation measures appropriate to their jobs **before** becoming involved with construction and restoration activities.

4. The authorized facility locations shall be as shown in the EA, as supplemented by filed alignment sheets. **As soon as they are available, and before the start of construction,** Millennium shall file with the Secretary any revised detailed survey alignment maps/sheets at a scale not smaller than 1:6,000 with station positions for all facilities approved by the Order. All requests for modifications of environmental conditions of the Order or site-specific clearances must be written and must reference locations designated on these alignment maps/sheets.

   Millennium's exercise of eminent domain authority granted under NGA Section 7(h) in any condemnation proceedings related to the Order must be consistent with these authorized facilities and locations. Millennium's right of eminent domain granted under NGA Section 7(h) does not authorize it to increase the size of its natural gas pipelines or aboveground facilities to accommodate future needs or to acquire a right-of-way for a pipeline to transport a commodity other than natural gas.

5. Millennium shall file with the Secretary detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all route realignments or facility relocations, and staging areas, contractor/pipe yards, new access roads, and other areas that would be used or disturbed and have not been previously identified in filings with the Secretary. Approval for each of these areas must be explicitly requested in writing. For each area, the request must include a description of the existing land use/cover type, documentation of landowner approval, whether any cultural resources or federally listed threatened or endangered species would be affected, and whether any other environmentally sensitive areas are within or abutting the area. All areas shall be clearly identified on the maps/sheets/aerial photographs. Each area must be approved in writing by the Director of OEP **before construction in or near that area**.

   This requirement does not apply to extra workspace allowed by the FERC Plan, and/or minor field realignments per landowner needs and requirements which do not affect other landowners or sensitive environmental areas such as wetlands.

   Examples of alterations requiring approval include all route realignments and facility location changes resulting from:

   a. implementation of cultural resources mitigation measures;

   b. implementation of endangered, threatened, or special concern species mitigation measures;

   c. recommendations by state regulatory authorities; and

d. agreements with individual landowners that affect other landowners or could affect sensitive environmental areas.

6. **Within 60 days of the acceptance of the Certificate and before construction begins**, Millennium shall file an Implementation Plan with the Secretary for review and written approval by the Director of OEP. Millennium must file revisions to the plan as schedules change. The plan shall identify:

a. how Millennium will implement the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests), identified in the EA, and required by the Order;

b. how Millennium will incorporate these requirements into the contract bid documents, construction contracts (especially penalty clauses and specifications), and construction drawings so that the mitigation required at each site is clear to onsite construction and inspection personnel;

c. the number of EIs assigned, and how the company will ensure that sufficient personnel are available to implement the environmental mitigation;

d. company personnel, including EIs and contractors, who will receive copies of the appropriate material;

e. the location and dates of the environmental compliance training and instructions Millennium will give to all personnel involved with construction and restoration (initial and refresher training as the Project progresses and personnel change);

f. the company personnel and specific portion of Millennium's organization having responsibility for compliance;

g. the procedures (including use of contract penalties) Millennium will follow if noncompliance occurs; and

h. for each discrete facility, a Gantt or PERT chart (or similar project scheduling diagram), and dates for:

(1) completion of all required surveys and reports;

(2) the environmental compliance training of onsite personnel;

(3) the start of construction; and

(4) the start and completion of restoration.

7. Millennium shall employ at least one EI per construction spread. The EIs shall be:

a. responsible for monitoring and ensuring compliance with all mitigation measures required by the Order and other grants, permits, certificates, or other authorizing documents;

b. responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract (see Condition 6 above) and any other authorizing document;

c. empowered to order the correction of acts that violate the environmental conditions of the Order, and any other authorizing document;

d. a full-time position, separate from all other activity inspectors;

e. responsible for documenting compliance with the environmental conditions of that Order, as well as any environmental conditions/permit requirements imposed by other federal, state, or local agencies; and

f. responsible for maintaining status reports.

8. Beginning with the filing of its Implementation Plan, Millennium shall file updated status reports with the Secretary on a **biweekly basis until all construction and restoration activities are complete.** On request, these status reports will also be provided to other federal and state agencies with permitting responsibilities. Status reports shall include:

a. an update on Millennium's efforts to obtain the necessary federal authorizations;

b. the construction status of the Project, work planned for the following reporting period, and any schedule changes for stream crossings or work in other environmentally sensitive areas;

c. a listing of all problems encountered and each instance of noncompliance observed by the EI during the reporting period (both for the conditions imposed by the Commission and any environmental conditions/permit requirements imposed by other federal, state, or local agencies);

d. a description of the corrective actions implemented in response to all instances of noncompliance, and their cost;

e. the effectiveness of all corrective actions implemented;

f. a description of any landowner/resident complaints which may relate to compliance with the requirements of the Order, and the measures taken to satisfy their concerns; and

g. copies of any correspondence received by Millennium from other federal, state, or local permitting agencies concerning instances of noncompliance, and Millennium's response.

9. **Prior to receiving written authorization from the Director of OEP to commence construction of any Project facilities**, Millennium shall file with the Secretary documentation that it has received all authorizations required under federal law (or evidence of waiver thereof).

10. Millennium must receive written authorization from the Director of OEP **before placing the Project into service.** Such authorization will only be granted following a determination that rehabilitation and restoration of the right-of-way and other areas affected by the Project are proceeding satisfactorily.

11. **Within 30 days of placing the authorized facilities in service,** Millennium shall file an affirmative statement with the Secretary, certified by a senior company official:

    a. that the facilities have been constructed and installed in compliance with all applicable conditions, and that continuing activities would be consistent with all applicable conditions; or

    b. identifying which of the conditions in the Order Millennium has complied with or will comply with. This statement shall also identify any areas affected by the Project where compliance measures were not properly implemented, if not previously identified in filed status reports, and the reason for noncompliance.

12. Millennium shall offer to conduct, with the well owner's permission, pre- and post-construction monitoring of well yield and water quality for wells within 150 feet of construction workspace.

13. Millennium s**hall not begin construction** of the Project **until**:

    a. the staff receives comments from the FWS regarding the proposed actions;

    b. the FERC staff completes any necessary Section 7 consultation with the FWS; and

    c. Millennium has received written notification from the Director of the OEP that construction and/or use of mitigation (including implementation of conservation measures) may begin.

14. **Prior to construction,** Millennium shall file with the Secretary documentation of its consultation regarding Project construction and operation within the Huckleberry

Ridge State Forest, including any specific procedures or permits identified by the NYSDEC.

15. **Prior to construction,** Millennium shall file with the Secretary documentation of its consultation regarding Project construction and operation within private parcels protected under conservation easements, including any specific procedures identified in coordination with The Nature Conservancy.

16. **Prior to construction using any drilling equipment or performing entry-side activity at MP 3.8 of the Mountain Road/Bedell Drive HDD**, Millennium shall file with the Secretary for review and written approval by the Director of the OEP, a revised HDD noise assessment for entry-side activity at MP 3.8 and an estimate of the number of days/weeks/months required to complete the HDD. If the results of the assessment show that noise levels would exceed 55 dBA L_{dn} at any NSA, Millennium shall file a noise mitigation plan that identifies all reasonable measures Millennium commits to implementing to reduce noise levels attributable to the proposed drilling operations at NSAs, and the resulting noise levels at each NSA with mitigation.

17. Millennium shall make all reasonable efforts to ensure its predicted impact on noise levels from the new Highland Compressor Station and modified Hancock Compressor Station are not exceeded at nearby NSAs, and file noise surveys showing this with the Secretary **no later than 60 days** after placing each station into service. If a full load condition noise survey of the entire station is not possible, Millennium shall file an interim survey at the maximum possible horsepower and file the full load survey **within 6 months**. If the noise attributable to the operation all of the equipment at either compressor station under full or interim horsepower load conditions exceeds an L_{dn} of 55 dBA at any nearby NSA, Millennium shall file a report on what changes are needed and shall install additional noise controls measures to meet the level **within 1 year** of the in-service date. Millennium shall confirm compliance with this requirement by filing a second noise survey with the Secretary **no later than 60 days** after it installs the additional noise controls.

18. Millennium shall file noise surveys with the Secretary **no later than 60 days** after placing the modified Ramapo and Huguenot Meter Stations in service. If the noise attributable to the operation of either meter station exceeds the previously existing noise levels at any nearby NSAs that are currently at or above an L_{dn} of 55 dBA, or exceeds 55 dBA L_{dn} at any nearby NSAs that are currently below 55 dBA L_{dn}, Millennium shall file a report on what changes are needed and shall install the additional noise controls to meet the requirements **within 1 year** of the in-service date. Millennium shall confirm compliance with the above requirement by filing a second sound level survey with the Secretary **no later than 60 days** after it installs the additional noise controls.

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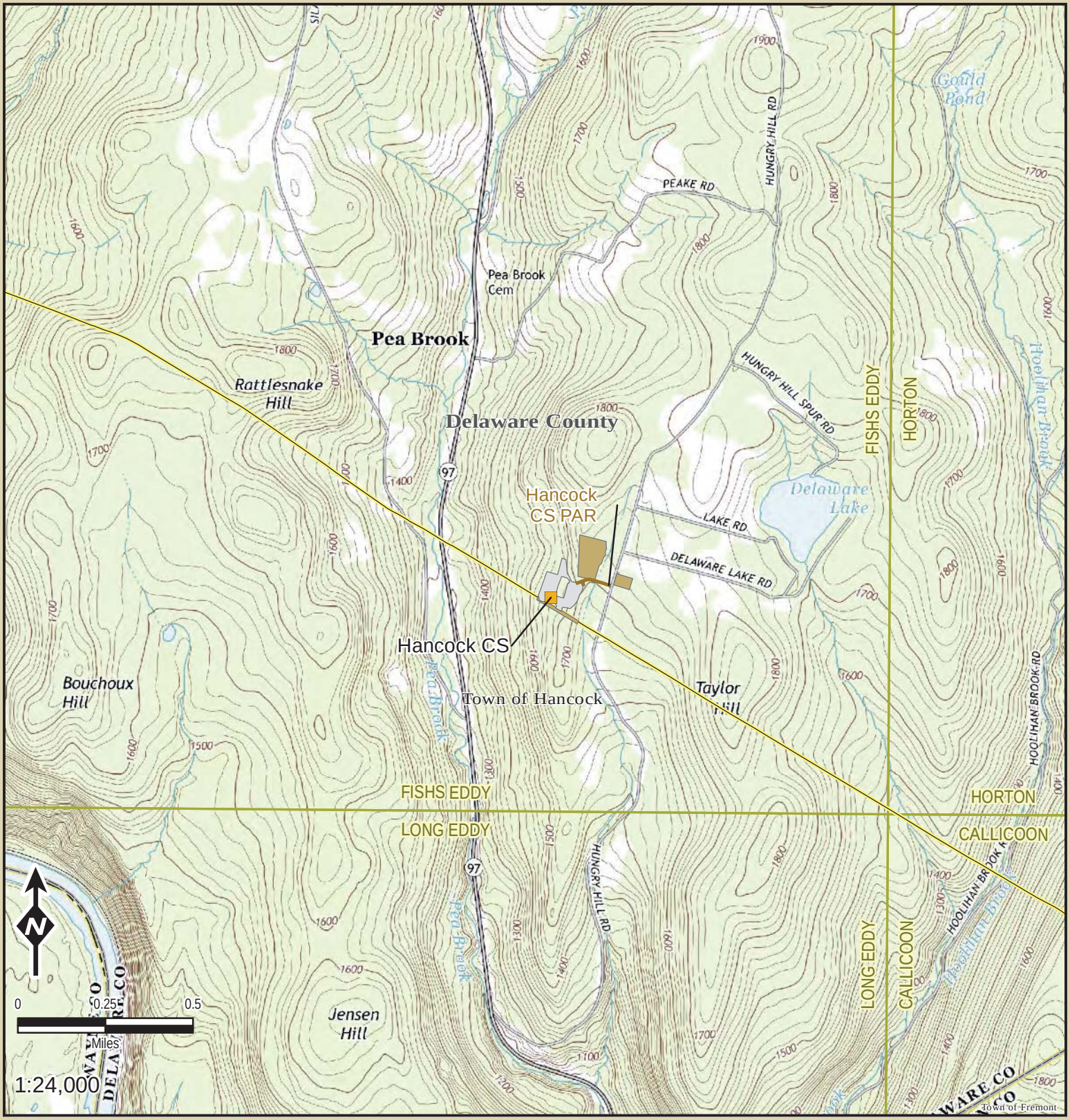
Edge Engineering and Science, LLC is a third party contractor assisting the Commission staff in reviewing the environmental aspects of the project application and preparing the environmental documents required by NEPA. Third party contractors are selected by Commission staff and funded by project applicants. Per the procedures in 40 CFR 1506.5(c), third party contractors execute a disclosure statement specifying that they have no financial or other conflicting interest in the outcome of the project. Third party contractors are required to self-report any changes in financial situation and to refresh their disclosure statements annually. The Commission staff solely directs the scope, content, quality, and schedule of the contractor's work. The Commission staff independently evaluates the results of the third party contractor's work and the Commission, through its staff, bears ultimate responsibility for full compliance with the requirements of NEPA.

APPENDIX A
TOPOGRAPHIC MAPS OF THE PROJECT



Existing Compressor Station(Modifications)

Proposed Access Road

Existing Millennium Pipeline

Operation Workspace

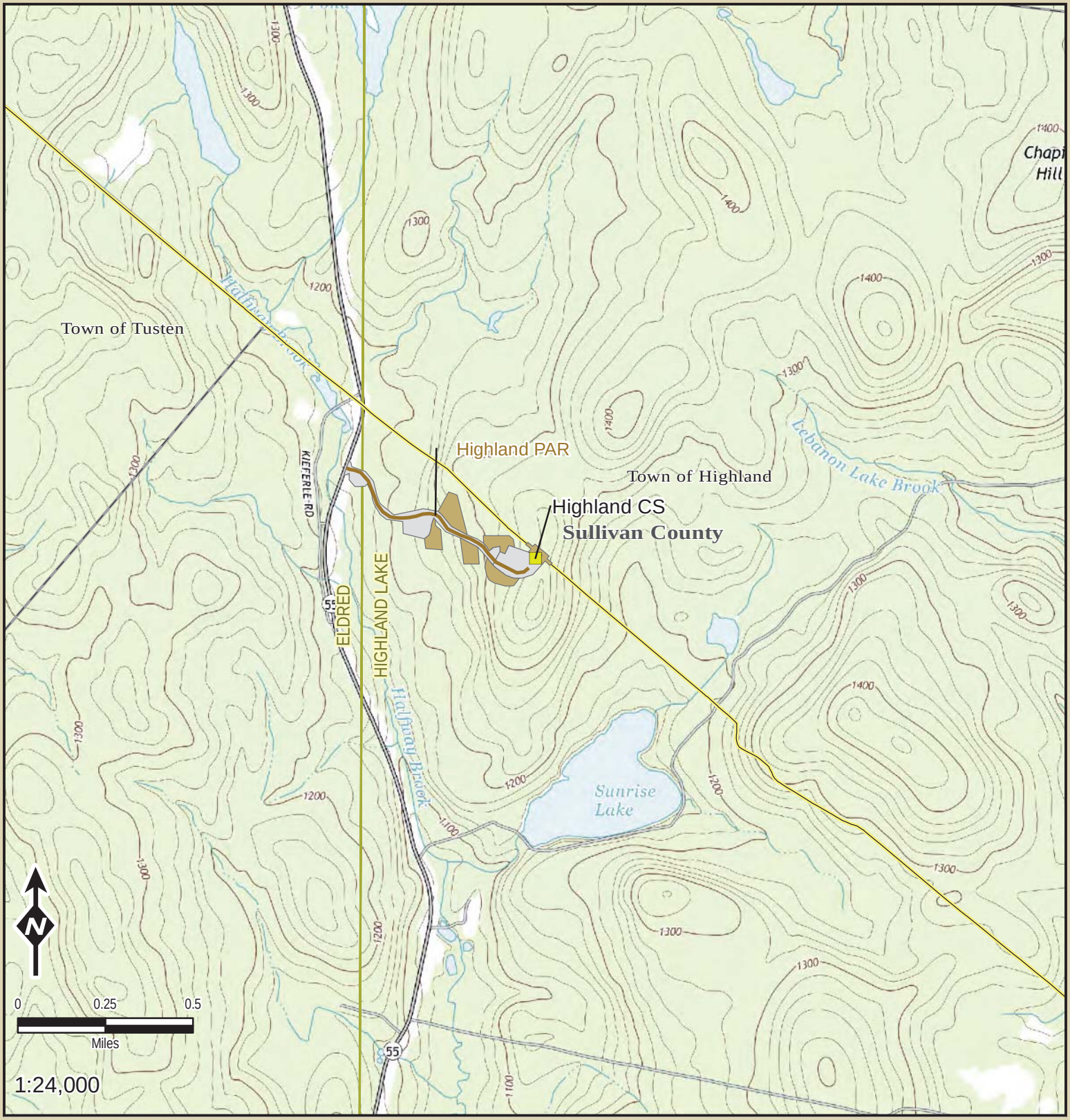
Construction Workspace

US Topo 7.5 Minute Quadrangle

Eastern System Upgrade Project
Project Facilities

Appendix A

Sources: USGS National Map 2013 (accessed December 2015), ESRI, Millennium, and TRC

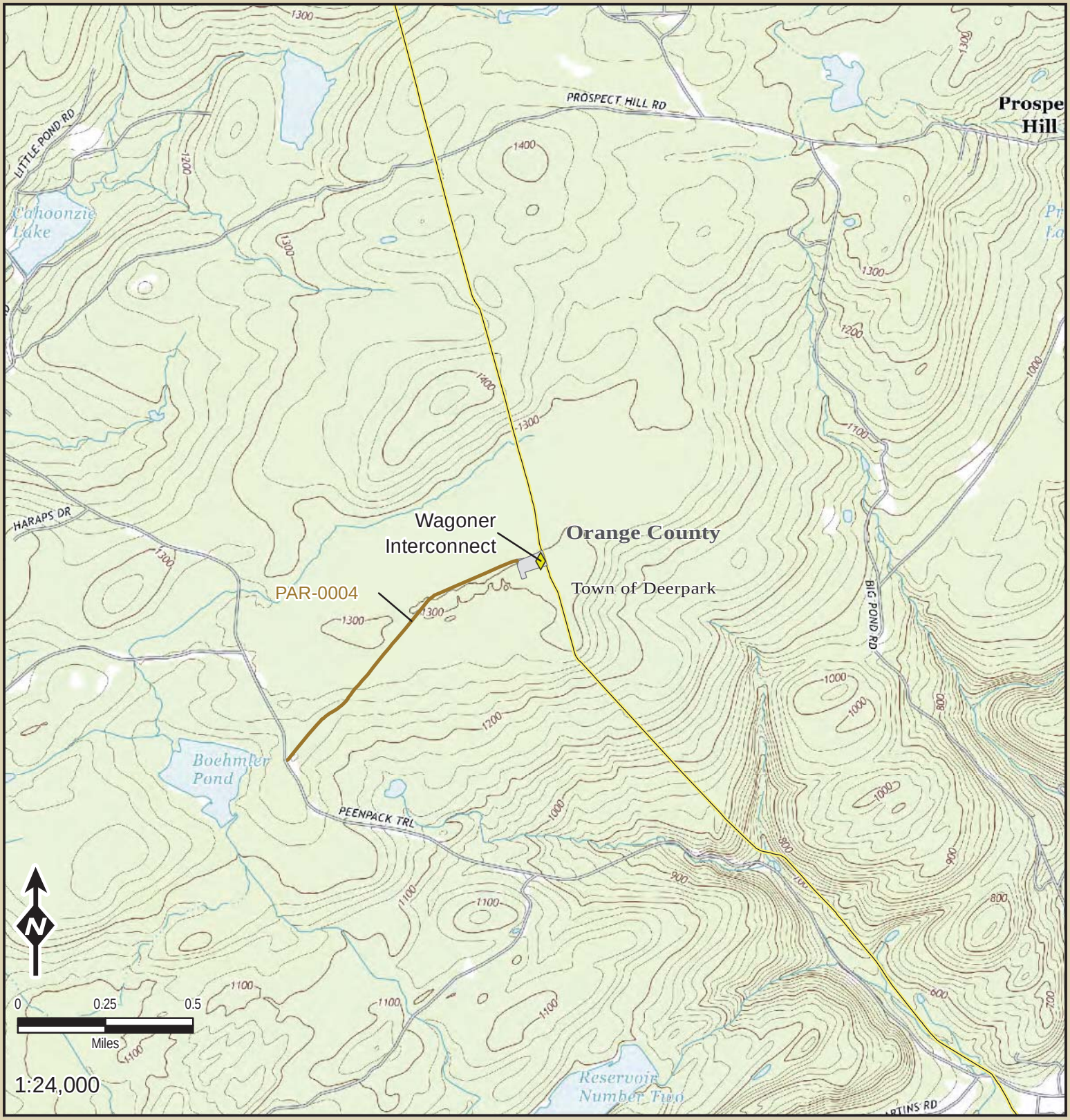


- Compressor (Proposed)
- Proposed Access Road
- Existing Millennium Pipeline
- Operation Workspace
- Construction Workspace
- US Topo 7.5 Minute Quadrangle

Eastern System Upgrade Project Project Facilities

Appendix A

Sources: USGS National Map 2013 (accessed December 2015), ESRI, Millennium, and TRC

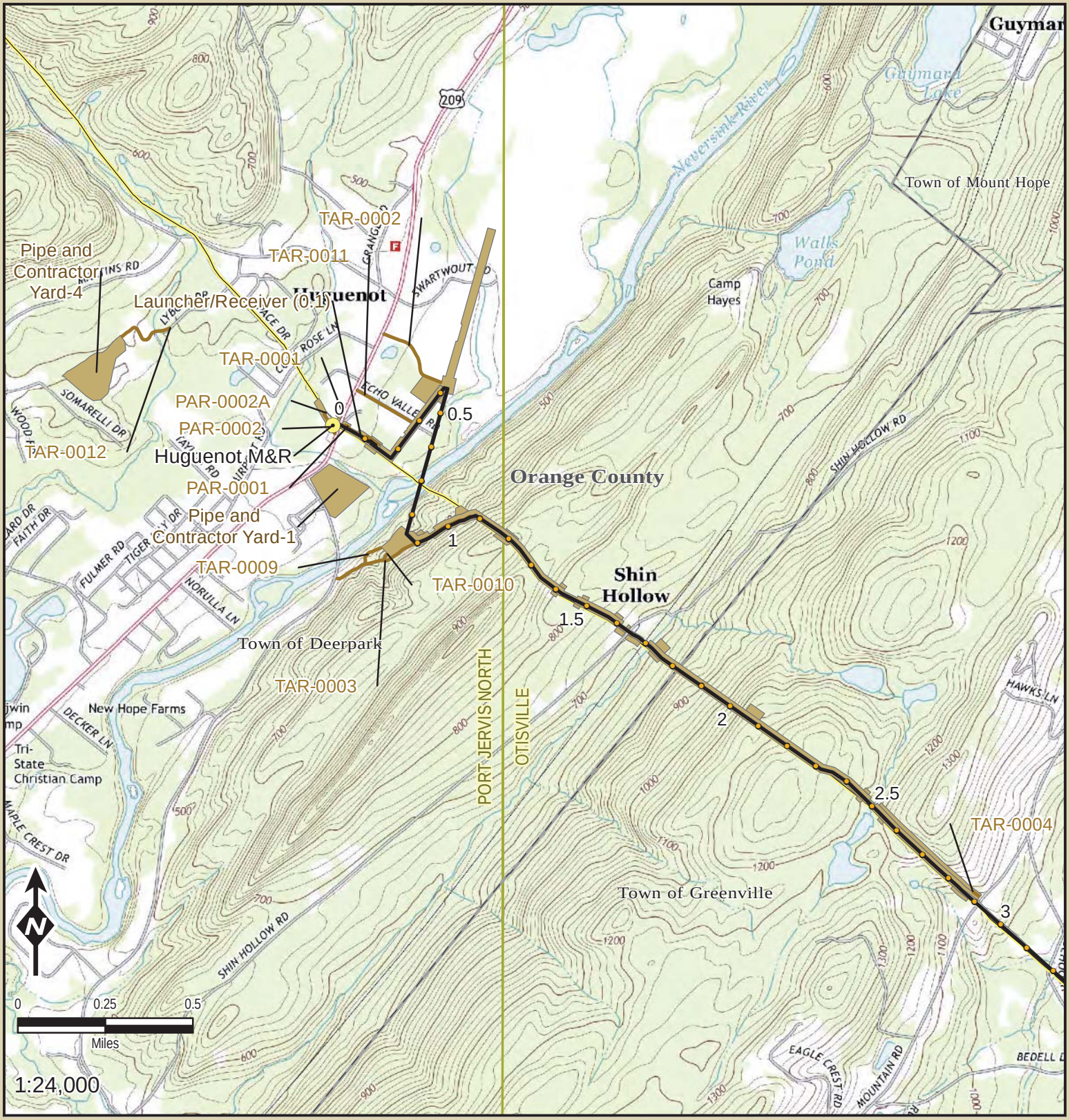


- Interconnect (Modifications)
- Proposed Access Road
- Existing Millennium Pipeline
- Operation Workspace
- US Topo 7.5 Minute Quadrangle

Eastern System Upgrade Project
Project Facilities

Appendix A

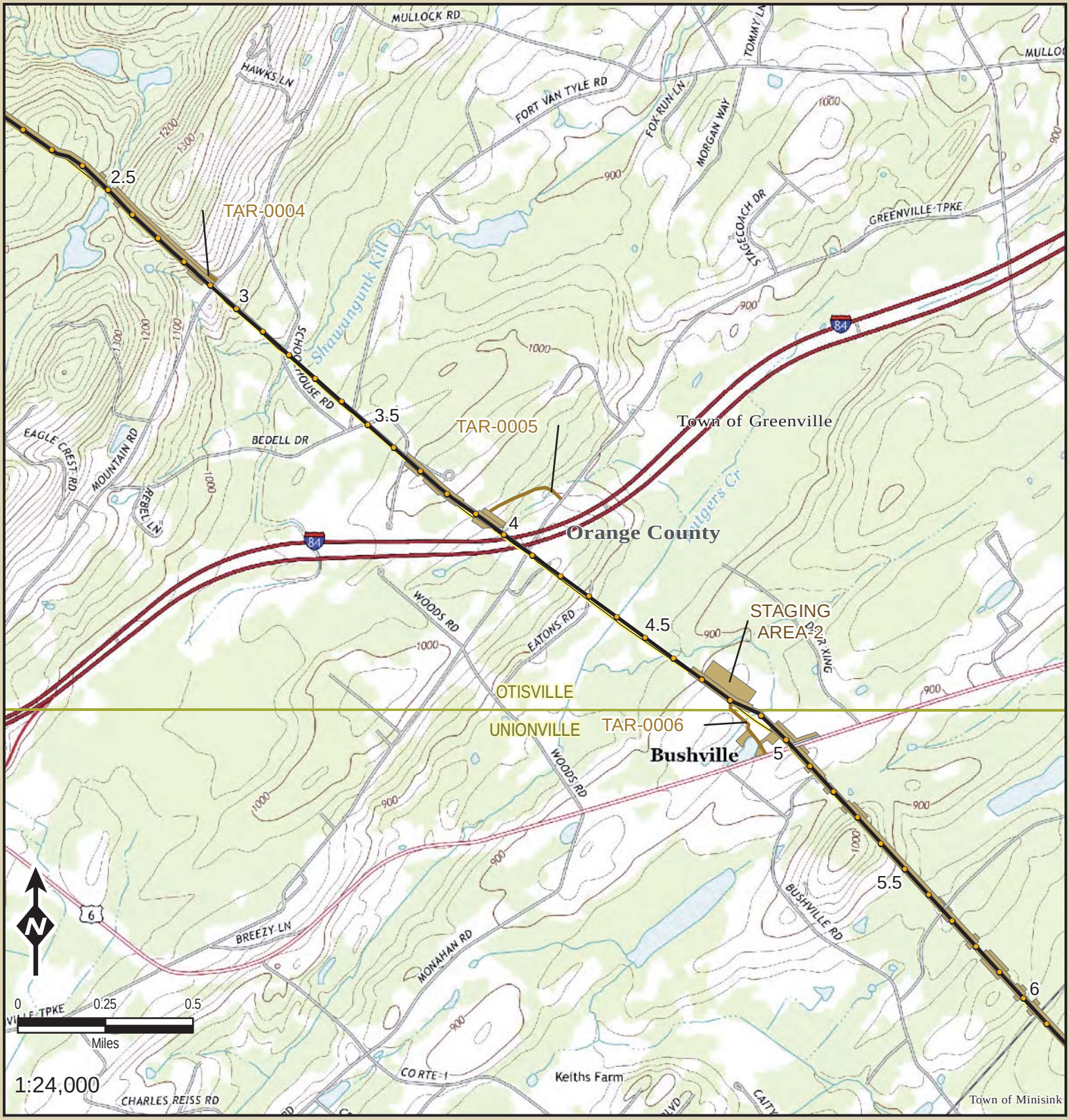
Sources: USGS National Map 2013 (accessed December 2015), ESRI, Millennium, and TRC



Eastern System Upgrade Project
Project Facilities

Appendix A

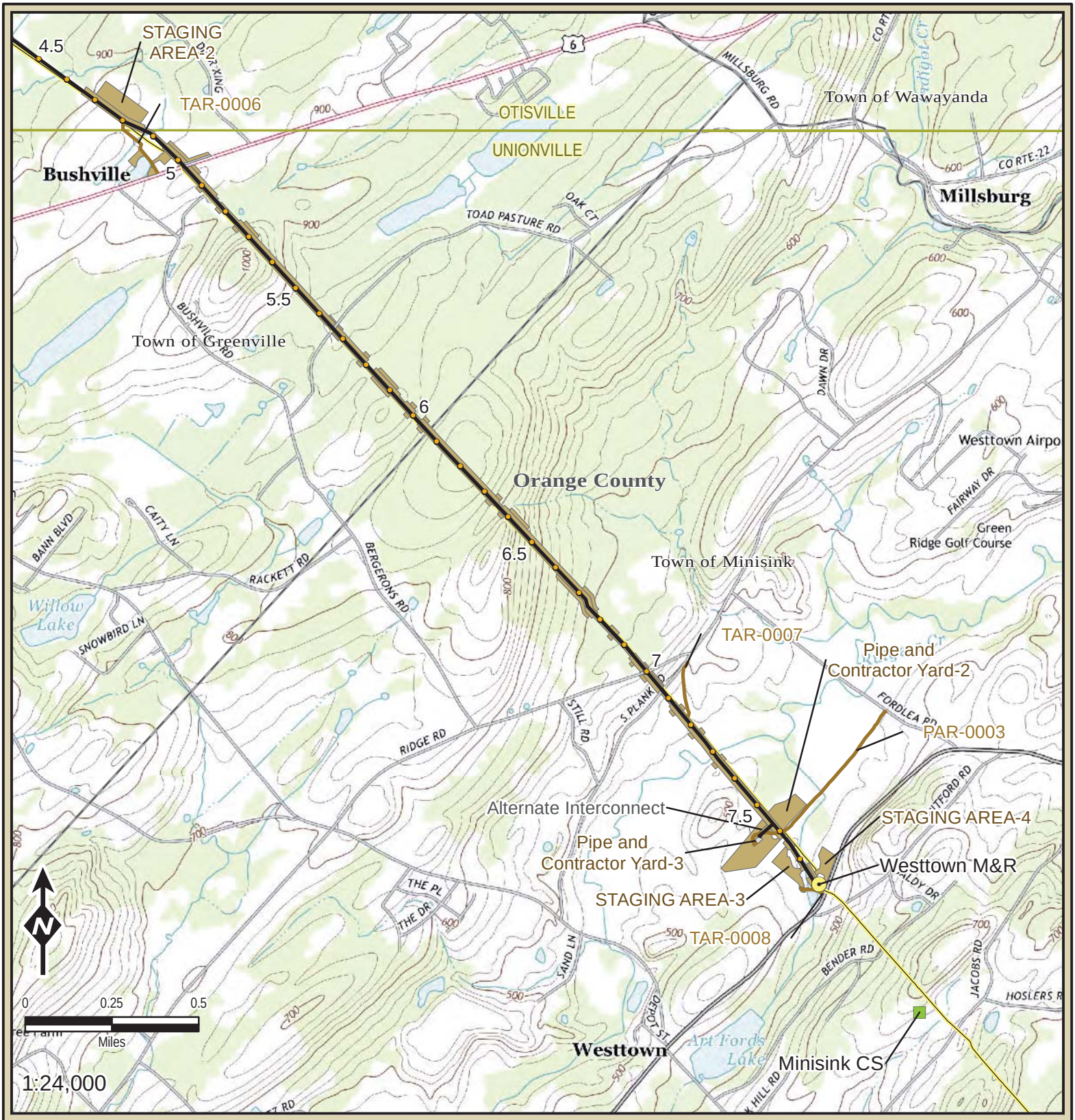
Sources: USGS National Map 2013 (accessed December 2015), ESRI, Millennium, and TRC



Eastern System Upgrade Project
Project Facilities

Appendix A

Sources: USGS National Map 2013 (accessed December 2015), ESRI, Millennium, and TRC

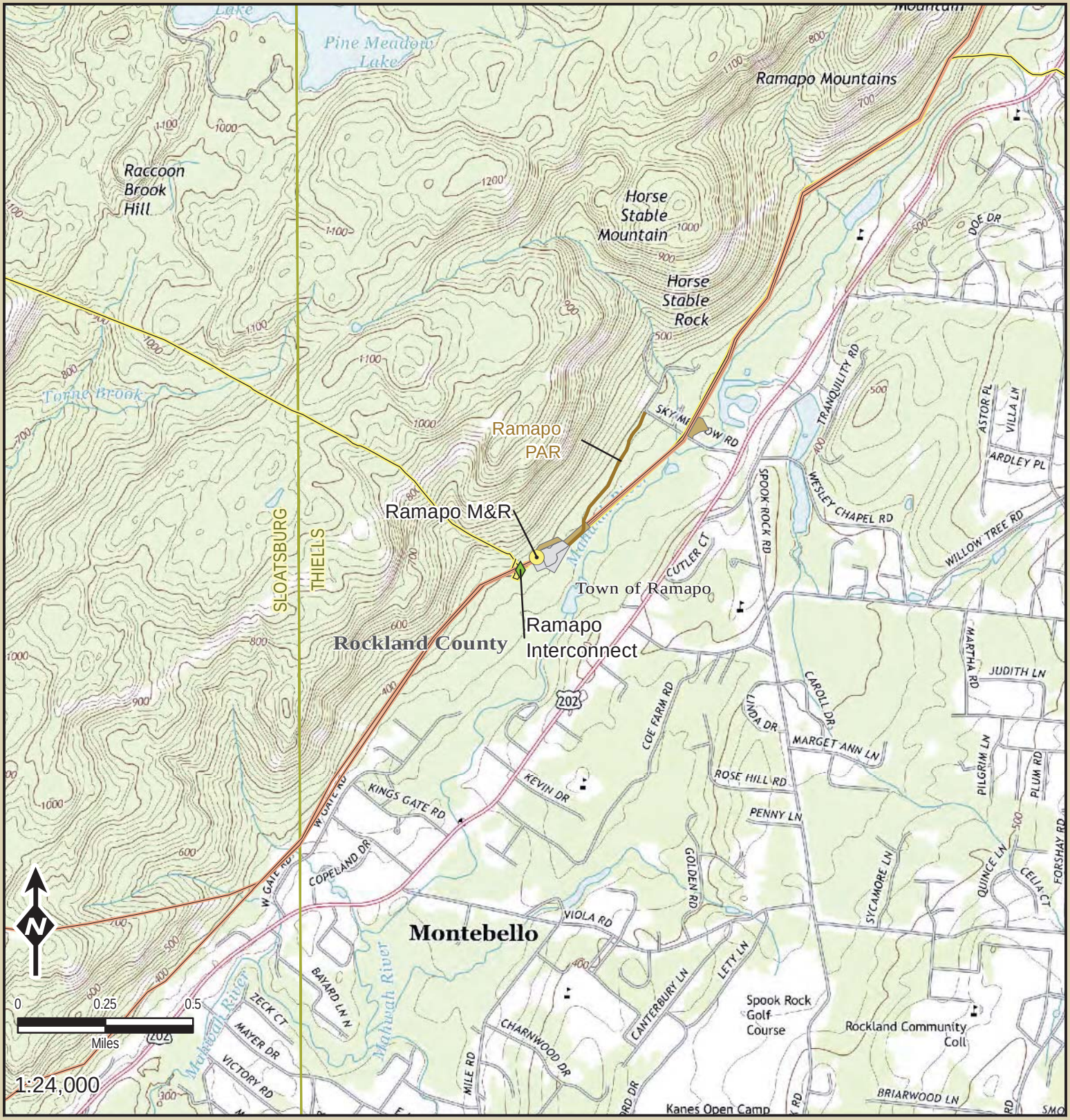


- Existing Compressor Station
- Existing Meter Station (Modifications)
- Milepost (0.1 mile)
- Proposed Loop
- Proposed Access Road
- Existing Millennium Pipeline
- Operation Workspace
- Construction Workspace
- US Topo 7.5 Minute Quadrangle

Eastern System Upgrade Project
Project Facilities

Appendix A

Sources: USGS National Map 2013 (accessed December 2015), ESRI, Millennium, and TRC



- Existing Interconnect
- Existing Meter Station (Modifications)
- Proposed Access Road
- Existing Algonquin Gas
- Existing Millennium Pipeline
- Operation Workspace
- Construction Workspace
- US Topo 7.5 Minute Quadrangle

Eastern System Upgrade Project Project Facilities

Appendix A

Sources: USGS National Map 2013 (accessed December 2015), ESRI, Millennium, and TRC

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APPENDIX B

LOCATION OF ADDITIONAL TEMPORARY WORKSPACES FOR THE PROJECT

Appendix B Location of Additional Temporary Workspaces for the Project					
ATWS Identification Number	**Reference MP**	**Approximate Dimensions (feet)**	**Acres[a]**	**Predominant Existing Land Use[b]**	**Justification**
Huguenot Loop					
ATWS 1-01	0.0	360 x 260	1.43	RL, OL, UF	Needed for work mobilization
ATWS 1-02	0.0	75 X 60	0.08	CI	Need extra work space to construct permanent aboveground facilities
ATWS 1-03	0.0	75 x 46	0.07	CI	Need extra work space to construct permanent aboveground facilities
ATWS 1-04	0.1	200 X 55	0.25	OL, UF	Need extra work space to construct permanent aboveground facilities
ATWS 1-05	0.1	200 X 20	0.09	UF	Need extra work space to construct permanent aboveground facilities
ATWS 2-01	0.4	182 X 35	0.14	AG	Workspace needed for HDD
ATWS 2-02	0.4	358 X 289 250 X 200 550 X 125 270 X 100	7.30	AG, OL, RL, UF	Workspace needed to string HDD
ATWS 2-03	0.9	245 X 445	2.25	UF	Workspace needed for HDD
ATWS 2-04	0.9	105 X 63	0.15	UF	Extra space for crossover
ATWS 2-05	0.9	168 X 25	0.10	UF	Extra space needed near Wetland
ATWS 3-01	1.0	694 X 25	0.39	UF	Extra space for crossover
ATWS 3-02	1.1	150 X 120	0.40	UF, OL	Extra space for crossover
ATWS 3-03	1.2	250 X 20	0.11	UF	Extra space for staging equipment and material over ridge
ATWS 3-04	1.2	250 X 55	0.32	UF, OL	Extra space for staging equipment and material over ridge
ATWS 3-05	1.4	100 X 50	0.11	UF	Extra space needed near wetland
ATWS 3-06	1.4	100 X 50	0.11	UF, OL	Extra space needed near wetland

Appendix B (continued) Location of Additional Temporary Workspaces for the Project					
ATWS Identification Number	**Reference MP**	**Approximate Dimensions (feet)**	**Acres[a]**	**Predominant Existing Land Use[b]**	**Justification**
ATWS 3-07	1.5	100 X 50	0.11	UF	Extra space needed near wetland
ATWS 3-08	1.5	100 X 50	0.11	UF, OL	Extra space needed near wetland
ATWS 3-09	1.6	130 X 50	0.15	UF, RL	Needed for road crossing near waterbody
ATWS 3-10	1.6	150 X 75	0.25	RL, OL	Extra space needed for road crossing and avoid pond
ATWS 3-11	1.7	222 X 75	0.39	OL	Extra space needed for road crossing, railroad crossing
ATWS 3-12	1.7	200 X 120	0.55	UF	Extra space needed for road crossing, railroad crossing and near wetland
ATWS 3-13	1.7	203 X 50	0.23	UF, OL	Needed for construction near streams and railroad crossing
ATWS 4-01	2.0	250 X 125	0.72	UF	Turnaround area
ATWS 4-02	2.5	100 X 50	0.11	UF	Needed for road crossing
ATWS 4-03	2.5	100 X 50	0.11	OL, UF	Needed for road crossing and construction near stream
ATWS 4-04	2.5	100 X 50	0.11	OL, UF	Needed for road crossing
ATWS 4-05	2.5	2,054 x 50	2.31	UF, OL	Workspace needed for HDD string
ATWS 4-06	2.8	300 X 50	0.35	UF, OL	Workspace needed for HDD
ATWS 5-03	3.7	350 x 50	0.40	UF, OL	Workspace needed for HDD
ATWS 5-04	3.8	388 X 75	0.67	OL, UF	Extra space needed near wetland
ATWS 5-05	3.8	236 X 75	0.41	OL, UF	Extra space needed near wetland
ATWS 6-01	5.0	250 X 142	0.61	AG, RL	Workspace added for pond water withdrawal
ATWS-6-02	4.9	399 X 20	0.19	AG, WL	Workspace added for HDD string
ATWS 7-01	5.0	275 X 150	0.33	AG	Extra space needed for road crossing and near wetland

Appendix B (continued)
Location of Additional Temporary Workspaces for the Project

ATWS Identification Number	Reference MP	Approximate Dimensions (feet)	Acres[a]	Predominant Existing Land Use[b]	Justification
ATWS-6-03	4.9	302 X 15	0.10	WL, UF	Workspace added for HDD string
ATWS 7-02	5.0	150 X 150 121 X 40	0.62	AG	Needed for road crossing
ATWS 7-03	5.0	390 X 50 310 X 50	0.85	AG, UF	To provide adequate workspace while avoiding residences
ATWS 7-04	5.0	150 X 50	0.19	AG	Extra space needed near wetland
ATWS 7-05	5.1	100 X 50	0.11	AG	Extra space needed near wetland
ATWS 7-06	5.2	100 X 50	0.11	UF	Extra space needed near wetland
ATWS 7-07	5.3	300 X 50	0.34	UF, OL	Needed for road crossing
ATWS 7-08	5.3	100 X 50	0.11	UF, OL	Needed for road crossing
ATWS 7-09	5.7	150 X 25	0.08	UF	Needed for road crossing
ATWS 7-10	5.7	100 X 25	0.06	RL	Extra space needed near wetland
ATWS 7-11	5.7	150 X 25	0.08	OL, UF	Extra space needed near wetland
ATWS 7-12	5.8	100 X 50	0.11	UF	Extra space needed near wetland
ATWS 7-13	5.8	100 X 50	0.11	UF, OL	Extra space needed near wetland
ATWS 7-14	5.8	415 X 50	0.47	UF	Extra space needed near wetland
ATWS 7-15	5.8	412 X 50	0.45	UF, OL	Extra space needed near wetland
ATWS 8-01	6.0	100 X 50	0.11	UF	Extra space needed near wetland
ATWS 8-02	6.0	100 X 50	0.11	UF, OL	Extra space needed near wetland
ATWS 8-03	6.0	100 X 50	0.11	UF	Extra space needed near wetland
ATWS 8-04	6.0	100 X 50	0.12	UF, OL	Extra space needed near wetland
ATWS 8-05	6.3	100 X 50	0.11	UF, OL	Extra space needed near wetland and stream
ATWS 8-06	6.3	100 X 50	0.11	UF	Extra space needed near wetland and stream
ATWS 8-07	6.4	100 X 50	0.11	UF, OL	Extra space needed near wetland and stream

Appendix B (continued)
Location of Additional Temporary Workspaces for the Project

ATWS Identification Number	Reference MP	Approximate Dimensions (feet)	Acres[a]	Predominant Existing Land Use[b]	Justification
ATWS 8-08	6.4	400 X 50	0.46	UF	Extra space needed near wetland and stream
ATWS 8-09	6.7	825 X 50	0.94	UF, OL	Needed for crossover and near wetland
ATWS 8-10	6.7	424 X 50	0.48	UF, OL	Needed for crossover and near wetland
ATWS 8-11	6.8	171 X 50	0.20	OL, UF	Extra space needed near wetland
ATWS 8-12	6.8	86 X 50	0.10	UF	Extra space needed near wetland
ATWS 9-01	7.0	66 X 50	0.08	UF	Extra space needed for road crossing, near wetland and stream
ATWS 9-02	7.0	100 X 25	0.06	OL, UF	Needed for road crossing
ATWS 9-03	7.0	126 X 50	0.14	AG	Needed for road crossing
ATWS 9-04	7.0	298 X 25	0.17	AG	Needed for road crossing
ATWS 9-05	7.1	100 X 50	0.11	AG	Extra space needed for road crossing and near wetland
ATWS 9-06	7.1	100 X 50	0.11	AG	Extra space needed for road crossing and near wetland
ATWS 9-07	7.2	100 X 50	0.11	AG	Extra space needed near wetland
ATWS 9-08	7.2	100 X 50	0.11	AG	Extra space needed near wetland
ATWS 9-09	7.3	100 X 50	0.11	AG	Needed for stream crossing
ATWS 9-10	7.3	100 X 50	0.11	AG	Needed for stream crossing
ATWS 9-11	7.6	295 X 25	0.11	IC	Needed for tie-in to CPV Valley Lateral
ATWS 9-12	7.7	245 X 35	0.20	AG	Needed for tie-in to Westtown Meter Station
Project Total[c]			**29.7**		

[a] Acreage calculated from actual footprint, which may not correspond to the approximate dimensions.

[b] AG = Agricultural; IC = Industrial/commercial; UF = Upland forest; OL = Open land; RL = Residential land; WL = Wetland.

[c] The numbers in this table have been rounded for presentation purposes. As a result, the totals may not reflect the sum of the addends.

APPENDIX C

PROPOSED ALTERNATIVE MEASURES TO THE FERC PROCEDURES FOR THE PROJECT

Appendix C
Proposed Alternative Measures to the FERC Procedures for the Project

Requirement	Deviation Location	Feature	Justification/Description	Additional Mitigation
	MP 0.4	S-18	ATWS 2-02 needed for HDD string.	
Section V.B.2 Locate all extra work areas at least 50 feet away from water's edge, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land.				Designation of a minimum of one EI to monitor HDD activities. Additionally, the EI would conduct daily inspections in these locations, even when active construction is not occurring, until permanent restoration measures are implemented.
	MP 2.9	S-11	ATWS 4-06 needed for HDD site.	
	MP 4.9	WB-04	ATWS 6-01 needed for water withdrawal.	Designation of a minimum of one EI to monitor water withdrawal activities at WB-04 to ensure erosion controls are maintained and to order corrective action where necessary.

Appendix C (continued)
Proposed Alternative Measures to the FERC Procedures for the Project

Requirement	Deviation Location	Feature	Justification/Description	Additional Mitigation
	MP 1.7	S-13	Temporary workspace needed for active railroad bore.	Designation of a minimum of one EI to monitor construction at MPs 1.7 and 7.6 at the crossing locations for the duration of the crossings to ensure erosion controls are maintained and to order corrective action where necessary. Additionally, the EI would conduct daily inspections in these locations until permanent restoration measures are implemented.
	MP 7.6	W-04	Temporary workspace needed for abandoned railroad bore.	
Section VI.A.3 Limit construction right-of-way to 75 feet or less (within wetlands).	MP 4.6	W-16	Temporary workspace needed for HDD string	Installation of timber mats across the wetland to protect the soil from rutting during stringing activities. Designation of a minimum of one EI to monitor stringing activities. The designated EI would conduct daily inspections in these locations until permanent restoration measures are implemented.
	MP 7.3	W-06	Temporary workspace needed for agricultural/wetland topsoil segregation. Workspace width requested by NYSDAM during site visit.	Designation of a minimum of one EI, with an agricultural background, to monitor construction within wetland W-06. The designated EI would be onsite at the crossing location for the duration of the crossing and would conduct daily inspections at this location until permanent restoration measures are implemented.

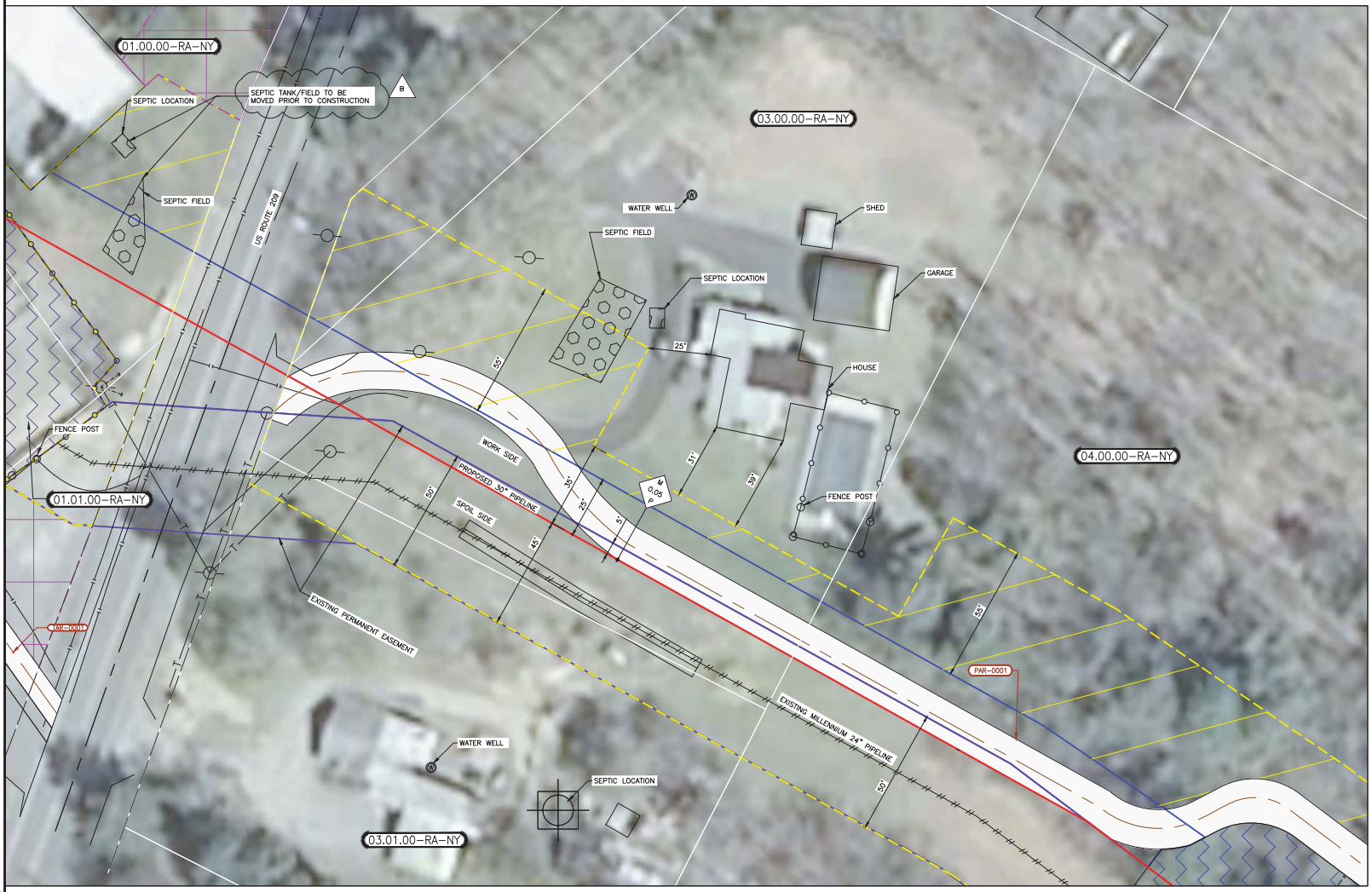
Appendix C (continued)
Proposed Alternative Measures to the FERC Procedures for the Project

Requirement	Deviation Location	Feature	Justification/Description	Additional Mitigation
Section VI.B.1.a Locate all extra work areas (such as staging areas and additional spoil areas) at least 50 feet away from wetland boundaries, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land.	MP 0.4	W-26	ATWS 2-02 needed for HDD string.	Designation of a minimum of one EI to monitor HDD activities. Additionally, the EI would conduct daily inspections in these locations, even when active construction is not occurring, until permanent restoration measures are implemented.
	MP 0.9	W-27	ATWS 2-03 needed for HDD site.	
	MP 2.9	W-28C	ATWS 4-06 needed for HDD site.	
	MP 4.6	W-16	ATWS 6-02 and 6-03 needed for HDD site	Installation of timber mats across the wetland to protect the soil from rutting during stringing activities. Designation of a minimum of one EI to monitor stringing activities. The designated EI would conduct daily inspections in these locations until permanent restoration measures are implemented.
Section VI.B.1.d The only access roads, other than the construction right-of-way that can be used in wetlands are those existing roads that can be used with no modifications or improvements, other than routine repair, and no impact on the wetland.	Highland Compressor Station	HL-W-01	New permanent access road needed to access the Highland Compressor Station.	Designation of a minimum of one EI to monitor construction of the access road across wetland HL-W-01; the EI would be onsite at the crossing location for the duration of and would conduct daily inspections in this location until permanent restoration measures are implemented.

APPENDIX D

RESIDENCES WITHIN 50 FEET OF THE PROJECT

TRACT 03.00.00–RA–NY
ORANGE COUNTY, NEW YORK



DESCRIPTION

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NOTES:

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3. MATURE TREES AND LANDSCAPING WILL NOT BE REMOVED FROM WITHIN THE EDGE OF THE CONSTRUCTION WORK AREA UNLESS NECESSARY FOR SAFE OPERATION OF CONSTRUCTION EQUIPMENT OR AS SPECIFIED IN LANDOWNER AGREEMENTS.
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12. CONTRACTOR SHALL INSTALL MATS OVER EXISTING SEPTIC FIELD.

ISSUED FOR FERC DATA REQUEST NO. 1
DATE: 10/20/2016

LEGEND

MILEPOST
PROPOSED PIPELINE
ROAD R.O.W.
PROPOSED PERMANENT EASEMENT
EXISTING MILLENNIUM PIPELINE
EXISTING PERMANENT EASEMENT
MUNICIPALTY BORDER
FOREIGN PIPELINE
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PROPOSED PERMANENT WORKSPACE
EXISTING PERMANENT WORKSPACE
PIPE / CONTRACTOR YARD
STAGING AREA
FEMA FLOODPLAIN
TEMPORARY ACCESS ROAD
PERMANENT ACCESS ROAD
PAR-0001 ACCESS ROAD NUMBER
W-02 WETLAND ID
S-02 WATERBODY ID
WETLAND
WATERBODY
SEPTIC FIELD
SI-30-001.000 PROPERTY TRACT NUMBER
GEOTECHNICAL BORE LOCATION
GUY WIRE
WATER WELL
POWER POLE
SEPTIC LOCATION

SCALE: 1"=20'
20' 10' 0' 20' 40'

No.	REVISIONS	APPROVED BY	DATE
1	ISSUED FOR FERC DATA REQUEST NO. 1	DAD	10/20/16
0	ISSUED FOR FERC	DAD	07/29/16

D3131–ALG–1 | PROPOSED 30"/36" HUGUENOT LOOP | DWG. NO. | REFERENCE

ENpipeline | Williams Pipeline

EASTERN SYSTEM UPGRADE

TITLE: MP 0.05 – RESIDENTIAL DETAIL
ORANGE COUNTY, NY

DRAWN BY	DATE	DRAWING NUMBER	SHEET	ISSUE
AR	3/10/16	D3131–RSD–1	1 OF 1	B

PROJECT NUMBER: 20562
WORK ORDER NUMBER: –

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10/20/2016 8:53 PM Matthew Williams

TRACT 04.01.00–RA–NY
ORANGE COUNTY, NEW YORK

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GEOTECHNICAL BORE LOCATION
GUY WIRE
WATER WELL
POWER POLE
SEPTIC LOCATION
SCALE: 1"=20'
20' 10' 0' 20' 40'

No.	REVISIONS	APPROVED BY	DATE
1	ISSUED FOR FERC	DAD	07/29/16

D3131–ALG–2 | PROPOSED 30"/36" HUGUENOT LOOP | DWG. NO. | REFERENCE

ENpipeline | MILLENNIUM PIPELINE
EASTERN SYSTEM UPGRADE
TITLE: MP 0.25 – RESIDENTIAL DETAIL ORANGE COUNTY, NY
DRAWN BY: AR | DATE: 3/10/16 | DRAWING NUMBER: D3131-RSD-2 | SHEET: 1 OF 1 | ISSUE: A
PROJECT NUMBER: 20562
WORK ORDER NUMBER: –

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10/20/2016 8:53 PM Marissa Williams

TRACT 08.00.00–RA–NY
ORANGE COUNTY, NEW YORK

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ISSUED FOR FERC DATA REQUEST NO. 1
DATE: 10/20/2016

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GEOTECHNICAL BORE LOCATION
GUY WIRE
WATER WELL
POWER POLE
SEPTIC LOCATION
SCALE: 1"=20'
20' 10' 0' 20' 40'

No.	REVISIONS	APPROVED BY	DATE
1	ISSUED FOR FERC DATA REQUEST NO. 1	DAD	10/20/16

D3131–ALG–3 | PROPOSED 30"/36" HUGUENOT LOOP | DWG. NO. | REFERENCE

ENpipeline | Millennium Pipeline
EASTERN SYSTEM UPGRADE
TITLE: MP 1.62 – RESIDENTIAL DETAIL
ORANGE COUNTY, NY

DRAWN BY	DATE	DRAWING NUMBER	SHEET	ISSUE
HP	10/12/16	D3131-RSD-4	1 OF 1	B

PROJECT NUMBER: 20562
WORK ORDER NUMBER: –

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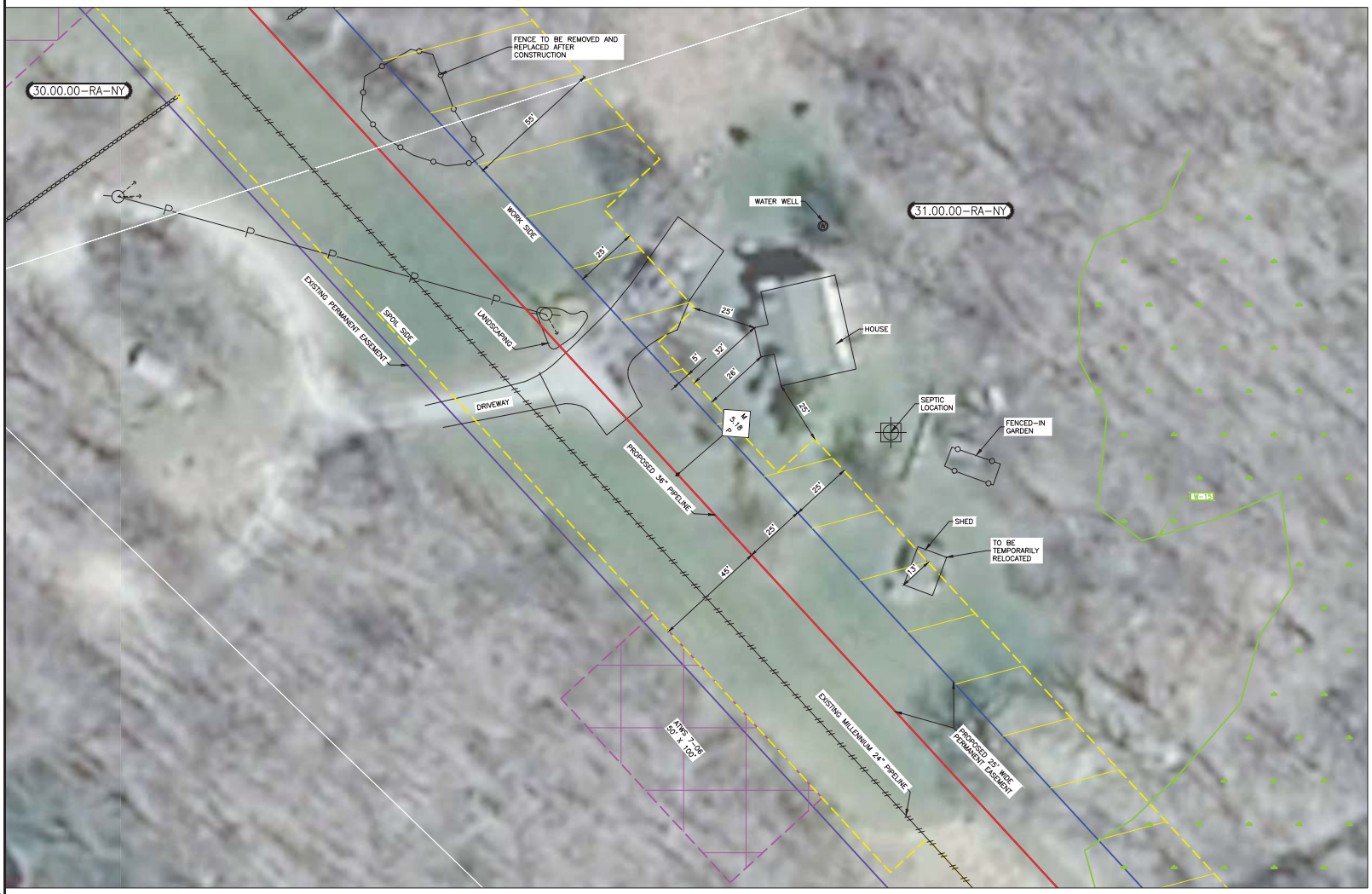
ORANGE COUNTY, NEW YORK



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ISSUED FOR FERC
DATE:07/29/2016

LEGEND

MILEPOST
PROPOSED PIPELINE
ROAD R.O.W.
PROPOSED PERMANENT EASEMENT
EXISTING MILLENNIUM PIPELINE
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SEPTIC LOCATION

SCALE: 1"=20'
20' 10' 0' 20' 40'

No.	REVISIONS	APPROVED BY	DATE
1	ISSUED FOR FERC	DAD	07/29/16

No.	REVISIONS	APPROVED BY	DATE

No.	REVISIONS	APPROVED BY	DATE

D3131-ALG-7 | PROPOSED 30"/36" HUGUENOT LOOP | DWG. NO. | REFERENCE

ENpipeline | MILLENNIUM PIPELINE

EASTERN SYSTEM UPGRADE

TITLE: MP 5.18 – RESIDENTIAL DETAIL
ORANGE COUNTY, NY

DRAWN BY	DATE	DRAWING NUMBER	SHEET	ISSUE
AR	3/10/16	D3131-RSD-5	1 OF 1	A

PROJECT NUMBER: 20562
WORK ORDER NUMBER: –

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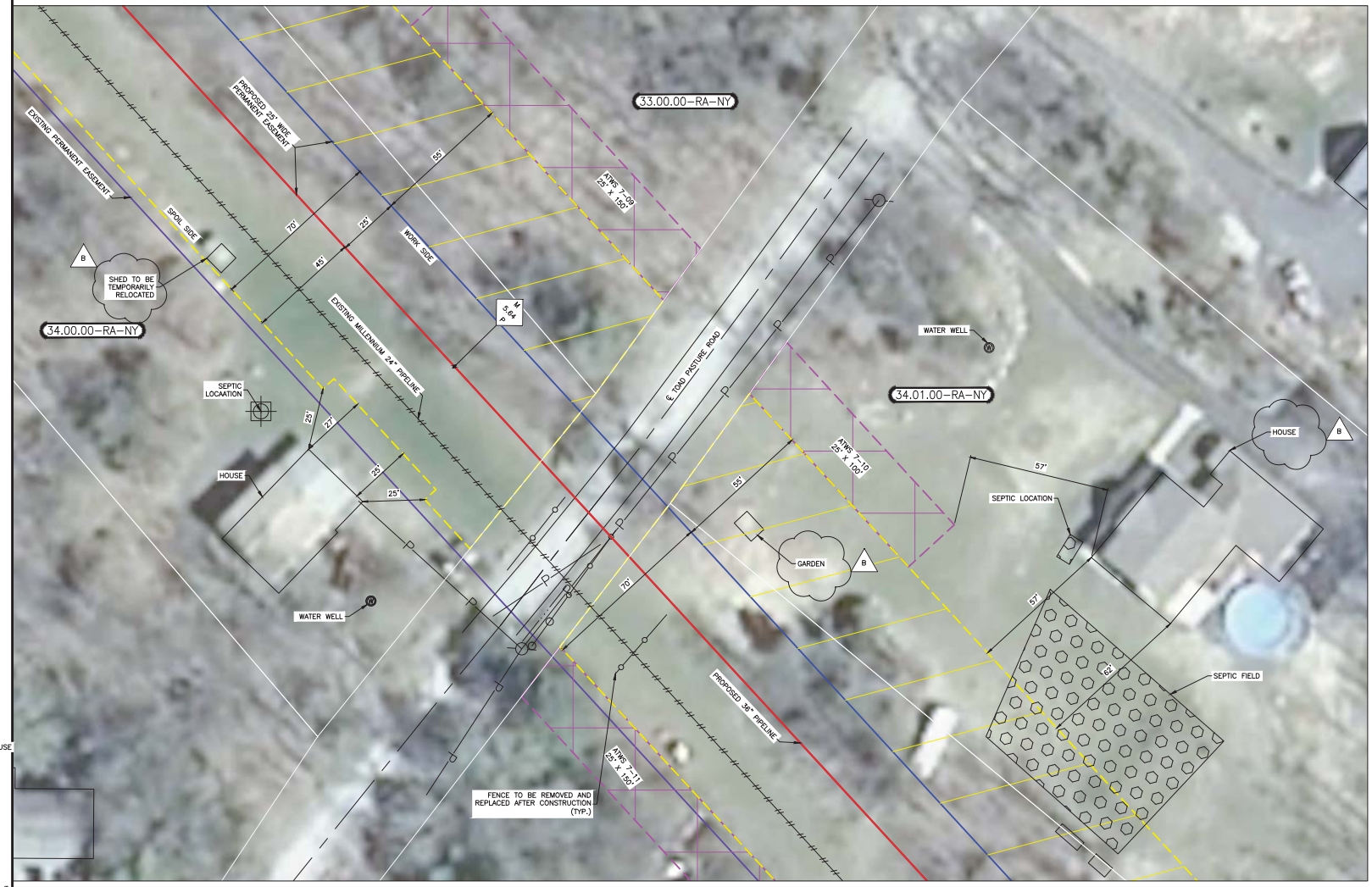
10/20/2016 8:53 PM Matthew Williams

TRACT 33.00.00–RA–NY
ORANGE COUNTY, NEW YORK



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4. OTHER EXISTING PHYSICAL FEATURES THAT NEED TO BE PROTECTED WILL BE ENCLOSED IN SAFETY FENCE TO AVOID DISTURBANCE DURING CONSTRUCTION.
5. TRENCH SHALL NOT BE EXCAVATED UNTIL PIPELINE IS READY FOR INSTALLATION AND SHALL BE BACKFILLED IN SAME DAY AS PIPE INSTALLATION IN THIS AREA. ALL OPEN DITCHES SHALL BE BARRICADED/FENCED OFF OR PLATED WHEN CONSTRUCTION ACTIVITIES ARE NOT IN PROGRESS.
6. IMMEDIATELY AFTER BACKFILLING THE TRENCH, ALL LAWN AND LANDSCAPING WILL BE RESTORED TO FINAL RESTORATION, OR TEMPORARY RESTORATION PENDING WEATHER AND SOIL CONDITIONS. IF SEASONAL OR WEATHER CONDITIONS PREVENT COMPLIANCE WITH THESE TIME FRAMES, TEMPORARY EROSION CONTROLS MUST BE MONITORED AND MAINTAINED UNTIL CONDITIONS ALLOW COMPLETION OF RESTORATION.
7. CONTRACTOR SHALL UTILIZE WATER TRUCKS AS NECESSARY TO MINIMIZE FUGITIVE DUST FROM CONSTRUCTION ACTIVITIES NEAR RESIDENCES/BUSINESSES.
8. ACCESS TO RESIDENCES BY CAR WILL BE MAINTAINED AT ALL TIMES, OR OTHER ACCOMMODATIONS WILL BE MADE WITH EACH RESPECTIVE LANDOWNER.
9. CONTRACTOR SHALL MAINTAIN AGREED UPON ACCESS TO THE IMPACTED AREA DURING CONSTRUCTION.
10. CONTRACTOR SHALL LIMIT WORK IN THIS AREA TO DAYLIGHT HOURS, UNLESS OTHERWISE AGREED UPON WITH LANDOWNER/OCCUPANT.
11. LANDOWNER/OCCUPANT SHALL BE NOTIFIED OF PROPOSED CONSTRUCTION ACTIVITIES PRIOR TO CONSTRUCTION WORK.
12. CONTRACTOR SHALL INSTALL MATS OVER EXISTING SEPTIC FIELD.

ISSUED FOR FERC DATA REQUEST NO. 1
DATE:10/20/2016

LEGEND
MP 5.64 MILEPOST
PROPOSED PIPELINE
ROAD R.O.W.
PROPOSED PERMANENT EASEMENT
EXISTING MILLENNIUM PIPELINE
EXISTING PERMANENT EASEMENT
MUNICIPALTY BORDER
PROPOSED FENCE
EXISTING FENCE
OVERHEAD POWER LINE
WATERLINE
TELEPHONE LINE
FOREIGN PIPELINE
TEMPORARY WORKSPACE
ADDITIONAL TEMPORARY WORKSPACE
STAGING AREA
PROPOSED PERMANENT WORKSPACE
EXISTING PERMANENT WORKSPACE
PIPE / CONTRACTOR YARD
FEMA FLOODPLAIN
TEMPORARY ACCESS ROAD
PERMANENT ACCESS ROAD
PAR–0001 ACCESS ROAD NUMBER
W–02 WETLAND ID
S–02 WATERBODY ID
WETLAND
WATERBODY
SEPTIC FIELD
51–00–001.000 PROPERTY TRACT NUMBER
GEOTECHNICAL BORE LOCATION
GUY WIRE
WATER WELL
POWER POLE
SEPTIC LOCATION
SCALE: 1"=20'
20' 10' 0' 20' 40'

No.	REVISIONS	APPROVED BY	DATE
2	ISSUED FOR FERC DATA REQUEST NO. 1	DAD	10/20/16
1	ISSUED FOR FERC	DAD	07/29/16

D3131–ALG–7 | PROPOSED 30"/36" HUGUENOT LOOP | DWG. NO. | REFERENCE

ENBridge | WILLIAMS PIPELINE
EASTERN SYSTEM UPGRADE
TITLE: MP 5.64 – RESIDENTIAL DETAIL
ORANGE COUNTY, NY

DRAWN BY	DATE	DRAWING NUMBER	SHEET	ISSUE
AR	3/10/16	D3131–RSD–6	1 OF 1	B

PROJECT NUMBER 20562
WORK ORDER NUMBER –

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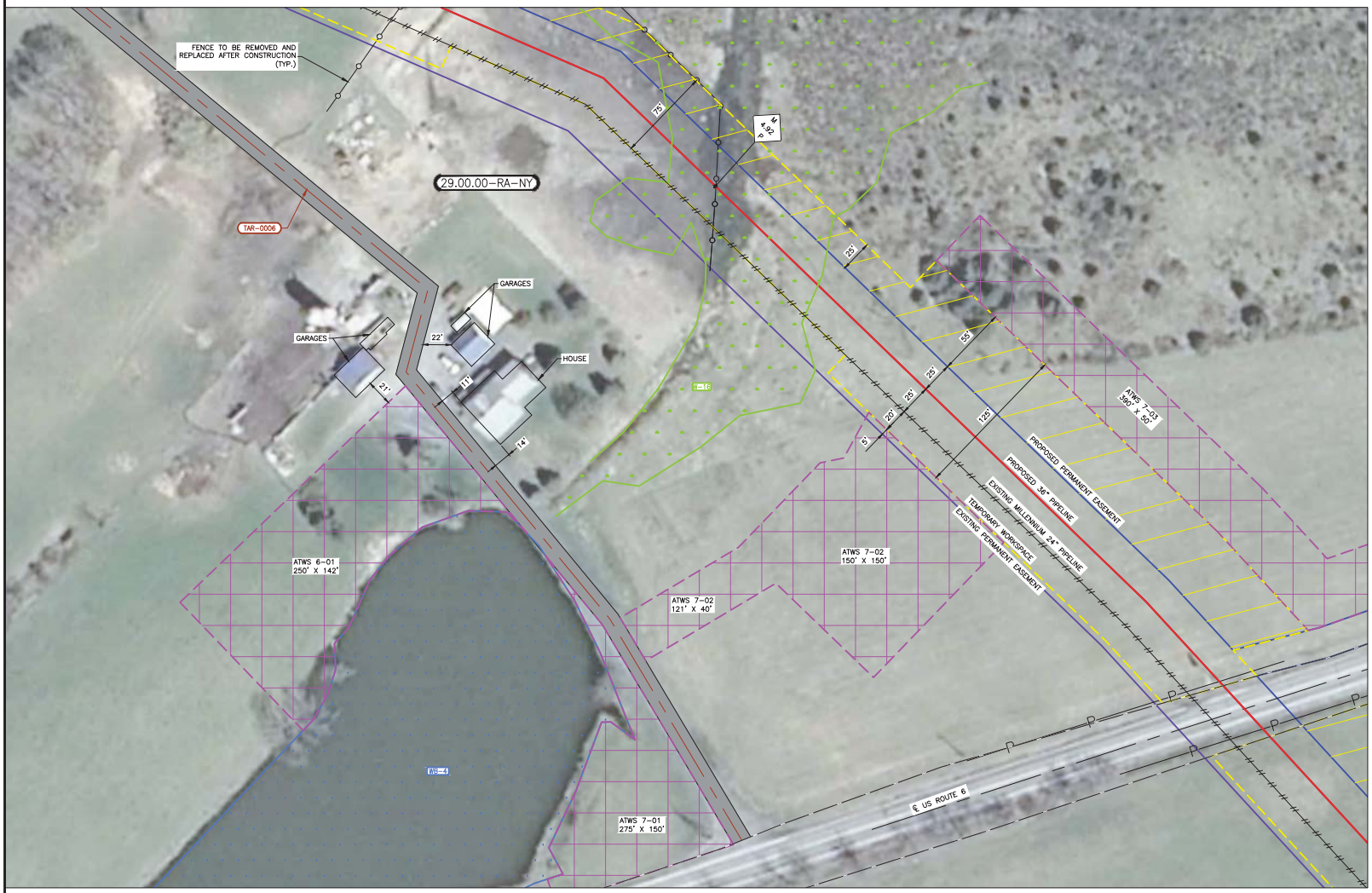
10/20/2016 8:53 PM Marissa Williams

TRACT 29.00.00–RA–NY
ORANGE COUNTY, NEW YORK



DESCRIPTION
THIS DRAWING DOCUMENTS MITIGATION MEASURES THAT WILL BE IMPLEMENTED FOR ALL RESIDENCES WITHIN 50 FEET OF THE PROPOSED CONSTRUCTION WORK AREA. CONTRACTOR SHALL COMPLY WITH THE FOLLOWING CONSTRUCTION MITIGATION REQUIREMENTS IN ADDITION TO THOSE LISTED IN THE CONSTRUCTION SPECIFICATIONS.

NOTES:

1. TOPOGRAPHIC INFORMATION AND AERIAL IMAGERY SHOWN HEREON WAS PREPARED FROM AERIAL STEREO PHOTOGRAMETRY PREPARED BY COL–EAST INC. AND FLOWN ON NOVEMBER 25, 2015. DATA SHOWN WAS TAKEN FROM DIGITALLY COMPILED MANUSCRIPTS.
2. NATIONAL MAPPING STANDARDS INDICATE 90% OF ALL CONTOURS SHOWN SHALL BE CORRECT WITHIN ONE HALF (1/2) OF THE CONTOUR INTERVAL, AND REMAINING 10% SHALL NOT BE IN ERROR BY MORE THAN THE CONTOUR INTERVAL.

CONSTRUCTION REQUIREMENTS:

1. CONTRACTOR SHALL ERECT AND MAINTAIN A SAFETY FENCE BETWEEN THE CONSTRUCTION ZONE AND THE ADJACENT RESIDENCES EXTENDING 100 FEET ON EITHER SIDE OF THE RESIDENCE TO ENSURE THAT EQUIPMENT, MATERIALS AND SPOIL REMAIN WITHIN THE CONSTRUCTION WORK AREA.
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ISSUED FOR FERC DATA REQUEST NO. 1
DATE: 10/20/2016

LEGEND
MILEPOST
PROPOSED PIPELINE
ROAD R.O.W.
PROPOSED PERMANENT EASEMENT
EXISTING MILLENNIUM PIPELINE
EXISTING PERMANENT EASEMENT
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PIPE / CONTRACTOR YARD
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TEMPORARY ACCESS ROAD
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PAR–0001 ACCESS ROAD NUMBER
W–02 WETLAND ID
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WETLAND
WATERBODY
SEPTIC FIELD
SI–30–001.000 PROPERTY TRACT NUMBER
GEOTECHNICAL BORE LOCATION
GUY WIRE
WATER WELL
POWER POLE
SEPTIC LOCATION
SCALE: 1"=40'
40' 20' 0' 40' 80'

No.	REVISIONS	APPROVED BY	DATE
1	ISSUED FOR FERC DATA REQUEST NO. 1	DAD	10/20/16

D3131–ALG–6 | PROPOSED 30"/36" HUGUENOT LOOP | DWG. NO. | REFERENCE

ENpipeline | Millennium Pipeline
EASTERN SYSTEM UPGRADE
TITLE: MP 4.92 – RESIDENTIAL DETAIL
ORANGE COUNTY, NY

DRAWN BY	DATE	DRAWING NUMBER	SHEET	ISSUE
HP	10/12/16	D3131–RSD–7	1 OF 1	B

PROJECT NUMBER: 20562
WORK ORDER NUMBER: –

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10/20/2016 8:53 PM Matthew Williams

TRACT 44.00.00–RA–NY
ORANGE COUNTY, NEW YORK

DESCRIPTION
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ISSUED FOR FERC DATA REQUEST NO. 1
DATE: 10/20/2016

LEGEND
MILEPOST
PROPOSED PIPELINE
ROAD R.O.W.
PROPOSED PERMANENT EASEMENT
EXISTING MILLENNIUM PIPELINE
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MUNICIPALTY BORDER
FOREIGN PIPELINE
PROPOSED FENCE
EXISTING FENCE
OVERHEAD POWER LINE
WATERLINE
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ADDITIONAL TEMPORARY WORKSPACE
PROPOSED PERMANENT WORKSPACE
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PIPE / CONTRACTOR YARD
STAGING AREA
TEMPORARY ACCESS ROAD
PERMANENT ACCESS ROAD
ACCESS ROAD NUMBER
WETLAND ID
WATERBODY ID
WETLAND
WATERBODY
SEPTIC FIELD
PROPERTY TRACT NUMBER
GEOTECHNICAL BORE LOCATION
GUY WIRE
WATER WELL
POWER POLE
SEPTIC LOCATION

SCALE: 1" = 20'
20' 10' 0' 20' 40'

No.	REVISIONS	APPROVED BY	DATE
B	ISSUED FOR FERC DATA REQUEST NO. 1	DAD	10/20/16
A			

No.	REVISIONS	APPROVED BY	DATE

No.	REVISIONS	APPROVED BY	DATE

D3131–ALG–9 | PROPOSED HUGUENOT LOOP | DWG. NO. | REFERENCE

ENpipeline | MILLENNIUM PIPELINE

EASTERN SYSTEM UPGRADE

TITLE: MP 7.71 – RESIDENTIAL DETAIL
ORANGE COUNTY, NY

DRAWN BY	DATE	DRAWING NUMBER	SHEET	ISSUE
AR	3/10/16	D3131-RSD-8	1 OF 1	B

PROJECT NUMBER: 20562
WORK ORDER NUMBER: –

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10/27/2016 9:08 AM Matthew Williams

APPENDIX E
WATERBODIES CROSSED BY THE PROJECT

Appendix E
Waterbodies Crossed by the Project

Waterbody ID	Waterbody Name	Approximate MP	Flow Type	Crossing Length (feet)	Size Classification[a]	Water Quality Standard[b]	Fishery Classification[c]	Impaired[d]	Crossing Method[e]
Huguenot Loop									
S-16	Neversink River	0.7	Perennial	365	Major	B	Coldwater	pH	HDD
S-19	Unnamed Tributary to Neversink River	0.8	Intermittent	<3	Minor	---	Coldwater	N/A	HDD
S-15	Unmapped Tributary to Neversink River	1.4	Intermittent	<3	Minor	---	Coldwater	N/A	Dry waterbody, dam-and-pump, or flume
S-14	Shin Hollow Brook	1.7	Perennial	<3	Minor	C(T)	Coldwater	N/A	Conventional bore
S-13	Unnamed Tributary to Shin Hollow Brook	1.7	Intermittent	<3	Minor	---	Coldwater	Phosphorous and unknown toxicity	Conventional bore
S-12	Shin Hollow Brook	2.5	Perennial	<3	Minor	C(T)	Potential wild brown and brook trout	Phosphorous and unknown toxicity	Flume or dam-and-pump
S-10	Unnamed Tributary to Shawangunk Kill	3.1	Perennial	<3	Minor	A	Coldwater	N/A	HDD
S-09	Unnamed Tributary to Shawangunk Kill	3.2	Perennial	<3	Minor	A	Coldwater	N/A	HDD
S-07	Unnamed Tributary to Rutgers Creek	4.6	Perennial	30	Intermediate	C	Coldwater	N/A	HDD
S-05	Unnamed Tributary to Rutgers Creek	6.3	Intermittent	<3	Minor	C	Coldwater	N/A	Dry waterbody, dam-and-pump, or flume
S-04	Unnamed Tributary to Rutgers Creek	6.9	Intermittent	<3	Minor	---	Coldwater	N/A	Dry waterbody, dam-and-pump, or flume

Appendix E (continued)
Waterbodies Crossed by the Project

Waterbody ID	Waterbody Name	Approximate MP	Flow Type	Crossing Length (feet)	Size Classification[a]	Water Quality Standard[b]	Fishery Classification[c]	Impaired[d]	Crossing Method[e]
S-04	Unnamed Tributary to Rutgers Creek	6.9	Intermittent	<3	Minor	---	Coldwater	N/A	Dry waterbody, dam-and-pump, or flume
S-03	Rutgers Creek	7.3	Perennial	45	Intermediate	C(T)	Coldwater	N/A	Flume or dam-and-pump
S-01	Unnamed Tributary to Rutgers Creek	7.7	Perennial	17	Intermediate	C	Coldwater	N/A	Flume or dam-and-pump
Contractor/Pipe Yards and Staging Areas									
S-02	Unmapped Tributary to Rutgers Creek	Staging Area 4	Perennial	<3	Minor	C	Coldwater	N/A	Equipment crossing and erosion controls
Access Roads									
S-17	Unnamed Tributary to Neversink River	TAR-0003	Ephemeral	Culvert	Minor	---	Coldwater	N/A	Use existing culvert[f]
S-17	Unnamed Tributary to Neversink River	TAR-0009	Ephemeral	Culvert	Minor	---	Coldwater	N/A	Use existing culvert[f]
S-08	Unnamed Tributary to Rutgers Creek	TAR-0005	Perennial	Culvert	Minor	C	Coldwater	N/A	Use existing culvert
WB-04	Unnamed Tributary to Rutgers Creek	TAR-0006	Lake/Pond	0	N/A	C	None	N/A	Install erosion controls/water withdrawal location
S-01	Unnamed Tributary to Rutgers Creek	TAR-0008	Perennial	Culvert	Minor	C	Coldwater	N/A	Use existing culvert
WB-01	Unnamed Tributary to Rutgers Creek	TAR-0008	Lake/Pond	Culvert	Minor	C	Coldwater	N/A	Use existing culvert

Appendix E (continued)
Waterbodies Crossed by the Project

Waterbody ID	Waterbody Name	Approximate MP	Flow Type	Crossing Length (feet)	Size Classification[a]	Water Quality Standard[b]	Fishery Classification[c]	Impaired[d]	Crossing Method[e]
HL-S-01	Unmapped Tributary to Halfway Brook	Highland Compressor Station PAR	Intermittent	<3	Minor	---	Coldwater	N/A	Construct open-bottom box culvert
HC-S-01	Unnamed Tributary to Pea Brook	Hancock Compressor Station PAR	Perennial	12	Intermediate	C(T)	Coldwater	N/A	Use existing permanent crossing
S-23	Unnamed Tributary to Rutgers Creek	PAR-0003	Intermittent	<3	Minor	C	Coldwater	N/A	Use existing culvert
S-24	Unnamed Tributary to Rutgers Creek	PAR-0003	Intermittent	<3	Minor	---	Coldwater	N/A	Use existing culvert

Crossing length of zero (0) feet indicates that the waterbody crosses the construction right-of-way space but does not cross the pipeline itself.

[a] Minor (<10-feet-wide); Intermediate (>10 - <100-feet-wide); Major (>100-feet-wide).

[b] Source: Gierloff 2016b and Water Quality Classifications; NYSDEC 2010a.

[c] Source: Gierloff 2016a and 2016b.

[d] State water quality classification has been defined in the Section 303(d) list.

[e] Where trenched crossings are proposed, a dry crossing method would be implemented (i.e., dam-and-pump or flume) where there is discernable flow at the time of crossing.

[f] The existing culvert would be protected with steel plating or equivalent.

APPENDIX F
WETLANDS CROSSED BY THE PROJECT

Appendix F
Wetlands Crossed by the Project

Facility/ Wetland ID	MP	Wetland Class[a]	Crossing Length (feet)[b]	Wetland Impact (acres)[c]						Permanent Forested Wetland Conversion (acres)[d]	State Wetland Classification[e]	Crossing Method[f]
				Construction New/Existing			Operation New/Existing					
				PFO	PSS	PEM	PFO	PSS	PEM			
Huguenot Loop												
W-27	0.8	PFO	41	---	---	---	---	---	---	---	---	HDD
W-24	1.4	PFO/PEM	0	0.02 /--	---	0.00 / 0.03	---	---	0.00 / 0.03	---	---	Open-cut
W-22	2.5	PFO/PEM	28	0.05 /--	---	0.02 / 0.01	0.01 /--	---	0.02 / 0.01	---	---	Open-cut
W-28C	2.9	PSS	0	---	---	---	---	---	---	---	---	ATWS (perimeter erosion controls)
W-21	3.1	PSS	98	---	---	---	---	---	---	---	---	HDD
W-21	3.2	PEM/PFO	41	---	---	---	---	---	---	---	---	HDD
W-21	3.3	PEM/PFO	257	---	---	---	---	---	---	---	---	HDD
W-20	3.5	PFO/PEM/ PSS	230	---	---	---	---	---	---	---	UN-1; Class 2	HDD
W-18	3.8	PEM/PFO	212	---	---	0.22 / 0.12	---	---	0.11 / 0.12	---	---	Open-cut
W-17	4.4	PEM/PFO	798	---	---	---	---	---	---	---	OT-33; Class 2	HDD
W-16	4.9	PEM	163	---	---	0.29 / 0.17	---	---	0.10 / 0.09	---	---	Open-cut
W-15	5.2	PEM/PFO	35	0.16 / 0.00	---	0.00 / 0.03	0.07 /--	---	0.00 / 0.03	0.03	NYSDC Eligible	Open-cut
W-12	5.8	PFO/PEM	0	0.06 / 0.00	---	-- / 0.03	0.06 / --	---	---	0.03	UN-7; Class 3	Open-cut
W-11	6.0	PEM/PFO	39	0.09 /--	---	0.01 / 0.02	0.04 /--	---	0.01 / 0.02	0.02	---	Open-cut
W-10	6.3	PEM/PFO	20	0.04 /--	---	0.00 / 0.01	0.02 /--	---	0.00 / 0.01	0.00	---	Open-cut
W-09	6.8	PEM/PFO	173	0.21 /--	---	0.01 / 0.08	0.10 /--	---	0.01 / 0.08	0.05	---	Open-cut
W-09	6.9	PEM/PFO	135	0.12 /--	---	0.02 / 0.08	0.05 /--	---	0.02 / 0.08	0.03	---	Open-cut

Appendix F (continued)
Wetlands Crossed by the Project

Facility/ Wetland ID	MP	Wetland Class[a]	Crossing Length (feet)[b]	Wetland Impact (acres)[c]						Permanent Forested Wetland Conversion (acres)[d]	State Wetland Classification[e]	Crossing Methodf
				Construction New/Existing			Operation New/Existing					
				PFO	PSS	PEM	PFO	PSS	PEM			
W-08	6.9	PEM/PFO	13	0.01 /--	---	0.00 / 0.01	---	---	0.00 / 0.01	---	---	Open-cut
W-08	6.9	PEM	27	---	---	0.01 / 0.01	---	---	0.01 / 0.01	---	---	Open-cut
W-07	7.1	PEM	134	---	---	0.08 / 0.09	---	---	0.04 / 0.09	---	---	Open-cut
W-06	7.2	PEM	211	---	---	0.36 / 0.21	---	---	0.13 / 0.12	---	---	Open-cut
W-04	7.6	PEM	9	---	---	-- / 0.02	---	---	-- / 0.01	---	---	Open-cut
W-03	7.6	PEM	240	---	---	0.28 / 0.12	---	---	0.14 / 0.12	---	---	Open-cut
Pipeline Total			**2,904**	**0.75 / --**	**---**	**1.31 / 1.05**	**0.35 / --**	**---**	**0.59 / 0.83**	**0.16**		
Access Roads												
W-07	TAR-0007	PEM	0	---	---	---	---	---	---	---	---	Fence and avoid
W-30	PAR-0003	PEM	0	---	---	---	---	---	---	---	---	Fence and avoid
W-31	PAR- 0003	PEM	0	---	---	---	---	---	---	---	---	Fence and avoid
HL-W-01	Highland Compressor Station PAR	PFO	10	0.02 / --	---	---	0.02 / --	---	---	0.02	---	Construct new permanent bridge
Project Total			**2,914**	**0.77 / --**	**---**	**1.31 / 1.05**	**0.37 / --**	**---**	**0.59 / 0.83**	**0.18**		---

Appendix F (continued)
Wetlands Crossed by the Project

Facility/ Wetland ID	MP	Wetland Class[a]	Crossing Length (feet)[b]	Wetland Impact (acres)[c]						Permanent Forested Wetland Conversion (acres)[d]	State Wetland Classification[e]	Crossing Methodf
				Construction New/Existing			Operation New/Existing					
				PFO	PSS	PEM	PFO	PSS	PEM			

[a] Wetland classification according to Cowardin *et al.* 1979.

[b] A crossing length of zero indicates the feature is not crossed by the centerline of the pipeline but is located within the construction work area. For access roads, a crossing length of zero indicates that the feature is located adjacent to the access road.

[c] Construction acreage includes all workspace during construction activities; Operation acreage = new 25-foot-wide permanent easement for the Huguenot Loop and existing 25-foot-wide permanent easement for existing Millennium Pipeline. No impact acres included for wetlands located within HDD crossings.

[d] PFO conversion = PFO wetland area within 15 feet of the centerline of the Huguenot Loop and within the Highland Compressor Station PAR.

[e] Source: Gierloff 2016b

APPENDIX G
NEAREST NOISE SENSITIVE AREAS TO THE ABOVEGROUND FACILITIES

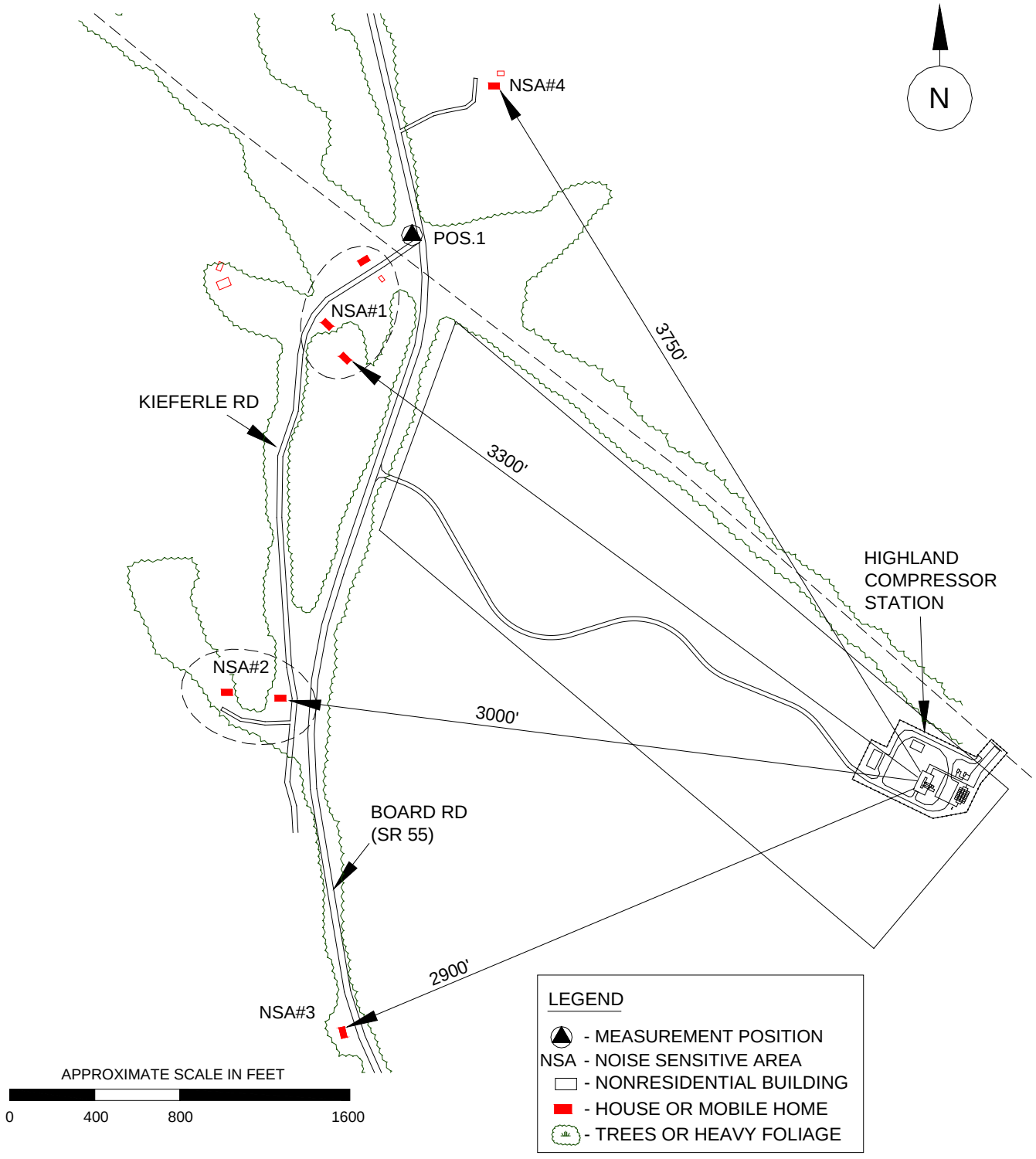

Figure G.1: Proposed Highland Compressor Station, Nearest Noise Sensitive Areas

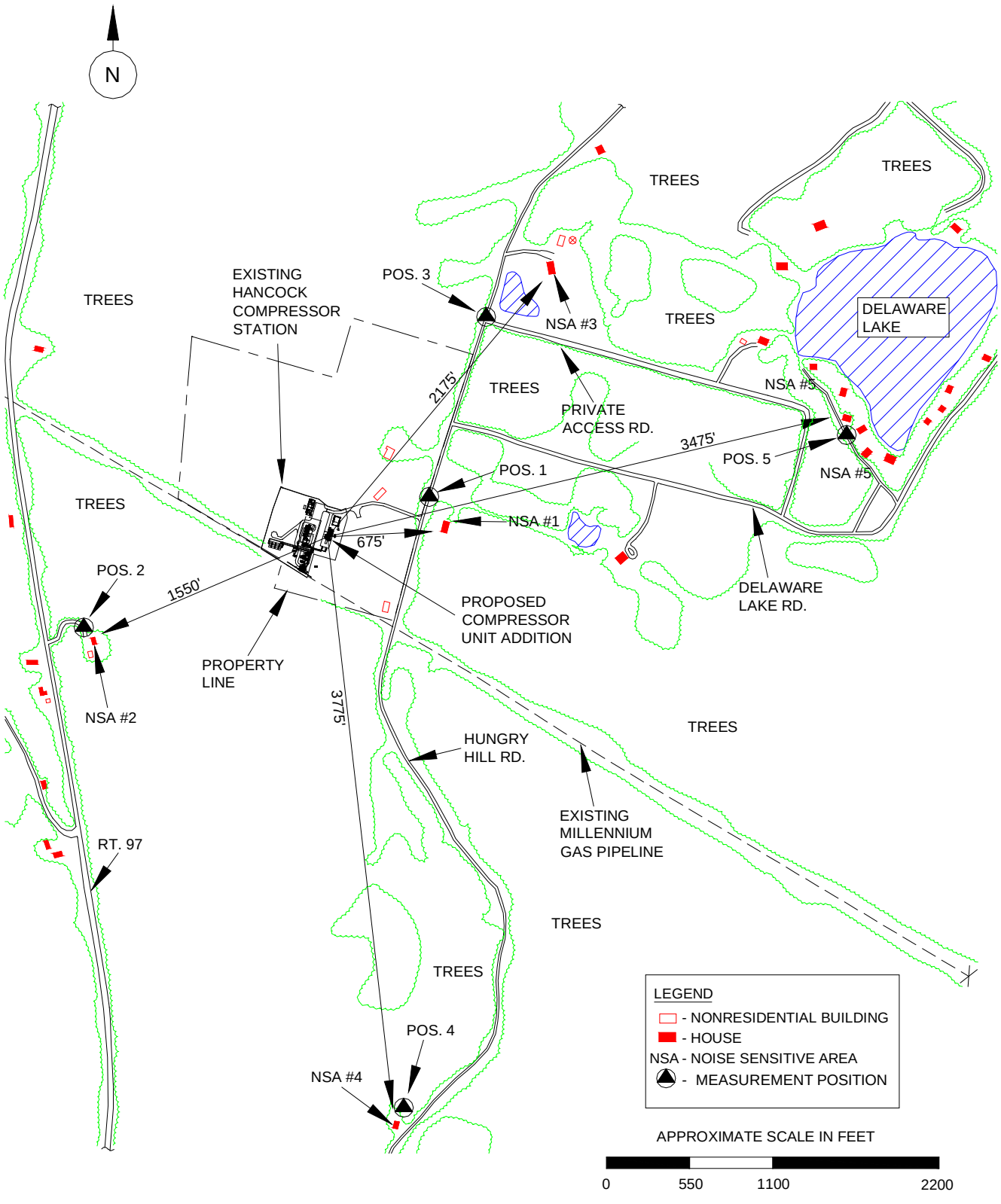

Figure G.2: Existing Hancock Compressor Station, Nearest Noise Sensitive Areas

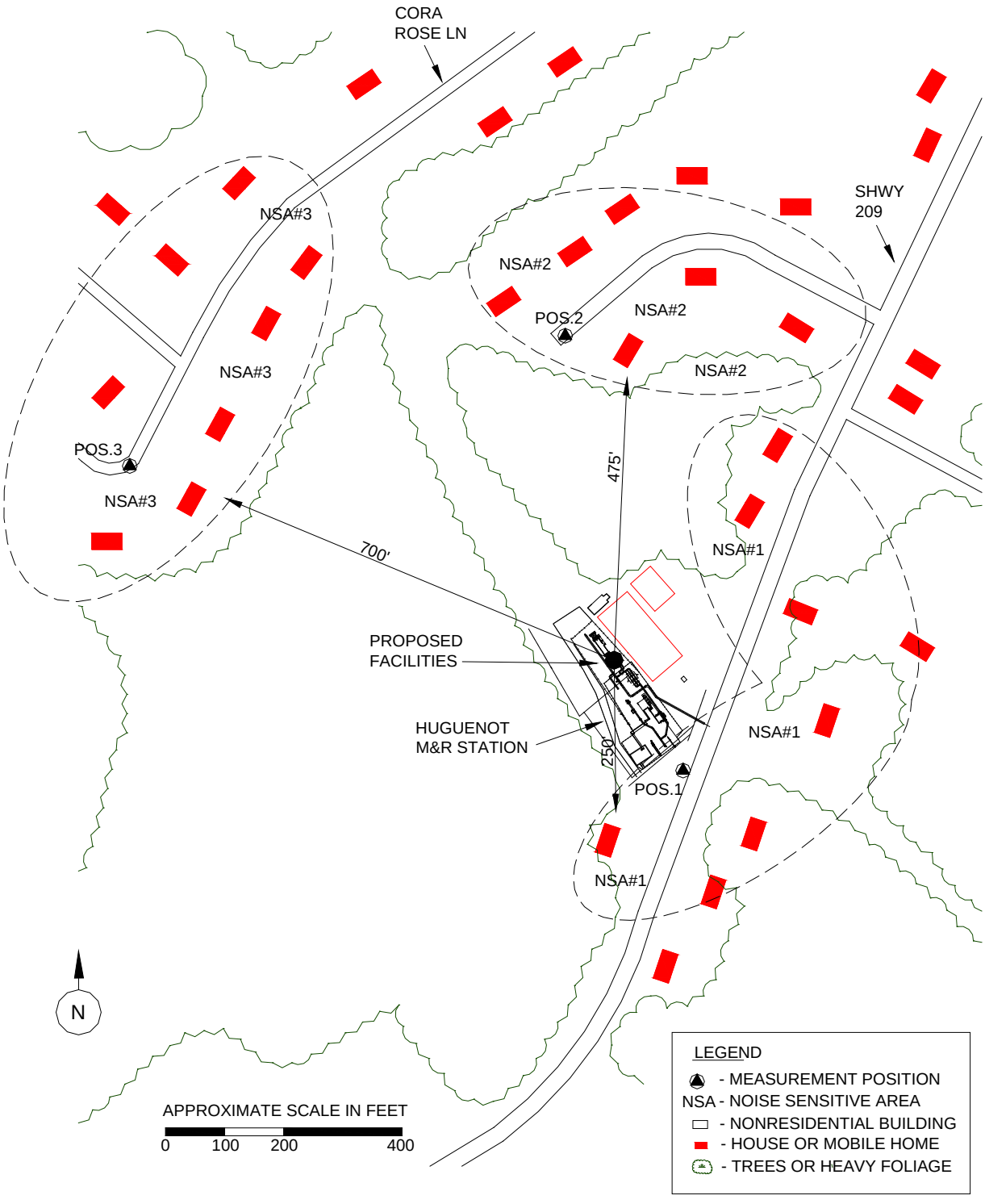

Figure G.3: **Existing Huguenot Meter Station, Nearest Noise Sensitive Areas**

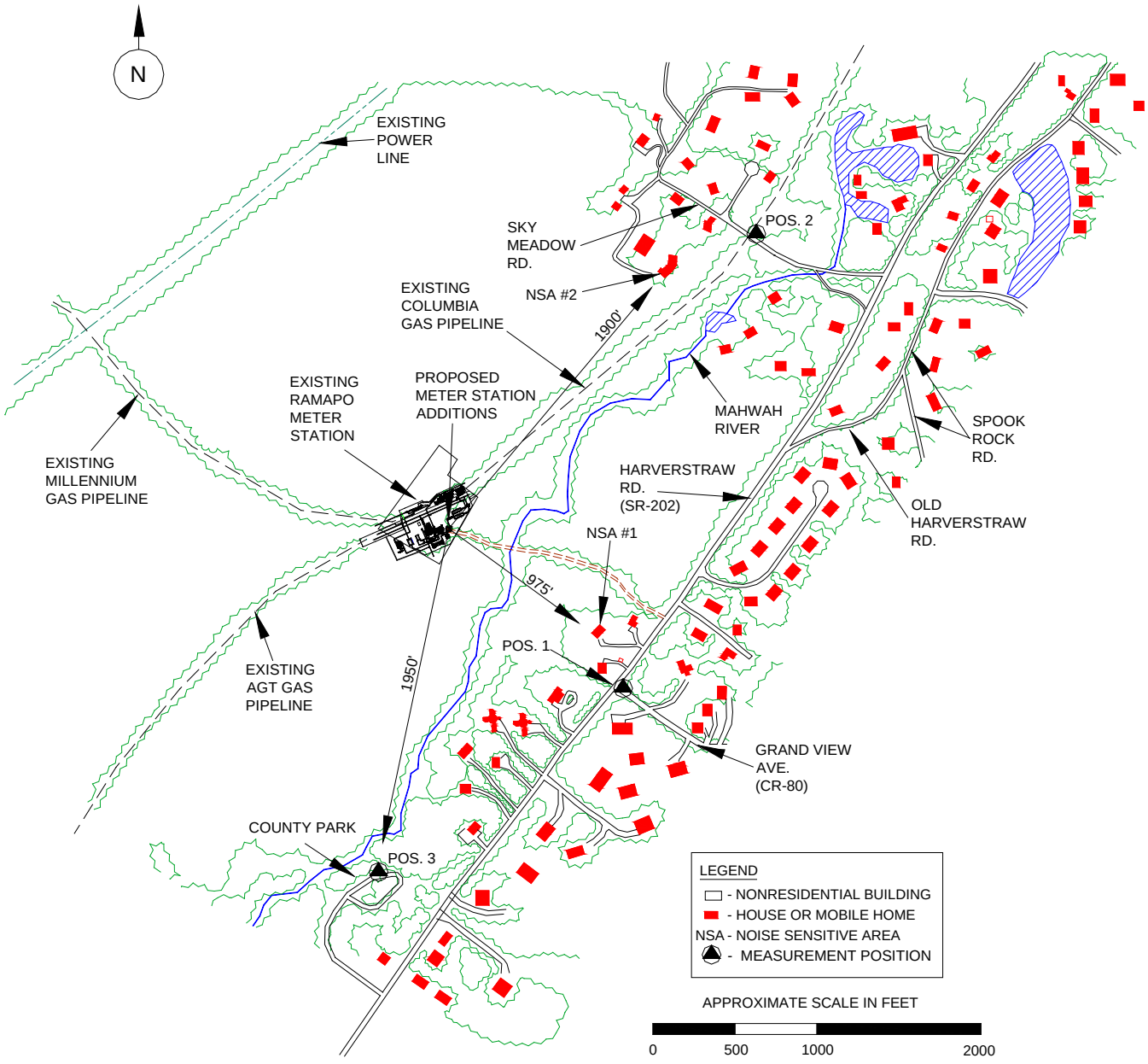

Figure G.4: **Existing Ramapo Meter Station, Nearest Noise Sensitive Areas**