Federal Energy Regulatory Commission

Office of
Energy Projects

May 2019

Tennessee Gas Pipeline Company, LLC Docket No. CP19-7-000

261 Upgrade Project

Environmental Assessment

U.S. Army Corps
of Engineers

Washington, DC 20426

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply Refer To:
OEP/DG2E/Gas 2
Tennessee Gas Pipeline Company, LLC
261 Upgrade Project
Docket No. CP19-7-000

TO THE INTERESTED PARTIES:

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared an environmental assessment (EA) for the 261 Upgrade Project (Project), proposed by Tennessee Gas Pipeline Company, LLC (Tennessee Gas) in the above-referenced docket. The Project is designed to provide 72,400 million cubic feet per day (Mcf/d) to subscribed Project shippers. Tennessee Gas also requests approval to upgrade facilities at Compressor Station (CS) 261 to increase reliability to existing shippers. The Project includes modifications to existing facilities and installation of new pipeline in Hampden County, Massachusetts.

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 (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 U.S. Army Corps of Engineers participated as a cooperating agency 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 proposed Project includes the following facilities in Hampden County, Massachusetts:

Horsepower Replacement Project

- Abandon and replace two existing turbine compressor units with one new turbine compressor unit and auxiliary facilities; and
- abandon and replace the emergency generator.

Looping Project

- Install 2.1 miles of 12-inch-diameter pipeline loop adjacent to Tennessee Gas pipelines;
- install pig launcher and receiver facilities and tie-in piping; and
- abandon and remove an inactive 6-inch-diameter pipeline.

The FERC staff mailed a copy of the *Notice of Availability* to federal, state, and government representatives and agencies; elected officials; environmental and public interest groups; Native American tribes; potentially affected landowners; other interested individuals and groups; and newspapers and libraries in the project area. The EA is only available in electronic format. It may be viewed and downloaded from the FERC's website (www.ferc.gov), on the Environmental Documents page (https://www.ferc.gov/industries/gas/enviro/eis.asp). In addition, the EA can be accessed by using the eLibrary link on the FERC's website. Click on the eLibrary link (https://www.ferc.gov/docs-filing/elibrary.asp), click on General Search, and enter the docket number in the "Docket Number" field, excluding the last three digits (i.e. CP19-7). Be sure you have selected an appropriate date range. For assistance, please contact FERC Online Support at FercOnlineSupport@ferc.gov or toll free at (866) 208-3676, or for TTY, contact (202) 502-8659.

Any person wishing to comment on the EA may do so. Your comments should focus on the EA's disclosure and discussion of potential environmental effects, reasonable alternatives, and measures to avoid or lessen environmental impacts. The more specific your comments, the more useful they would 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 5:00pm Eastern Time on **June 17, 2019.**

For your convenience, there are three methods you can use to file your comments to the Commission. The Commission encourages electronic filing of comments and has staff available to assist you at (866) 208-3676 or FercOnlineSupport@ferc.gov. Please carefully follow these instructions so that your comments are properly recorded.

(1) You can file your comments electronically using the eComment feature on the Commission's website (www.ferc.gov) under the link to Documents and Filings. This is an easy method for submitting brief, text-only comments on a project;

(2) You can also file your comments electronically using the eFiling feature on the Commission's website (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 must select the type of filing you are making. If you are filing a comment on a particular project, please select "Comment on a Filing"; or

(3) You can file a paper copy of your comments by mailing them to the following address. Be sure to reference the project docket number (CP19-7-000) with your submission: Kimberly D. Bose, Secretary, Federal Energy Regulatory Commission, 888 First Street NE, Room 1A, Washington, DC 20426.

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 (18 CFR 385.214). Motions to intervene are more fully described at http://www.ferc.gov/resources/guides/how-to/intervene.asp. Only intervenors have the right to seek rehearing or judicial review of the Commission's decision. The Commission may grant affected landowners and others with environmental concerns intervenor status upon showing good cause by stating that they have a clear and direct interest in this proceeding which no other party can adequately represent. **Simply filing environmental comments will not give you intervenor status, but 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 **(866) 208-FERC,** or on the FERC website (www.ferc.gov) using the eLibrary link. The eLibrary link also provides access to the texts of all 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.

TABLE OF CONTENTS

LIST OF TABLES

LIST OF FIGURES

LIST OF APPENDICES

TECHNICAL ACRONYMS AND ABBREVIATIONS

APE	Area of Potential Effects
AQCR	Air Quality Control Region
ATWS	Additional temporary workspace
BMP	Best Management Practices
BVW	Bordering Vegetated Wetlands
Certificate	Certificate of Public Convenience and Necessity
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CMA	Columbia Gas of Massachusetts
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
Commission	Federal Energy Regulatory Commission
CS	Compressor station
cPAH	carcinogenic polycyclic aromatic hydrocarbons
dB	Decibel
dBA	A-weighted decibel
DOT	U.S. Department of Transportation
EA	environmental assessment
ECD	Erosion Control Devices
ECMP	Environmental Construction Management Plan
EI	environmental inspector
EO	Executive Order
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act
FDCP	Fugitive Dust Control Plan
FERC	Federal Energy Regulatory Commission
FWS	U.S. Fish and Wildlife Service
G	Gravity
GHG	greenhouse gas
GWP	global warming potential
HAP	hazardous air pollutants
HDD	Horizontal Directional Drilling
hp	Horsepower
HUC	Hydrologic Unit Code
IPAC	Information for Planning and Consultation
IVW	Isolated Vegetated Wetlands
L_{eq}	equivalent sound level
L_{dn}	day-night sound level
LUWW	Land Under Waterbodies and Waterways
M&R	meter and regulator

MA DFW	Massachusetts Division of Fisheries and Wildlife
MassDEP	Massachusetts Department of Environmental Protection
MBTA	Migratory Bird Treaty Act
Mcf/d	million cubic feet per day
MOU	Memorandum of Understanding
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NGA	Natural Gas Act
NHESP	Natural Heritage and Endangered Species Program
NNSR	Nonattainment New Source Review
NO_2	nitrogen dioxide
NO_x	nitrogen oxides
N_2O	nitrous oxide
NOI	*Notice of Intent to Prepare an Environmental Assessment for the Proposed 261 Upgrade Project and Request for Comments on Environmental Issues*
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSA	noise sensitive area
OEP	Office of Energy Projects
OTP	Ozone Transport Region
PAR	permanent access road
PCB	polychlorinated biphenyl
PGA	peak ground acceleration
Plan	FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan*
$PM_{2.5}$	particulate matter with an aerodynamic diameter less than or equal to 2.5 microns
PM_{10}	particulate matter with an aerodynamic diameter less than or equal to 10 microns
Procedures	FERC's *Wetland and Waterbody Construction and Mitigation Procedures*
Project	261 Upgrade Project
PSD	Prevention of Significant Deterioration
Secretary	Secretary of the Commission
SHPO	State Historic Preservation Officer
SO_2	sulfur dioxide
SPCP	Spill Prevention and Control Plan
TAR	temporary access road
Tennessee Gas	Tennessee Gas Pipeline Company, LLC
TCP	Traditional Cultural Properties
THPO	Tribal Historic Preservation Officer
USACE	U.S. Army Corps of Engineers
USGS	U.S. Geological Service
VOC	volatile organic compound
WPA	Wetlands Protection Act

A. PROPOSED ACTION

INTRODUCTION

The staff of the Federal Energy Regulatory Commission (Commission or FERC) has prepared this environmental assessment (EA) to assess the environmental effects of the natural gas pipeline facilities proposed by Tennessee Gas Pipeline Company, LLC (Tennessee Gas) in Hampden County, Massachusetts.

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

On October 19, 2018, Tennessee Gas filed an application with the Commission in Docket No. CP19-7-000 for the 261 Upgrade Project (Project) under section 7(b) and 7(c) of the Natural Gas Act (NGA) and part 157 of the Commission's regulations. Tennessee Gas seeks to construct, operate, and abandon certain natural gas facilities in Massachusetts. The Project would provide long term firm transportation service to Project shippers, creating 72,400 dekatherms per day (Dth/d) of new firm transportation capacity.

PURPOSE AND NEED

Tennessee Gas stated that the Project purpose would be to upgrade the existing 261B-100 pipeline and Compressor Station (CS) 261 to provide long-term firm transportation service to Project shippers, Columbia Gas of Massachusetts (CMA) and Holyoke Gas and Electric Department, and to help alleviate capacity-strain in the New England gas markets. To accomplish this, Tennessee Gas proposes to increase the firm transportation capacity on the existing pipeline to allow greater access to natural gas supplies.

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 of Public Convenience and Necessity (Certificate) to construct and operate them. The Commission bases its decisions on technical competence, financing, rates, market demand, gas supply, environmental impact, long-term feasibility, and other issues concerning a proposed project.

Section 7(b) of the NGA specifies that no natural gas company shall abandon any portion of its facilities subject to the Commission's jurisdiction without the Commission first finding that the abandonment would not negatively affect the present or future public convenience and necessity. The Commission bases its decisions on technical competence, financing, rates, market demand, gas supply, environmental impact, long-term feasibility, and other issues concerning a proposed project.

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

PROPOSED FACILITIES

Tennessee Gas proposes to perform the following activities for construction of the Project in Hampden County, Massachusetts (figure 1):

Horsepower (HP) Replacement Project

- Abandon and replace two existing turbine compressor units totaling 6,689 hp with one new 11,107 hp turbine compressor unit and auxiliary facilities; and
- abandon and replace the emergency generator.

Looping[2] Project

- Install 2.1 miles of 12-inch-diameter pipeline loop adjacent to Tennessee Gas pipelines;
- install pig launcher and receiver facilities and tie-in piping; and
- abandon and remove an inactive 6-inch-diameter pipeline.

NON-JURISDICTIONAL FACILITIES

There are no non-jurisdictional facilities associated with the Project.

PUBLIC REVIEW AND COMMENT

On December 6, 2018, the Commission issued a *Notice of Intent to Prepare an Environmental Assessment for the Proposed 261 Upgrade Project and Request for Comments on Environmental Issues* (NOI). The NOI was mailed to affected landowners, federal, state, and local government representatives and agencies; elected officials; Native American tribes; environmental and public interest groups; and newspapers and libraries in the Project area. The NOI requested written comments from the public on the scope of the analysis for the EA. The public scoping period closed on January 7, 2019. In response to the NOI, the Commission received comments from the Massachusetts Attorney General Office, City of Northampton, Massachusetts Energy Facilities Sitting Board, Berkshire Environmental Action Team, Pipe Line Awareness Network, Columbia Gas Resistance Campaign, Corinne Wingard, and Linda Grimaldi, requesting evaluation of need, renewables, alternatives, impacts to wetlands and waterbodies, invasive species, threatened and endangered species, soils, land use, air quality, noise, cumulative impacts, climate change, and safety. In addition, the Commission received several requests for intervention that contained environmental comments on the topics identified above. A comment was received from Gary B. Liquori on behalf of Edward Cecchi and Kathy Gaynor, who cites concerns on landowner property value and use. These comments are addressed throughout the EA.

Several commentors contend that Tennessee has improperly segmented the Longmeadow meter station from the 261 Upgrade Project to reduce the level of environmental scrutiny. Connected actions (1) automatically trigger other actions; (2) cannot or will not proceed unless

[2] A pipeline loop is a segment of pipe constructed parallel to an existing pipeline to increase capacity.

other actions are taken previously or simultaneously; and (3) are interdependent parts of a larger action and depend on the larger action for their justification.[3] The Longmeadow meter station would be constructed under Tennessee Gas's blanket certificate (Docket No. CP82-413-000). We find that the proposed Project and the Longmeadow meter station are functionally independent projects; either can go forward without the other. Therefore, we do not consider the Longmeadow meter station to be part of the proposed action. The Longmeadow meter station is discussed further in section B.9 of the EA regarding cumulative impacts.

We also received comments from the Massachusetts Attorney General Office, city of Northampton, and Berkshire Environmental Action Teams questioning the need for the Project and whether it serves the public convenience and necessity. A project's need is established by FERC when it determines whether a project is required by the public convenience and necessity (i.e., when the Commission's decision is made). FERC's Certificate Policy Statement 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 FERC environmental staff and hence this EA does not make that determination.

In preparing this EA, we are fulfilling our obligation under NEPA to consider and disclose the environmental impacts of the Project. This EA addresses the impacts that could occur on a wide range of resources, should the Project be approved and constructed.

PERMITS, APPROVALS, AND REGULATORY CONSULTATIONS

Tennessee Gas would obtain all necessary permits, licenses, clearances, and approvals related to construction and operation of the Project, outlined in table 1.

[3] 40 C.F.R. § 1508.25(a)(1) (2018).

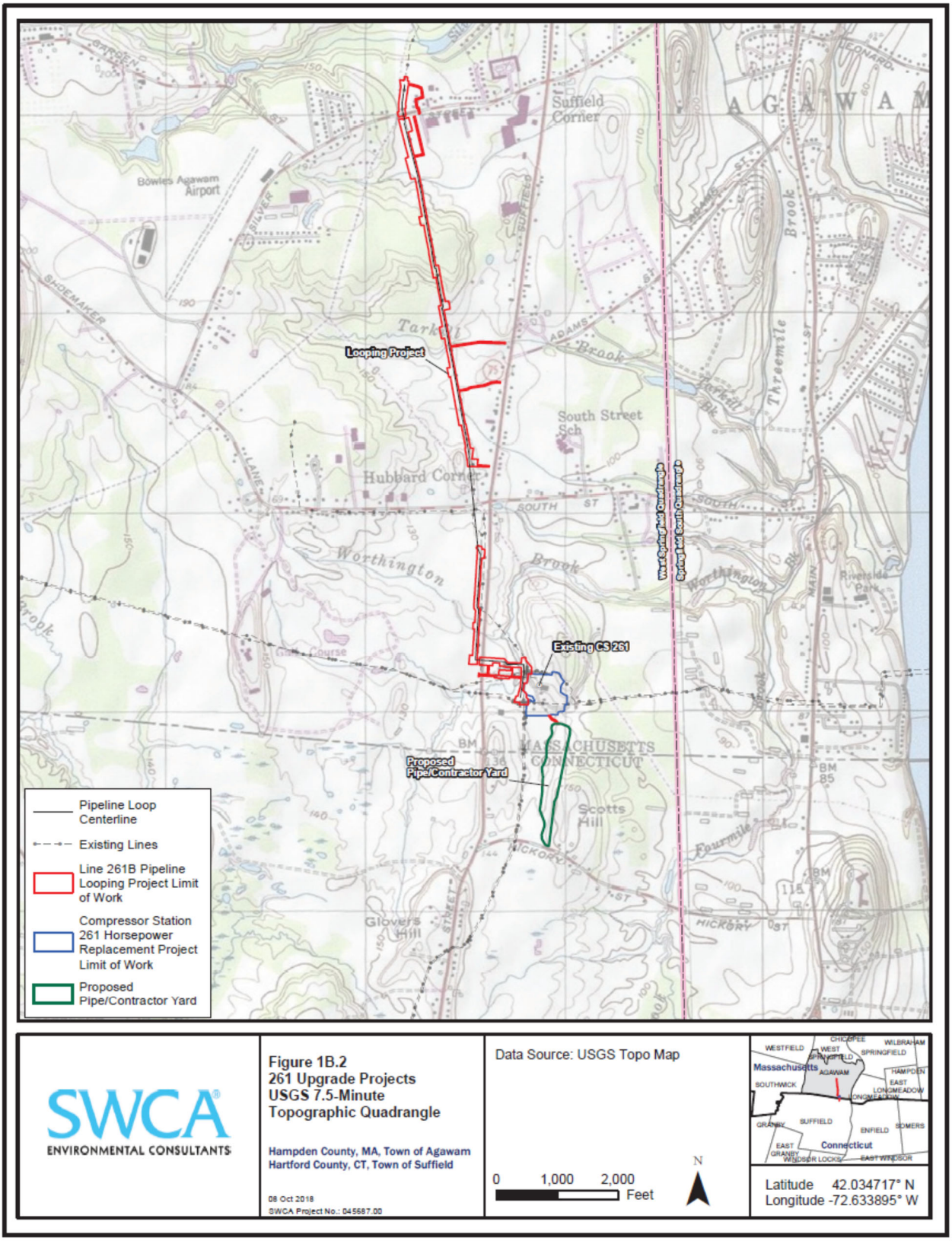


Figure 1
General Location Map

Table 1 Applicable Major Federal Permits, Authorizations, and Clearances		
Agency	**Permit/Approval Title**	**Status**
Federal		
FERC	Certificate of Public Convenience and Necessity	Submitted October 2018- Pending
U.S. Army Corps of Engineers (USACE)	Clean Water Act, Section 404	Submitted October 2018- Pending
U.S. Fish and Wildlife Service (FWS)	Endangered Species Act, Section 7 Consultation	Submitted August 2018 Approval received September 16, 2018
Commonwealth of Massachusetts		
Massachusetts Department of Environmental Protection (MassDEP)	Clean Water Act Section 401 Water Quality Certification Clean Air Act, Non-Major Comprehensive Plan Approval Non-Traditional Asbestos Abatement Work Practice	Submitted October 2018- Response by October 2019 Submitted December 2017- Pending To be submitted 1st quarter 2020- Pending
State Historic Preservation Officer	Section 106 of the Natural Historic Preservation Act	Submitted May 2018 Approval received November 2018
Executive Office of Energy and Environmental Affairs	Massachusetts Environmental Policy Act (MEPA)[a]	Submitted July 2018- Pending
Massachusetts Natural Heritage and Endangered Species Program	Project Review	Submitted January 2019- Pending
Agawam Conservation Commission/ MassDEP	Order of Conditions under Massachusetts Wetlands Protection Act	Submitted January 2019- Pending
Town of Agawam- Department of Public Works	Street Opening Permit	To be submitted 3rd quarter 2019
State of Connecticut		
State Historic Preservation Officer	Section 106 Consultation of the Natural Historic Preservation Act	Submitted October 2018 Approval received November 2018
Suffield Conservation Commission	Inland Wetlands Permit	To be submitted May 2019
Connecticut Natural Diversity Database	Rare Species Consultation	Submitted October 2018- Pending
a. Massachusetts requires that projects which meet certain criteria undergo review by the Executive Office of Energy and Environmental Affairs for compliance with the Massachusetts Environmental Policy Act.		

CONSTRUCTION, OPERATION, AND MAINTENANCE

Tennessee Gas would construct, operate, and maintain the Project in compliance with all applicable federal and state permit requirements, regulations, and environmental guidelines, including the U.S. Department of Transportation (DOT) under 49 CFR 192 - *Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards*. During all phases of the Project, Tennessee Gas would follow the applicable Occupational Safety and Health Administration Requirements.

Tennessee Gas anticipates that construction of the Project would begin on the Looping project in March 2020 with an in-service date of November 1, 2020. Construction of the HP Replacement Project is planned to start in May 2020 with a planned in-service date of November 1, 2020. Construction activities would occur during daytime hours of 7:00AM to 7:00PM Monday through Saturday, with intermittent night time and Sunday work when required for activities such as hydrostatic testing, horizontal directional drilling (HDD) activities, and operation of pumps at dry waterbody crossings.

Tennessee Gas adopted the FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan), and *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures) with minor modifications that includes conducting vegetation maintenance in wetlands between HDD entry or exit points until the depth of pipe reaches eight feet or greater below the ground surface. These modifications are reviewed in section B.3.3 of this EA. The Plan and Procedures are referred to as Tennessee Gas's Plan and Procedures throughout this document, along with best management practices (BMPs). Tennessee Gas would also utilize a Spill Prevention and Control Plan (SPCP) to address the handling of construction fuel and other materials, an Unanticipated Discovery Plan for cultural resources, and Tennessee Gas's Environmental Construction Management Plan (ECMP).

During construction, Tennessee Gas would clear and grade the sites for the pipeline facilities and remove brush, trees, roots and other obstructions such as stumps. As part of the Looping Project, an inactive 6-inch-diameter pipeline would be removed for approximately 0.9 mile of the pipeline loop length and replaced with the new pipeline loop, using the existing trench at that location. Erosion control devices (ECD) would be installed as needed to prevent erosion and offsite impacts in accordance with Tennessee Gas's Plan and Procedures, and applicable state permit requirements. Following pipeline lowering, the trench would be backfilled and the right-of-way would be restored to pre-construction conditions. No blasting would be required for construction of the Project.

During construction and restoration, Tennessee Gas would use at least one full-time environmental inspector (EI) during construction of the Project. The EI would be on site during construction activities to ensure compliance with the construction procedures contained in the Plan and Procedures. Tennessee Gas would conduct environmental training sessions in advance of construction to ensure that all individuals working on the Project are familiar with the environmental mitigation measures appropriate to their jobs and the EI's authority. FERC staff would also conduct inspections of the Project facilities during construction and restoration to determine compliance with any conditions attached to FERC's *Order Issuing Certificate* (Order).

Specialized Construction Techniques

HDD is a trenchless crossing method involving drilling a hole beneath the waterbody and installing a pre-fabricated pipe segment through the hole. The first step in an HDD is to directionally drill a small-diameter pilot hole from one side of the crossing to the other. The pilot hole is then enlarged by several reaming passes using successively larger reaming tools until the borehole is of sufficient diameter to allow for pullback of the pre-fabricated pipe. Throughout the drilling process, a slurry of non-toxic, bentonite clay and water is pressurized and pumped through the drilling head to lubricate the drill bit, remove drill cuttings, and hold the hole open. Although requiring overall greater land disturbance on either side of a feature to accommodate the drilling and receiving equipment, the HDD method reduces impacts on the feature (e.g., roads; streams; riparian areas). This method is proposed for an unnamed tributary to Fourmile Brook, Shoemaker Lane, forested land, wetlands, and a number of foreign utility lines. About 520,000 gallons of water would be required to complete the HDD crossing. The water for the HDD would be sourced from municipal sources.

The conventional bore crossing method is similar to an HDD in that it is a trenchless construction technique; however, conventional bores are not directionally drilled and are not typically as deep underground as an HDD. The conventional bore method involves excavating large bell holes on each side of the feature that are deep enough for the bore equipment to auger a hole horizontally from one bell hole to the other, typically a minimum of 5 feet below the surface or feature. Once the bell hole has been created, the pipeline is then pushed or pulled through the hole. This method is proposed to cross Suffield Street, Silver Street, and a number of foreign utility lines.

Tennessee Gas proposes to cross waterbodies via HDD or dry crossing (dam-and-pump or flume), methods. The dam-and-pump crossing method involves using pumps and hoses instead of flumes to move water around the construction work area. A flume crossing involves diverting the flow of water across the construction work area through one or more flume pipes placed in the waterbody. Sandbags or other diversion structures would be placed directly in the waterbody upstream and downstream of the pipeline centerline to divert the water flow through the flume pipes. The trench line would be isolated and pumped dry, allowing construction crews to excavate the trench and install the pipe. For both crossing types, downstream water flow would be maintained until the trench is backfilled, at which time the dams and flume pipe would be removed.

LAND REQUIREMENTS

Construction of the Project facilities would temporarily impact 46.4 acres of land, and of this, 5.4 acres would be permanently affected by operation of the proposed facilities. The entire pipeline loop route would be co-located with Tennessee Gas's existing facilities, other utilities, and roadways. The new pipeline loop would extend approximately 2.1 miles, from Tennessee Gas's existing CS 261 to a tie-in just north of Silver Street. The loop would be, to the extent practicable, co-located to Tennessee Gas's existing 8-inch-diameter 261BP-100 pipeline or Tennessee Gas's existing 10-inch-diameter 261B-100 pipeline. The new loop would be located 10 feet to the west of Tennessee Gas's existing Line 261B-100. In two locations, the loop would cross to the east of Line 261B-100 to avoid buildings or utilities. In the sections co-located with

line 261BP-100, the new pipeline loop would be located approximately 28 feet to the west of the existing pipeline. The 6-inch-diameter pipeline to be abandoned and removed would occur within the workspace for the new loop. The HP Replacement Project activities would occur within the existing fenced area of CS 261. The new turbine would be housed in the existing building as the two units being removed. A new auxiliary building to house the emergency generator would be constructed on the site.

During construction of the proposed pipeline loop, a construction workspace 75 feet in width would be required. Where the pipeline loop overlaps with Tennessee's existing permanent easement, the existing permanent easement would be expanded by an approximate 20-foot width for operation and maintenance of the pipeline loop. Where the pipeline loop deviates from the existing easement, a new 40-foot-wide permanent easement is proposed, adjacent to the existing easement. The construction workspace and permanent easement for the proposed loop overlaps in certain areas with Tennessee Gas's existing permanent right of way, depicted on the alignment sheets provided in appendix A.

One contractor pipeyard, the Hickory Street Pipeyard, straddles the state line and is located in both Hampden, Massachusetts and Hartford, Connecticut.

Construction access to each of the three sites would be from existing public roadways, temporary access roads and permanent access roads. Of the seven proposed access roads proposed for use during the Looping Project, four are temporary and would be used during construction only, and three would be permanent which would be used during construction and operations for maintenance purposes. All seven access roads are located within existing disturbed areas and it is not anticipated that widening or roadway improvements would be required for use of the access roads. Additional temporary workspace (ATWS) and temporary access roads (TAR) would revert to pre-construction conditions. Land requirements are shown in table 2.

Table 2 Land Requirements			
Facility	**County, State**	**Land Affected by Construction (acres)**	**Land Affected by Operation (acres)**
Looping Project			
Pipeline Loop ROW	Hampden, MA	17.06	4.24
Pig Launcher/Tie-In[a]	Hampden, MA	0.00	0.00
Pipeline Facility Access Roads	Hampden, MA	2.12	1.10
Additional Temporary Workspace (ATWS)	Hampden, MA	6.04	0.00
Pig Receiver/Tie-In[a]		0.00	0.00
Looping Project Total		**25.22**	**5.34**
HP Replacement Project			
CS 261 Upgrade	Hampden, MA	9.35	0.00
HP Replacement Project Total		**9.35**	**0.00**
Common Facilities			
Contractor Yard	Hampden, MA	3.30	0.00
Contractor Yard	Hartford, CT	8.00	0.00
Access Roads	Hampden, MA	0.51	0.00
Common Facilities Total		**11.81**	**0.00**
261 Upgrade Project Total		**46.38**	**5.34**

a. pig launcher/receiver and tie-in activities occur within existing footprint of the proposed HP Replacement Project activities and therefore have no separate construction or operational impact.

Approximately 40 to 60 crew members would be required during construction of the Looping Project. Construction of the HP Replacement Project would require 30 personnel at the peak of construction. Areas used as temporary contractor yards would be restored to pre-construction conditions upon Project completion.

B. ENVIRONMENTAL ANALYSIS

The following sections discuss the Project's potential direct and indirect impacts on environmental resources. When considering the environmental consequences of the Project, the duration and significance of any potential impacts are described below according to the following four levels: temporary, short-term, long-term, and permanent. Temporary impacts generally occur during construction, with the resources returning to pre-construction conditions almost immediately. Short-term impacts could continue for up to three years following construction. Long-term impacts would require more than three years to recover, but eventually would recover to pre-construction conditions. Permanent impacts could occur because of activities that modify resources to the extent that they may not return to pre-construction conditions during the life of the Project, such as with the construction of an aboveground facility. An impact would be considered significant if it would result in a substantial adverse change in the physical environment.

1.0 GEOLOGY

The Project is in the New England Upland Section of the New England physiographic province. This section is characterized by undulating hilly topography that ranges in elevation from below 1,000 feet to above 2,000 feet above mean sea level, with local relief ranging from a few hundred feet to 1,000 feet above mean sea level at the larger mountains in the section (United States Geological Survey [USGS], 1999). The surficial geology of the Project vicinity generally consists of glacial till and stratified deposits (Massachusetts Bureau of Geographic Information [MassGIS], 2015). Project area bedrock is mapped as Jurassic-age siltstone, sandstone, and shale (USGS, 1983).

Mineral Resources

Based on a review of topographic maps, aerial photographs, USGS mapping, and MassGIS land use data, one active sand and gravel mining operation is approximately 400 feet west of the Looping Project (USGS, 2003; MassGIS, 2005). The proposed pipeline loop would be adjacent to an existing pipeline and permanent easement that Tennessee Gas currently operates and maintains. Due to the distance of the mine property line from the pipeline, and an adjacent wetland between the pipeline and the mine, Tennessee Gas does not anticipate that the Project would impact current or future mining efforts. Other mining operations were not identified within 0.25 mile of Project workspaces. Massachusetts and Connecticut have no petroleum reserves, production, or refineries; no natural gas reserves or production; and no coal reserves (U.S. Energy Information Administration, 2018a and 2018b). Therefore, we conclude that impacts on fuel and non-fuel mineral resources would not occur during Project construction and operation.

Geologic Hazards

Geologic hazards are natural, physical conditions that can result in damage to land and structures or injury to people. Such hazards typically are seismic-related, including earthquakes, surface faulting, and soil liquefaction; landslides, flooding, and karst terrain; or ground subsidence hazards. These hazards, as well as the feasibility of utilizing HDD, based on

hydrogeologic conditions present in the Project area, and the potential for an inadvertent return of drilling fluid to the ground surface during HDD activities, are discussed below.

The shaking during an earthquake can be expressed in terms of the acceleration as a percent of gravity (g), and seismic risk can be quantified by the motions experienced at the ground surface or by structures during a given earthquake, expressed in terms of g. USGS National Seismic Hazard Probability Mapping shows that for the Project area, within a 50-year period, there is a 2 percent probability of an earthquake with an effective peak ground acceleration (PGA) of 8 to 10 percent g; and a 10 percent probability of an earthquake with an effective PGA of 3 to 4 percent g being exceeded (USGS, 2014). For reference, PGA of 10 percent g (0.1g) is generally considered the minimum threshold for damage to older structures or structures not constructed to resist earthquakes.

Further, modern pipeline systems have not sustained damage during seismic events except due to permanent ground deformation, or traveling ground-wave propagation greater than or equal to a Modified Mercalli Intensity of VIII (similar to a Richter scale magnitude around 6.8 to 7.0) (O'Rourke and Palmer 1996, USGS 2018a). According to the USGS Quaternary Fault and Fold Database, no Quaternary-age faults would be crossed by the Project (USGS, 2018b). As such, the risk of a significant earthquake in the Project area damaging Project facilities is low and the risk of seismic ground faulting to occur is also low. Similarly, because the Project area has a low potential for strong prolonged ground shaking associated with seismic events, the soil liquefaction potential is negligible.

Based on a review of topographic mapping and mapping completed by the Massachusetts Geological Survey, the Project would be in a low-lying area in the Connecticut River Valley. The Massachusetts Geological Survey characterizes the slope stability in the Project area and vicinity as "stable" (2013). Furthermore, Tennessee Gas filed communication that while the tie-in at the northern end of the proposed Project intersects with a tributary to Worthington Brook, this stream flows over glacial lake sediments that are resistant to erosion, and bank slopes are of low grade (University of Massachusetts, 2014). As such, we conclude that the potential for slope instability to significantly impact construction or operation of the Project is low.

Ground subsidence, involving the localized or regional lowering of the ground surface, may be caused by karst formation due to limestone or gypsum bedrock dissolution; sediment compaction due to groundwater pumping and/or oil and gas extraction; and underground mining. Oil and gas extraction and subsurface mines do not occur in the Project area. No karst terrain is present and the lithology that could lead to bedrock dissolution and karst development do not generally occur within the Project area. Furthermore, the Project is not in an area known to have experienced land subsidence from groundwater withdrawals, and as described in more detail in section 3.1, aquifer yields in the Project vicinity are likely low. Therefore, we conclude that the potential for the Project to be significantly impacted by ground subsidence during construction or operation is low.

Length of an HDD alignment, pipeline diameter, and subsurface material are factors in the technical feasibility of an HDD installation. Subsurface conditions that can affect feasibility of an HDD installation include excessive rock strength and abrasivity, poor rock quality, solution cavities, and artesian conditions. Furthermore, inadvertent returns are more likely to occur in less permeable soils or via fractures or fissures in bedrock. Chances for an inadvertent return to

occur are greatest near the drill entry and exit points where the drill path has the least amount of ground cover.

Tennessee Gas has proposed the use of the HDD construction method to cross Shoemaker Lane. This is the only HDD activity proposed for the Project, and includes avoiding impacts to two wetlands and a waterbody. Tennessee Gas drilled two geotechnical borings, both on the north side of the 1,545-feet-long crossing, to depths of approximately 80 feet below the ground surface in an effort to evaluate subsurface conditions along the proposed alignment. Generally, the soil stratigraphy was found to consist of a thin layer of sand and gravel with varying clay content overlying very stiff to hard glacial till consisting of low plasticity clay and silt with varying amounts of sand and gravel to the terminal depth of the borings. Bedrock was not encountered. Gravel contents of selected samples tested for grain-size distribution (sieve analyses) ranged from 1 to 36 percent.

Based on evaluation of the data collected, Tennessee Gas's geotechnical contractor concluded that the primary risks for the proposed HDD are related to encountering gravel, cobble, or oversize rock fragments, which could lead to potential steering difficulties and poor cuttings removal from the hole. These risks would be somewhat mitigated by the apparent prevalence of fine-grained soil matrix in which the coarse-grained soils are found. Tennessee Gas's geotechnical contractor concluded that the Shoemaker Lane HDD has a high likelihood of successful completion.

To minimize potential drilling complications, including inadvertent returns, Tennessee Gas would follow various industry standard HDD BMPs such as monitoring drilling fluid makeup and injection rates, conducting routine visual inspection of the HDD alignment, and maintaining a clean borehole during the drilling process. Tennessee Gas would additionally follow its HDD Contingency Plan which outlines specific procedures to minimize and address inadvertent returns during construction.

Based on the above analysis, we do not believe the presence of glacial till identified by the geotechnical studies would render the HDD infeasible or significantly increase the risk of drill failure or inadvertent returns, and we conclude that potential impacts from HDD construction would not be significant.

Based on the construction methods and mitigation measures, we conclude that the impact from geologic hazards on the Project facilities during construction and/or operation would be minimal and the Project would not significantly impact geologic resources.

2.0 SOILS

Soil characteristics in the Project area were assessed using the Natural Resources Conservation Service (NRCS) Soil Survey geographic database (NRCS, 2018). Soils were evaluated according to the characteristics that could affect construction or increase the potential for soil impacts during construction. These characteristics include prime farmland designation, compaction potential and hydric soils, highly erodible soils, revegetation concerns and the presence of stones and shallow bedrock. Potential construction impacts to these soils are presented in table 3, below. Additional soil-related issues considered in the analysis include soil contamination.

Table 3
Soil Characteristics (Construction Impacts, in acres)

County	Compaction Prone [b]	Hydric [c]	Highly Erodible		Revegetation Concerns [f]	Stony/ Rocky [g]	Prime Farmland [h]	Shallow Bedrock [i]
			Wind [d]	Water [e]				
Looping Project								
Hampden, MA	5.2	6.7	2.2	0	3.6	1.0	19.0	0
HP Replacement Project								
Hampden, MA	0	0	0	0	6.4	0	9.4	0
Facilities Common to Both Project								
Hampden, MA	0	0.1	0	0	0.1	0	3.6	0
Hartfield, CT	0	<0.1	0	0	0.4	0.4	2.4	0
Total [a]	**5.2**	**6.8**	**2.2**	**0**	**10.5**	**1.4**	**34.4**	**0**

a The totals shown in this table may not equal the sum of addends due to rounding.

b Includes soils in somewhat poor to very poor drainage classes with surface textures of sandy clay loam and finer.

c As designated by the NRCS.

d Soils with a wind erodibility group classification of 1 or 2.

e Land in capability subclasses 4E through 8E and soils with an average slope greater than or equal to 9 percent.

f Soils with a surface texture of sandy loam or coarser that are moderately well to excessively drained, soils with an average slope greater than or equal to 9 percent, and soils with high potential seedling mortality.

g Includes soils with a cobbley, stony, boulder, shaley, very gravelly, or extremely gravelly modified to the textural class of the surface layer.

h As designated by the NRCS, includes prime farmland, unique farmland, farmland of statewide importance, and farmland of local importance.

i Soils identified as containing bedrock at a depth of 5 feet or less from the surface.

Typical soil impacts that may occur during construction include mixing of topsoil and subsoil layers, compaction, rutting, erosion, and alteration of drainage characteristics. Construction activities such as clearing, grading, trench excavation, backfilling, heavy equipment traffic, and restoration along the construction right-of-way have the potential to adversely affect natural soil characteristics such as water infiltration, storage and routing, and soil nutrient levels, thus reducing soil productivity. Clearing removes protective vegetative cover and exposes soils to the effects of wind and water which potentially increases the potential for soil erosion and the transport of sediment to sensitive resource areas.

Prime Farmland

The U.S. Department of Agriculture defines prime farmland as land that has the best combination of physical and chemical characteristics for growing food, feed, forage, fiber, and oilseed crops. Unique farmland is land that is used for production of specific high-value food and fiber crops. In addition, soils may be considered of statewide or local importance if those soils are capable of producing a high yield of crops when managed according to accepted farming methods. Construction in agricultural areas and pasture areas would temporarily disrupt ongoing agricultural activities and eliminate use of the land for the duration of construction.

The Project would disturb approximately 34.4 acres of soils classified as prime farmland or farmland of statewide importance, of which approximately 9.4 acres (associated with the workspace for the HP Replacement portion of the Project) are within the existing facility fence line and have already been removed from agricultural production. Approximately 1.4 acres of prime farmland soils, associated with the Looping Project, are currently in agricultural use.

Potential impacts on agricultural soils would be minimized and mitigated in accordance with Tennessee Gas's ECMP. These include measures to conserve and segregate the upper 12 inches of topsoil, alleviate soil compaction, protect and maintain existing drainage tile and irrigation systems, prevent the introduction of weeds, and retain existing soil productivity. Implementation of proper topsoil segregation, soil decompaction, drainage, and weed controls would help ensure post-construction revegetation success and productivity, thereby minimizing the potential for long term impacts on agricultural lands. Furthermore, agricultural lands within both the construction workspace and permanent easement of the Looping Project would revert to existing conditions following construction. Therefore, we conclude that impacts on prime farmland and farmland of statewide importance would be temporary and minor.

Stony/Rocky Soil

To minimize the introduction of stones or rocks to surface soil layers, Tennessee Gas's ECMP requires that the size, density, and distribution of rock on the construction work area be similar to adjacent areas undisturbed by construction, and requires that excess rock be removed from at least the top 12 inches of soil in agricultural areas or in compliance with landowner agreements. Through adherence to these measures, no significant increase to the rock content of topsoil is anticipated.

Soil Erosion and Revegetation Potential

Soil erosion is the wearing away of physical soil properties by wind and water, and could result in a loss of soil structure, organic matter, and nutrients, all of which, when present, contribute to healthy plant growth and ecosystem stability. While Project area soils are not generally highly erodible by wind or water, clearing, grading, and equipment movement can accelerate the erosion process and, without adequate protection, result in discharge of sediment to waterbodies and wetlands.

To minimize or avoid potential impacts due to soil erosion, Tennessee Gas would implement controls in accordance with their ECMP, which incorporates the FERC Plan and Procedures. Temporary erosion controls, including sediment filter devices, such as silt fences, would be installed immediately following land disturbing activities. Tennessee Gas would

inspect these devices on a regular basis and after each rainfall event of 0.5 inch or greater to ensure proper function. Tennessee Gas would additionally utilize dust-control measures, including routine wetting of the construction workspace as necessary. Temporary erosion control devices would be maintained until the Project area has been successfully revegetated or stabilized with gravel surfacing. Tennessee Gas would restore the construction workspaces in accordance with the ECMP and applicable seed mix requirements from the NRCS, or agency recommendations and relevant landowner agreements.

Given Tennessee Gas's proposed mitigation measures and that disturbed areas would be returned to pre-construction conditions, maintained in an herbaceous state, or stabilized with gravel cover, permanent impacts due to soil erosion or poor revegetation potential are not anticipated.

Soil Rutting and Compaction

During construction of the Project, compaction from soil rutting would be avoided or minimized through the use of timber mats, or by postponing work until soils have dried, where practicable and deemed necessary. In accordance with the FERC Procedures, Tennessee Gas would use low ground weight construction equipment such as swamp excavators or similar equipment, or operate normal equipment on timber mats, where standing water or saturated soils are present, to minimize soil compaction.

Tennessee Gas would test topsoil and subsoil for compaction at regular intervals in agricultural or residential areas disturbed by construction activities, and would conduct tests on the same soil type under similar moisture conditions in undisturbed areas to approximate pre-construction conditions. In areas where topsoil has been segregated, Tennessee Gas would plow the subsoil before replacing segregated topsoil. If subsequent construction and cleanup activities result in further compaction, Tennessee Gas would conduct additional tilling.

Adverse impacts on soils due to compaction during construction activities would generally be temporary. Soils underlying permanent aboveground facility foundations would be permanently affected by compaction; however, these effects would be highly localized and minor.

Inadvertent Spills or Discovery of Contaminants

In the event that unanticipated contaminated soil, groundwater, or other potential environmental contamination is encountered during construction activities (e.g., malodorous soils and/or groundwater with visible staining and/or sheen), Tennessee Gas would adhere to the measures contained in its Unanticipated Contamination Discovery Plan, which describes procedures to identify, handle, temporarily store, and properly dispose of such contaminated media. Tennessee Gas has filed a draft version of this plan, with the final plan to be provided prior to construction. Section 3.1 provides a discussion of existing, known soil and groundwater contamination within and in the vicinity of the Project area.

During construction, contamination from accidental spills or leaks of fuels, lubricants, and coolant from construction equipment could adversely impact soils. To minimize impacts, Tennessee Gas would implement measures contained in its SPCP which specifies cleanup

procedures in the event of inadvertent spills during Project construction. We have reviewed this plan and find it to be acceptable.

Based on the above analysis, we conclude that the Project's impacts on soils would not be significant.

3.0 WATER RESOURCES

3.1 Groundwater

An aquifer is a water-bearing geologic unit of rock or unconsolidated material that is capable of providing groundwater to wells and springs. The Project area is mapped within the Early Mesozoic Basin Aquifer (Olcott 1995). In the area of the Project, a large lake covered most of the Connecticut Valley lowlands in Massachusetts and Connecticut following the retreat of the last glacial ice sheet and left deposits of silt, clay, and fine sand up to 200 feet thick in the lowland areas. Sand and gravel beneath fine-grained lake deposits comprise the main aquifer of the Connecticut Valley lowlands and supply most municipal wells (Simcox 1992).

The fine-grained and unstratified glacial deposits mapped in the area of the Project are categorized as consolidated bedrock aquifers and are the least productive of the major aquifers (Olcott 1995). Furthermore, aquifers of high and medium yield are mapped by MassGIS; the nearest such aquifer is approximately 1.1 miles northeast of the proposed Looping Project's route (MassGIS, 2018). There are no areas of high or medium aquifer yield mapped in the area of the Project, therefore yields from underlying aquifers are expected to be relatively low.

Sole-Source Aquifers

The United States Environmental Protection Agency (EPA) oversees the Sole Source Aquifer Protection Program to protect high production aquifers that supply 50 percent or more of the region's water supply and for which there are no reasonably available alternative drinking water sources should the aquifer become contaminated. The Project area does not overlie any EPA designated sole-source aquifer.

Public and Private Water Supply Wells

Tennessee Gas requested information on public and private water supply wells from local planning and health boards in February 2018. In response, the Agawam Health Department indicated that there are no known surface drinking water supplies within the Town of Agawam, and no known public drinking water wells, reservoirs, or springs within 300 feet of the Project (Agawam Health Department, 2018). Tennessee Gas initiated consultation with the North Central District Health Department in Connecticut regarding water supply wells in the vicinity of the Hickory Street Pipeyard; no response has been received to date. However, previous consultation with the Drinking Water Section of the Connecticut Department of Public Health for the separate Connecticut Expansion Project (Docket No. CP14-529-000) indicated that the area of the Hickory Street Pipeyard is not within any public drinking water or aquifer protection areas (FERC, 2015). Tennessee Gas additionally consulted the USGS National Water Information System (USGS, 2018c) to identify groundwater springs within one mile of the Project and none were found.

Tennessee Gas is consulting with affected landowners to identify private wells within 150 feet of any Project workspaces. Two private wells have been identified within 150 feet of the Project: one is within 150 feet of the HDD alignment but is more than 150 feet from a workspace, and the other within 150 feet of the proposed Hickory Street Pipeyard. Additional surveys, landowner discussions, and consultation with local officials are ongoing.

Groundwater Contamination

Tennessee Gas obtained a federal and state database search report to identify sites with existing soil and/or groundwater contamination within 0.25 mile of the Project. Numerous sites were identified by this search. However, the majority were associated with regulatory closure status or were listed on non-contamination databases, such that no impact is anticipated. Based on regulatory status and nature of the reported incident or contaminant, two sites were identified in close proximity to the Project where residual contamination may exist and are presented in table 4.

Table 4
Sites with Residual Soil/Groundwater Contamination

Site Name	MP	Distance/Direction from Project (feet)	Regulatory Status	Contaminant	Site Description
Prudent Associates	1.06	240/ east	Class A2 [a]	Industrial waste, metals	Impacts to wetlands evaluated, removal of 720 cubic yards of soil.
Gel-Tron International	1.35	300/ east	Class B1 [b]	Petroleum product	Gasoline, waste oil, and fuel oil underground storage tanks removed from 1983 to 1992. Impacts to groundwater identified.

a Remedial work was completed and a level of "no significant risk" has been achieved; contamination has not been reduced to background.
b Site assessment indicates that "no significant risk" exists. No remedial work was necessary.

In addition to the sites listed in table 4, CS 261 appears to be associated with several listings, including a release incident that occurred in March 2015 and is described as involving the spill of 140 gallons of "cooling synthetic oil" and cleanup via soil excavation, and stormwater catch basin and swale cleanup. Additional information about this incident (including specific location) was not filed. However, the incident is associated with a "PSNC" (permanent solution with no conditions) status, assigned to sites where "response actions were sufficient to achieve a level of No Significant Risk for all current and foreseeable uses of the site without the need to restrict the use of the property". Therefore, it is not anticipated that Project activities would encounter residual environmental contamination pertinent to this incident.

Based on distance from Project areas, and because residual contamination concentrations at the above-listed sites were determined to be of "no significant risk" by the Massachusetts Department of Environmental Protection (MassDEP), the potential for the Project to encounter, spread, or be impacted by nearby sites is low. In the event unanticipated contaminated soil,

groundwater, or other potential environmental contamination are encountered during construction activities associated with the Project (e.g., malodorous soils and/or groundwater with visible staining and/or sheen), Tennessee Gas would adhere to the measures contained in its Unanticipated Contamination Discovery Plan, which describes procedures to identify, handle, temporarily store, and properly dispose of such contaminated media.

Groundwater Impacts and Mitigation

No groundwater withdrawals are anticipated during the Project construction or operation, except for trench dewatering, if needed. Surface drainage and groundwater recharge patterns can be temporarily altered by clearing, grading, trenching, and soil stockpiling activities, potentially causing minor fluctuations in groundwater levels and/or increased turbidity, particularly in shallow surficial aquifers. We expect the resulting changes in water levels and/or turbidity in these aquifers to be localized and temporary because water levels quickly re-establish equilibrium and turbidity levels rapidly subside.

Tennessee Gas would conduct pre- and post-construction monitoring for well yield and water quality for any public or private wells identified within 150 feet of the construction workspaces, with landowner permission. If the Project impacts private or public well quality or yield, Tennessee Gas would provide alternative water sources or offer compensation to the well owner. Should permanent well damage be sustained, Tennessee Gas would either compensate the well owner or make arrangements for a new well to be drilled.

An accidental spill of fuel or hazardous material during refueling or maintenance of construction equipment could affect groundwater if not cleaned up appropriately. Soils impacted from spills could continue to leach contaminants to groundwater long after the spill has occurred. To minimize the risk of potential fuel or hazardous material spills, and to respond to any such spills, Tennessee Gas would implement measures within its SPCP.

Upon completion of construction, Tennessee Gas would restore the ground surface to original contours, to the extent practicable, and would re-vegetate disturbed areas, excluding areas within permanent aboveground facility fence lines and access roads, with the goal of restoring preconstruction overland flow and recharge patterns. We conclude no significant or long-term impacts from construction of the facilities would occur on groundwater resources with implementation of proposed mitigation measures and Tennessee Gas's ECMP. The addition of impervious surfaces at aboveground facilities may affect overland flow patterns and subsurface hydrology. However, these effects would be highly localized and minor.

3.2 Surface Water

The Project lies within the Mill River-Connecticut River watershed (Hydrologic Unit Code [HUC] 0108020501) and the Pecousic Brook-Connecticut River subwatershed (HUC 010802050102). During field surveys conducted in November 2017, and May and July 2018, Tennessee Gas identified ten waterbodies (a total of 13 waterbody crossings) within and immediately adjacent to the Project' workspaces, which are presented in table 5. Four of the crossings listed in table 5 would only cross state-defined buffer zones or riverfront areas. Three crossings would utilize existing culverts. A mat bridge would be installed across one waterbody for a temporary access road. The remaining five waterbody crossings are classified as minor and

intermediate[4] waterbody crossings and would be crossed via HDD, or dry-ditch methods (dam-and-pump or flume). Waterbodies were only identified at the portions of the Project in Massachusetts. No surface waters were identified at the Hickory Street Pipeyard in Connecticut.

The streams crossed by the Project have not been assigned a designation according to the Massachusetts Surface Water Quality Standards (314 CMR 4.00). However, as tributaries to the Connecticut River, which is a Class B water, they are presumed to be Class B waters. Class B waters are designated as a habitat for fish, other aquatic life, and wildlife, including for their reproduction, migration, growth and other critical functions, and for primary and secondary recreation; and are suitable as a source of public water supply with appropriate treatment and irrigation and other agricultural uses. Fisheries are discussed further in section 4.2.

Sensitive Surface Waters

The Massachusetts Wetlands Protection Act (WPA) protects two resource areas associated with surface waters – Bank and Land Under Waterbodies and Waterways (LUWW). Bank is defined in the WPA regulations at 310 CMR 10.54(2) as that portion of the land surface that normally abuts and confines waterways and waterbodies, and extends from the mean annual low flow level to the mean annual flood level or first observable break in slope, whichever is lower. For intermittent streams, the entire channel below the "top of bank" line is the resource area Bank. LUWW is present in perennial streams only and is defined in 301 CMR 10.56(2) as that area beneath a creek, river, stream, pond, or lake below the mean annual low water level. The WPA regulates a 100-foot buffer zone from Bank and LUWW; activities within this buffer zone requires regulatory review by the MassDEP. In addition to the protection provided by the Massachusetts WPA, the Massachusetts Rivers Protection Act provides additional protection to land adjacent to perennial streams (riverfront area). The riverfront area is "…a 200-foot wide corridor on each side of a perennial river or stream, measured from the mean annual high-water line of the river." Riverfront areas associated with Worthington Brook, Tarkill Brook, and an unnamed tributary to Threemile Brook would be crossed by the Looping Project. Previously developed riverfront area associated with Worthington Brook would be impacted by the HP Replacement Project.

[4] FERC defines a waterbody as any natural or artificial stream, river, or drainage with perceptible flow at the time of crossing, and other permanent waterbodies such as ponds and lakes. A minor waterbody is less than or equal to 10 feet wide and an intermediate waterbody is greater than 10 feet wide but less than or equal to 100 feet wide.

Table 5
Waterbodies Associated with the 261 Upgrade Project

Approximate Milepost	Waterbody ID	Waterbody Name	Flow Regime	Crossing Width (feet) [a]	State Water Quality Designation / Fishery Classification [b]	Anticipated Crossing Method
Looping Project- Hampden, MA						
0.00	MA2	UNT to Worthington Brook	Intermittent	N/A	Class B / C	N/A – buffer zone only
0.13	MA1	UNT to Worthington Brook	Perennial	15	Class B / C	Dam and pump
N/A	MA1	UNT to Worthington Brook	Perennial	15	Class B / C	Existing culvert at TAR-CS[a]
0.34	MA6	Worthington Brook	Perennial	13	Class B / C	Flume
0.73	MA5	UNT to Fourmile Brook	Intermittent	12	Class B / C	HDD
N/A	MA7	UNT to Tarkill Brook	Intermittent	N/A	Class B / W	N/A – existing culvert PAR-2[a]
1.27	MA4	Tarkill Brook	Perennial	14	Class B / W	Flume
N/A	MA4	Tarkill Brook	Perennial	14	Class B / W	Existing culvert at PAR-2[a]
1.77	MA3	UNT to Threemile Brook	Perennial	60	Class B / C	Flume
HP Replacement Project- Hampden, MA						
N/A	MA1	UNT to Worthington Brook	Perennial	N/A	Class B / C	N/A – Riverfront area only
Facilities Common to Both Projects- Hampden, MA						
N/A	MA8	UNT to Fourmile Brook	Intermittent	9	Class B / C	Mat bridge at TAR-PY
N/A	MA8A	UNT to Fourmile Brook	Intermittent	N/A	Class B / C	N/A – buffer zone only
N/A	MA8B	UNT to Fourmile Brook	Intermittent	N/A	Class B / C	N/A – buffer zone only

a. Waterbodies crossed by an access road using an existing culverted crossing would not require any improvements to use the access road.

No impaired waterbodies per Section 303(d) of the Clean Water Act[5] would be crossed or impacted by the Project. However, the Project is located within the watershed of Segment MA34-05 of the Connecticut River, which is listed as a Category 5 water for the following impairments: *Escherichia coli*, polychlorinated biphenyls in fish tissue, and total suspended solids.

Waterbody Crossing Methods

Tennessee Gas proposes to cross waterbodies dry crossing (dam-and-pump or flume), or HDD methods. A dry-ditch crossing method involves the installation of a flume pipe(s) and/or dam-and-pump prior to trenching, to divert the stream flow over or around the construction area. The dam-and-pump method involves installing temporary dams upstream and downstream of the proposed waterbody crossing, typically using sandbags and plastic sheeting. Trench excavation and pipe installation would then commence through the dewatered and relatively dry portion of the waterbody channel. After pipe installation, backfilling of the trench, and restoration of the stream banks, the temporary dams would be removed, and flow through the construction work area would be restored. The dam-and-pump method is typically used at waterbodies where pumps and hoses can adequately transfer stream flow volumes from upstream of the work area to downstream of the work area, and there are no concerns with preventing the passage of aquatic organisms.

A flume crossing temporarily directs the flow of water through one or more flume pipes placed over the area to be excavated. Trenching would then occur across the waterbody and underneath the flume pipes without reducing downstream water flow. After pipeline installation, backfilling of the trench, and restoration of the stream banks, the flume pipes would be removed. This crossing method generally minimizes downstream turbidity during trenching by allowing excavation under relatively dry conditions.

HDD is a specialized construction technique that is used to install pipelines in areas where traditional open cut excavations are not practicable due to sensitive resource areas or logistical reasons. This trenchless construction method is described in detail in section 1.0.

Impacts and Mitigation

Waterbody impacts would be limited to pipeline installation and crossing of a temporary access road. Tennessee Gas proposes to install the pipeline using an HDD under an unnamed tributary to Fourmile Brook. All other flowing waterbody crossings would be constructed using a dry-ditch crossing method (i.e., flume or dam-and-pump crossing, as described above). Tennessee Gas would cross waterbodies with no perceptible flow at the time of crossing using standard open-cut construction techniques. The greatest impacts associated with dry-ditch open-cut crossings would be during the installation and removal of in-waterbody dams and water diversion structures.

---

[5] Section 303(d) of the Clean Water Act and the implementing regulations at 40 CFR 130.7 require states to identify those waterbodies that are not expected to meet state water quality standards after the implementation of technology-based controls and to prioritize and schedule them for the development of total maximum daily loads. A total maximum daily load establishes the maximum amount of a pollutant that may be introduced into a waterbody and still ensure attainment and maintenance of water quality standards.

These impacts include increases in local sediment loading and turbidity from in-waterbody construction activities, or construction adjacent to waterbody channels. Clearing and grading of waterbody banks and in-waterbody construction could result in temporary modifications of aquatic habitat and decreased dissolved oxygen concentration. In addition, backfilling and settling of the streambed trench over time could result in modified contours that lead to minor changes in waterbody flow patterns and velocity. These changes could further result in waterbody bed scouring and/or deposition in new areas.

In general, impacts would be limited to the in-waterbody construction period and immediately thereafter. Tennessee Gas would restore the bed and banks and conditions are expected to return to normal after waterbody restoration activities. Where access roads cross waterbodies, Tennessee Gas would utilize existing culverts and install a temporary timber mat bridge, which would allow construction equipment and personnel to cross the waterbodies and avoid direct impacts. Stream banks and riparian zones impacted by the mat bridge would be restored to pre-construction conditions immediately following completion of construction.

The CS 261 modifications would have no direct impact on surface waters. Indirect impacts during construction would be avoided by implementation of the Project' ECMP, and adherence to applicable state and federal regulations and permit conditions.

Tennessee Gas would adhere to measures in its SPCP and ECMP to prevent and clean up inadvertent spills of hazardous materials that may be used during construction, such as fuels, lubricants, and coolants. Specific measures include instructing personnel on the operation and maintenance of equipment to prevent the accidental discharge or spill of fuel, oil, and lubricants and parking equipment overnight, refueling, and storing hazardous materials at least 100 feet from a waterbody boundary.

During operation, a buffer at least 25 feet wide adjacent to waterbodies would be revegetated to pre-construction conditions over the entire width of the right-of-way (except for a 10-foot-wide strip centered over the pipeline to be maintained in an herbaceous state for pipeline inspection). Trees would not be allowed to grow within 15 feet of the pipeline. Riparian cover on affected waterbody banks would be expected to recover over several months to several years. In accordance with its ECMP, Tennessee Gas would monitor and maintain erosion controls during construction and throughout restoration and would only remove the controls once restoration is deemed successful. All affected areas would be restored as closely as possible to their previous condition.

Use of HDD greatly reduces the temporary and permanent impacts on waterbodies by eliminating direct in-stream construction impacts. However, with the use of HDD, there is potential for inadvertent returns of drilling fluid, which is mostly non-toxic bentonite. The primary impact of losses of drilling fluid in waterbodies is increased sedimentation and turbidity. Tennessee Gas has prepared an HDD Contingency Plan, which includes measures it would implement should there be inadvertent returns of drilling fluid while crossing the unnamed tributary to Fourmile Brook. Measures included in the plan contain monitoring protocols for three scenarios: when full circulation of drilling mud during HDD operations is maintained; when a loss of circulation occurs; and when inadvertent returns of drilling fluid is detected. Specifically the plan addresses the following:

- When HDD operations are in progress and full drilling fluid circulation is being maintained, the presence of drilling fluid returns would be continuously monitored and documented on daily inspection reports at intervals ranging from two to three hours throughout each production shift and waterways would be visually inspected from the banks for a visible drilling fluid plume;

- When HDD operations are in progress and drilling fluid circulation to the HDD endpoints is lost or severely diminished and circulation is not re-established, Tennessee Gas's inspector would conduct visual inspection along the drilled path alignment hourly and would document the time of inspections and observations on the daily inspection reports; and

- If an inadvertent return of drilling fluids is detected, the HDD contractor would first reduce the pressure, if possible, and commence containment of drilling mud and notification and response protocols would be followed depending on whether the release is located on land or to a waterway. If inadvertent returns occur within a wetland, waterway or other sensitive areas, Tennessee Gas would notify appropriate parties and evaluate the potential impact of the release on a site-specific basis in order to determine an appropriate course of action.

We have reviewed this plan and find it acceptable.

Tennessee Gas designed the Project to avoid surface waterbodies to the maximum extent practicable. Tennessee Gas would minimize impacts from construction and operation through adherence to the Project' ECMP, as well as applicable permit conditions, including Clean Water Act sections 404 and 401 authorizations from the U.S. Army Corps of Engineers (USACE) and the MassDEP, respectively. Given Tennessee Gas's proposed waterbody crossing methods, adherence to its ECMP and HDD Contingency Plan, and compliance with conditions of all applicable permits, we conclude that the Project's impacts on surface water quality would be adequately minimized.

Water Needs for Hydrostatic Testing, HDDs, and Dust Control

In compliance with DOT regulations (49 CFR 192, Subpart J), Tennessee Gas would perform hydrostatic testing of new pipeline and the new aboveground facility piping prior to placing the Project facilities into service. Hydrostatic testing would require a total of about 66,000 gallons of water, which would be obtained from municipal sources. In addition, Tennessee Gas would conduct a hydrostatic test on the HDD pipe segment before installation using about 9,000 gallons of water from municipal sources. Following the pre-test and hydrostatic testing, the water would be transferred to holding tanks, where it would be tested and disposed of at an appropriate off-site facility. Tennessee Gas would also source water needs from municipal sources for HDD operations (approximately 520,000 gallons) and any necessary dust control (10,000 gallons).

Given that Tennessee Gas would obtain all applicable permits, and water would be disposed of at an appropriate off-site facility, we conclude that hydrostatic testing and water needs for HDD operations and dust control would not result in significant impacts.

3.3 Wetlands

Tennessee Gas conducted field surveys in November 2017, and May and July 2018 to identify wetlands located within and immediately adjacent to the Looping Project, HP Replacement Project, and access road TAR-PY. Wetlands in the vicinity of the Hickory Street Pipeyard were previously delineated in 2013 as part of Tennessee Gas's Connecticut Expansion Project (Docket No. CP14-529-000). Wetlands were delineated in accordance with the *Corps of Engineers Wetland Delineation Manual* (Corps, 1987) and the *Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast* Region (Corps, 2011). The wetlands that were identified were further classified according to the U.S. Fish and Wildlife Service (FWS) classification system (Cowardin et al., 1979). Desktop review of USGS topographic maps, National Wetlands Inventory datasets, and MassDEP wetlands data layers, was used to identify wetlands outside the survey corridor that may have state-regulated 100-foot buffer zones that extend onto the Project' workspaces. These surveys identified a total of 26 wetlands, state buffer zones, or upland review areas that would be crossed by the Project and are presented in table 6.

Vernal pools are small, shallow ponds characterized by lack of fish and by periods of dryness. Vernal pool habitat is extremely important to a variety of wildlife species including some amphibians that breed exclusively in vernal pools, and other organisms such as fairy shrimp, which spend their entire life cycles confined to vernal pool habitat. No certified vernal pools or potential vernal pools are located within 0.5-mile of the Project' workspaces. However, a wetland that functions as a vernal pool was identified approximately 60 feet to the northwest of the proposed Hickory Street Pipeyard during delineations conducted for Tennessee Gas's Connecticut Expansion Project (Docket No. CP14-529-000), but no activities are proposed within this wetland.

In Massachusetts, wetlands are regulated by the MassDEP under the Massachusetts WPA. The WPA defines Bordering Vegetated Wetlands (BVW) as "freshwater wetlands which border on creeks, rivers, streams, ponds and lakes and includes wet meadows, marshes, swamps and bogs. Isolated Vegetated Wetlands (IVW) are not regulated by the WPA, unless they are located within another resource area (e.g., Riverfront Area) or meet the definition of Isolated Land Subject to Flooding (ILSF), which is an isolated depression or closed basin without an inlet or outlet that confines standing water to a volume of at least ¼ acre-feet at an average depth of 6 inches at least once a year. Wetlands meeting neither the BVW nor ILSF definition may still be regulated by the USACE under Section 404 of the Clean Water Act.

Connecticut regulates inland wetlands under the Inland Wetlands and Watercourses Act. These state statutes are implemented through the Inland Wetlands and Watercourse Regulations as administered by the individual municipalities.

Table 6
Wetlands Associated with the 261 Upgrade Project

Wetland ID	Approx. Milepost	State Wetland Type	Centerline Crossing Length (feet)	Anticipated Crossing Method	Wetland Impact by Classification (acres) [b]						
					Construction [c]				Operation [d]		
					PFO	PSS	PEM	Total	PFO	PSS	Total
Looping Project											
C	0.01	BVW	0	N/A – State buffer zone	0	0	0	**0**	0	0	**0**
B	0.02	BVW	58	Conventional	0	0	0.11	**0.11**	0	0	**0**
A	0.12	BVW	87	Conventional	0	0	0.15	**0.15**	0	0	**0**
S	0.28	BVW	380	Conventional	0.7	0	0.2	**0.90**	0.18	0	**0.18**
N	0.51	BVW	1,400	Conventional / HDD	0.14	1.76	0	**1.90**	0.03	0.18	**0.21**
J	0.78	BVW	203	HDD	0	0	0	**0**	0	0	**0**
M	0.92	IVW	69	Conventional	0	0	0.11	**0.11**	0	0	**0**
L	0.98	BVW	488	Conventional	0	0.19	0.76	**0.95**	0	0	**0**
K	1.14	BVW	382	Conventional	0	0	0.73	**0.73**	0	0	**0**
H	1.22	BVW	22	Conventional	0.03	0	0.02	**0.05**	0.01	0	**0.01**
G	1.24	BVW	0	Conventional (workspace only)	0	0.05	0	**0.05**	<0.01	0	**<0.01**
GA	1.27	BVW	0	Conventional (workspace only)	0	0.02	0	**0.02**	<0.01	0	**<0.01**
V	1.27 (access road only)	BVW	0	N/A – State buffer zone	0	0	0	0	0	0	0
W	1.27 (access road only)	BVW	0	N/A – State buffer zone	0	0	0	0	0	0	0
F	1.57	IVW	167	Conventional	0	0	0.11	**0.11**	0	0	**0**
FA	1.65	BVW	0	Conventional (workspace only)	0	0	0.01	**0.01**	0	0	**0**
E	1.74	BVW	457	Conventional	0.45	0	0.32	**0.77**	0.1	0	**0.1**
EA	1.86	BVW	0	N/A – State buffer zone	0	0	0	**0**	0	0	**0**
				Looping Project Total	**1.32**	**2.02**	**2.52**	**5.86**	**0.32**	**0.18**	**0.50**
HP Replacement Project											
B	0.02	BVW	0	N/A - State buffer zone only	0	0	0	**0**	0	0	**0**

Table 6
Wetlands Associated with the 261 Upgrade Project

Wetland ID	Approx. Milepost	State Wetland Type	Centerline Crossing Length (feet)	Anticipated Crossing Method	Wetland Impact by Classification (acres) [b]						
					Construction [c]				Operation [d]		
					PFO	PSS	PEM	Total	PFO	PSS	Total
C	N/A	BVW	0	Temporary workspace	0	0	0.02	**0.02**	0	0	**0**
T	N/A	IVW	0	N/A - State buffer zone only	0	0	0	**0**	0	0	**0**
HP Replacement Project Total					**0**	**0**	**0.02**	**0.02**	**0**	**0**	**0**
Facilities Common to Both Projects											
D	N/A	BVW	0	N/A - State buffer zone (MA) only	0	0	0	**0**	0	0	**0**
WCT 1B [f]	N/A	BVW / CT Inland Wetland	0	N/A - State buffer zone (MA), upland review area (CT) only	0	0	0	**0**	0	0	**0**
WMA 1A [f]	N/A	BVW	0	N/A - State buffer zone (MA) only	0	0	0	**0**	0	0	**0**
WMA 1B [f]	N/A	BVW	0	N/A - State buffer zone (MA) only	0	0	0	**0**	0	0	**0**
WCT 1A	N/A	CT Inland Wetland	0	N/A - Upland review area (CT) only	0	0	0	0	0	0	0
				Facilities Common to Both Project Total	**0**	**0**	**0**	**0**	**0**	**0**	**0**
				261 Upgrade Project Totals	**1.32**	**2.02**	**2.54**	**5.88**	**0.32**	**0.18**	**0.50**

N/A = not applicable
a: Wetland classifications according to FGDC 2013; PEM = palustrine emergent wetland; PSS = palustrine scrub-shrub wetland; PFO = palustrine forested wetland; POS = palustrine open water
b: Per the Massachusetts Wetlands Protection Act (MGL Ch. 131 §40); BVW = bordering vegetated wetland; IVW = isolated vegetated wetland. Connecticut wetlands are regulated by the Connecticut Inland Wetlands and Watercourses Act (General Statutes § 22A-36-45) and the Inland Wetlands and Watercourses Regulations of the Town of Suffield.
c: Construction acreage = permanent right-of-way and temporary workspaces
d: Permanent acreage = permanently maintained right-of-way through wetlands
e: Totals may not equal sum of addends due to rounding.
f: Wetland was delineated by AECOM, Inc. in 2013 as part of the Connecticut Expansion Project (Tennessee Gas 2014).

Impacts and Mitigation

In wetlands where soils are non-saturated and able to support construction equipment at the time of crossing, topsoil would be segregated from the subsoil along the trenchline. Immediately after backfilling is complete, the segregated topsoil would be restored to its original location. In wetlands with saturated soils or soils unable to support construction equipment without significant soil disturbance, prior to crossing and movement of construction equipment through these wetlands, the right-of-way would be stabilized using timber mats to allow for a stable, safe working condition. Where necessary a drag-section method may be used, which involves the trenching, installation and backfill of a prefabricated length of pipeline containing several pipe segments all in one day. The trench is backfilled at the end of each day after the pipe is lowered in, as necessary, to ensure safety. In addition, Tennessee Gas would cross two wetlands (Wetland J and a portion of Wetland N) via HDD. With the use of HDD, there is potential for inadvertent returns of drilling mud, which was discussed in section B.3.2.

Tennessee Gas would adhere to measures in its SPCP and ECMP to prevent and clean up inadvertent spills of hazardous materials that may be used during construction, such as fuels, lubricants, and coolants. Following construction and restoration, most construction workspaces, would be allowed to revert to pre-construction land use and vegetation type. Temporary wetland impacts may include soil disturbance, temporary alteration of hydrology, and loss of vegetation during construction. Indirect impacts on adjacent wetlands would be avoided by the placement of erosion and sediment controls (e.g. silt fence) in accordance with Tennessee Gas's ECMP. All wetlands would be restored to their pre-construction grades, contours, and drainage patterns, and reseeded or replanted with native hydrophytic vegetation species. For the new permanent right-of-way, woody vegetation would be allowed to regenerate within the construction right-of-way, except for a 10-foot-wide area centered over the pipeline that would be maintained in an herbaceous/scrub-shrub state to allow for inspection and maintenance of the pipeline once it is in service. In addition, trees within 15 feet of the pipeline with roots that could compromise the integrity of the pipeline coating would be selectively cut and removed from the permanent right-of-way.

In compliance with federal, state, and local regulatory permitting relative to wetland protection, Tennessee Gas would develop a wetland mitigation plan specific to the Project prior to construction. The mitigation plan would detail measures to avoid, minimize, and mitigate for temporary and permanent wetland impacts associated with the Project. Options for mitigation for permanent wetland impacts being evaluated by Tennessee Gas include, but are not limited to off-site waterbody or wetland restoration, wetland conservation, and contributions to an in-lieu fee program sponsored by the Massachusetts Department of Fish and Game. Tennessee Gas's consultation with the MassDEP and the USACE to develop appropriate mitigation measures for impacts on wetlands is ongoing.

Tennessee Gas would obtain all applicable permits and approvals prior to construction, including authorizations under sections 401 and 404 of the Clean Water Act. Given Tennessee Gas's proposed measures and adherence with its ECMP, we conclude that the Project would not result in significant impacts on wetlands.

Modifications to the Procedures

Tennessee Gas proposed modifications to the FERC Procedures section VI.B.1.b for ATWS within 50 feet of wetlands, and section VI.D.1 to conduct routine vegetation mowing within PSS between HDD entry and exit points for approximately 60 linear feet until the depth of the pipe is greater than 8 feet below the ground service to maintain safety of the pipeline system. Table 7 describes the proposed modification, justification, and equal compliance measures. We find the modifications reasonable and acceptable.

Table 7 Proposed Modifications to the FERC Procedures						
MP	**Wetland/Stream ID**	**ATWS ID**	**Applicable Section of the Procedures**	**Workspace Purpose and Justification**	**Land Use Type**	**Acres of Wetland Disturbance**
0.90	Wetland M, Wetland LA	11	Procedures VI.B.1.a - Locate all extra work areas (such as staging areas and additional spoil storage areas) at least 50 feet away from wetland boundaries, except where the adjacent upland consists of cultivated or rotated cropland or other disturbed land.	HDD work area and access; other configurations were assessed but increased topography on the west side of the workspace would require additional earthwork and more room.	OL / PEM	0.04
1.00	Wetland L, Wetland K	12		Topsoil segregation, cut timber storage, wetland crossings; no suitable upland area available. Where ATWS is located, Wetland L and K are agricultural wetlands.	AG / PEM	0.22
1.83	Wetland EA	17		Wetland crossing, laydown area; disturbed upland area.	CI / AG	0
0.61	Wetland N	N/A	Procedures VI.D.1 - Do not conduct any routine vegetation mowing or clearing in wetlands that are between HDD entry and exit points.	Conduct vegetation maintenance in wetlands between HDD exit or entry points for approximately 60 linear feet from the south HDD entry/exit point within the PSS portion of Wetland N until the depth of the pipe is greater than 8 feet below the ground service to maintain safety of the pipeline system. This 60 foot length of Wetland N would be maintained in an herbaceous state for a width of 10 feet centered over the pipeline.	PSS	0.01

a. CI= commercial/industrial; OL = open land; PFO = palustrine forested wetland; PSS = palustrine scrub shrub wetland; PEM = palustrine emergent wetland; AG = agricultural land

4.0 VEGETATION, WILDLIFE, AND THREATENED AND ENDANGERED SPECIES

This section discusses wildlife habitats and existing vegetation resources at each of the Project sites, and the federally- and state-protected wildlife species that are known to occur or may potentially occur in the Project vicinity.

4.1 Vegetation

The Project is located in the Connecticut Valley ecoregion (Ecoregion 59A). The general cover types crossed or impacted by the Project includes open upland, agricultural land, commercial/industrial land, forested upland, forested wetlands, and open wetlands. Open uplands are crossed by the Looping Project and generally include maintained utility easements. Agricultural lands crossed by the Looping Project include active cropland, hayfields and pastureland for grazing livestock. Commercial/industrial lands crossed or impacted by the Looping Project, the HP Replacement Project, and the Hickory Street pipeyard consist of buildings, stone or paved parking lots, landscaped areas, and maintained lawn. Forested uplands are crossed by the Looping Project and are located outside of the existing maintained Line 261B-100 easement. These forested uplands may be classified as an oak-hemlock-white pine forest. Forested wetlands are crossed by the Looping Project and are located in low-lying areas outside of the existing maintained Line 261B-100 easement. Open wetlands are crossed or impacted by the Looping Project and the HP Replacement Project and include emergent marsh and scrub shrub wetlands and are free of trees because they either are within a maintained utility easement or have sufficient hydrology to inhibit tree growth. Wetland in the Project area are discussed in section B.3.3. No vegetation communities of special concern would be affected by the Project. Representative vegetation species with potential to occur in each habitat type are identified in table 8.

Impacts and Mitigation

The Project would primarily impact open upland. About 17.4 acres of open upland would be impacted by construction, all of which would revert to preconstruction conditions following construction. Additionally, less than 3.0 acres of upland forest would be temporarily impacted by construction, with less than 1.0 acre of this being proposed to be maintained within the permanent right-of-way. Further, the Project would impact less than 3.0 acres of agricultural land, all of which would be restored to preconstruction conditions as shown in table 9.

Table 8 Representative Vegetation and Wildlife Species		
Vegetation Habitat Category	**Representative Vegetation Species**	**Representative Wildlife Species**
Open upland	multiflora rose, Morrow's honeysuckle, goldenrods, white bedstraw, grasses, bitter dock, Allegheny blackberry	eastern cottontail, gray squirrel, opossum, raccoon, red fox
Open wetlands	PEM: goldenrods, purple loosestrife, reed canary grass, broad-leaf cattail, soft rush, fringed sedge, bulrushes, Japanese stiltgrass, and sensitive fern. PSS: species above mixed with silky dogwood, speckled alder, nannyberry, and red maple saplings	red-winged blackbird, great blue heron, star-nosed mole, muskrat, white-tailed deer, bullfrog, common snapping turtle, painted turtle, pickerel frog
Agricultural land	active cropland, hayfields and pastureland for grazing livestock. Inactive dominated by maintained or grazed grasses, white clover, goldenrods, great plantain, and common dandelion	white-tailed deer, European starling, mourning dove
Commercial/industrial land	buildings, stone or paved parking lots, landscaped areas, and maintained lawn	American robin, mockingbirds, American crow, house sparrows, raccoons, striped skunk
Forested upland	northern red oak, white oak, post oak, eastern hemlock, eastern white pine, gray birch, black birch, American beech	warblers, eastern wood-pewee, great-crested flycatcher, white-tailed deer, coyote, black bear, fisher, shrews, white-footed mouse, red squirrels, snakes, turtles
Forested wetland	red maple, pin oak, glossy false buckthorn, cinnamon fern, soft rush	American toad, northern spring peeper, gray treefrog

Table 9
Vegetation Communities Impacted by Construction and Operation of the 261 Upgrade Project (acres)

Facilities	Agricultural		Open Upland		Mixed Hardwood Forest		Open Wetland (PEM or PSS)		Forested Wetland	
	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.
Looping Project	2.84	0	6.09	0	2.76	0.66	4.54	0.17	1.32	0.32
HP Replacement Project	0	0	0	0	0	0	0.02	0	0	0
Facilities Common to Both Projects	0	0	11.3	0	0.11	0	0	0	0	0
Total	**2.84**	**0**	**17.39**	**0**	**2.87**	**0.66**	**4.56**	**0.17**	**1.32**	**0.32**

The primary impact on vegetation from the Project facilities would be the new permanent conversion of less than 1.0 acre of forested upland to open land, comprised of maintained right-of-way. In addition, about 4.0 acres of forested upland would be cleared for temporary construction workspaces. This would be considered a long-term impact as it would take more than 20 years for forested vegetation to return to pre-construction conditions. However, vegetation within developed, upland herbaceous, and herbaceous wetland habitat types would likely return to their preconstruction conditions within 1 to 5 years.

Tennessee Gas designed the Project to minimize the acreage of clearing required by co-locating the Project with its existing pipeline easements, other utility and roadway easements, and its existing CS 261 facility, to the extent practicable. In addition, use of HDD would avoid vegetation clearing between the HDD entry and exit workspaces during both construction and operation, with the exception of negligible vegetation trimming for placement of the wireline and foot traffic for monitoring the location of the drill bit for the HDD. After construction, Tennessee Gas would revegetate the right-of-way and temporary workspace according to its ECMP. In accordance with the Project' ECMP, topsoil would be stripped from the full work area, or from the trench and subsoil storage area in active or rotated crop and pasturelands, residential areas, hayfields, or other areas at the landowner's request. Topsoil segregation and reuse would improve the success of revegetation by preserving the soil seed bank, organic material, and nutrients present in the topsoil.

Given that the Project is co-located with existing rights-of-way as much as possible and that almost all Project workspaces would be revegetated and restored to pre-construction conditions, we conclude that the Project would not have a significant impact on vegetation.

Noxious Weeds and Invasive Species

Noxious weeds and invasive plants can disrupt native ecosystems by displacing native species and altering habitat characteristics. The Massachusetts Department of Agricultural Resources maintains a Prohibited Plant List that identifies plants determined to be invasive in Massachusetts.

Noxious weeds were identified during wetland field surveys. Emergent wetlands in the area of the Project was found to have up to 65 percent cover of purple loosestrife, common reed, and reed canary grass, with lesser amounts of Japanese stiltgrass. Multiflora rose was identified in various upland plots. Forested wetlands and uplands were found to have up to 80 percent cover of Morrow's honeysuckle and 50 percent cover of glossy buckthorn. Forested uplands were also found to have noxious woody vines, including up to 40 percent of Asian bittersweet.

Removal of existing vegetation and disturbance of soils during construction of the Project could create conditions conducive to the establishment of noxious weeds and invasive species. Tennessee Gas would implement its Preliminary Invasive Plant Management Plan within its ECMP to minimize the spread of invasive plants during construction. Specific measures include:

- ensuring all construction equipment is clean prior to beginning work on the Project;
- requiring the construction contractor to use weed-free straw or hay bales for sediment barrier installations and/or mulch; and
- using weed-free seed mixes for post-construction revegetation.

Tennessee Gas would conduct pre-construction invasive plant surveys and identify species-specific best management practices in coordination with the appropriate agencies to prevent the introduction or spread of invasive plant species and noxious weeds resulting from construction and restoration activities. We find these measures acceptable.

4.2 Fisheries

The quality of a fishery is associated with the quality of its inhabited waterbody. The Project would cross freshwater perennial and intermittent waterbodies. As discussed in section B.3.2, the Project would cross 10 waterbodies (six intermittent and four perennial). The name, location, crossing distance, flow regime (i.e., perennial, intermittent) and fishery classification of each waterbody associated with the Project was described in section B.3.2. Tennessee Gas has consulted with the Massachusetts Division of Fisheries and Wildlife (MA DFW) regarding game, non-game, and commercial fishery inventories and fishery classifications for waterbodies in the area of the Project. The Looping Project crosses both warmwater and coldwater fisheries; no waterbodies are crossed by the HP Replacement Project. One stream is proposed to be crossed by a temporary access road (temporary mat bridge) at the Hickory Street Pipeyard. Representative fish species for the general vicinity were identified by MA DFW through consultation obtained for the Project as identified in table 10.

Table 10
Representative Fish Species in Waterbodies Crossed by the Looping Project

Fishery Type	Common Name	Scientific Name	Location Surveyed
Warmwater	Blacknose Dace [b]	*Rhinichthys atratulus*	Worthington Brook, Tarkill Brook, Threemile Brook
	Golden Shiner	*Notemigonus crysoleucas*	Tarkill Brook
	White Sucker [b]	*Catostomus commersonii*	Worthington Brook, Tarkill Brook, Threemile Brook
Coldwater	American Eel [b]	*Anguilla rostrata*	Worthington Brook, Threemile Brook
	Bluegill	*Lepomis macrochirus*	Worthington Brook, Threemile Brook
	Bluntnose Minnow	*Pimephales notatus*	Worthington Brook
	Eastern Brook Trout [b]	*Salvelinus fontinalis*	Worthington Brook, Threemile Brook
	Largemouth Bass	*Micropterus salmoides*	Worthington Brook, Threemile Brook
	Pumpkinseed	*Lepomis gibbosus*	Worthington Brook
	Tessellated Darter [b]	*Etheostoma olmstedi*	
	Brown Trout [b]	*Salmo trutta*	
	Fallfish [b]	*Semotilus corporalis*	
	Yellow Perch	*Perca flavescens*	

a. Source: MA DFW 2018

b. Species listed as being of greatest conservation need in the Massachusetts State Wildlife Action Plan (MA DFW 2015).

There are no marine or anadromous waters within the area of the Project. Further, no federally listed fish species were identified within the area of the Project. Consultation with the MA DFW did not identify any state-listed fish species in the vicinity of the Project or any significant commercial or recreational fisheries. MA DFW identified Worthington Brook, Three Mile Brook, and their tributaries as coldwater fisheries. Further, MA DFW indicated that any stream that has not been sampled by MA DFW should be assumed to be a coldwater fishery. Tarkill Brook was identified as a warmwater fishery. Coldwater fisheries are considered sensitive habitats by MA DFW and are defined in 314 CMR 4.00 as "waters in which the mean of the maximum daily temperature over a seven day period generally does not exceed 68 degrees Fahrenheit (20 degrees Celsius) and, when other ecological factors are favorable (such as habitat), are capable of supporting a year-round population of stenothermal aquatic life, such as trout (*Salmonidae* spp.). Changes in land and water use can reduce the ability of these waters to support trout and other kinds of coldwater fish. Coldwater fish species of concern that were documented in Worthington and Three Mile Brooks by MA DFW are identified in table 10.

Impacts and Mitigation

As previously mentioned, an unnamed tributary to Fourmile Brook would be crossed by HDD, and therefore, no impacts are anticipated on this waterbody. However, when using HDD, there is potential for inadvertent returns of drilling fluid (mostly bentonite), which could lead to an increase in turbidity as mentioned in section B.3.2. Tennessee Gas would implement measures outlined in its HDD Contingency Plan to stop, contain, and clean up any inadvertent returns.

As discussed in section B.3.2, all other waterbodies would be crossed with a dry-ditch construction method (dam-and-pump or flume). In-water construction and removal of riparian vegetation may cause a temporary increase in turbidity levels, which can increase the sedimentation rate immediately downstream of the work area. Temporary habitat alteration and substrate disturbance could also occur resulting in potential impacts on fish populations. Loss of riparian vegetation in forested areas could affect fish populations that may be present downstream of construction activities by reducing shade and cover, and increasing water temperature. Refueling of construction equipment and storage of fuel oil or other hazardous materials near waterbodies could contaminate waterbodies, if a spill were to occur. Therefore, Tennessee Gas would implement measures in its SPCP and ECMP, including not refueling equipment within 100 feet of these resources without secondary containment, ensuring that all equipment parked overnight are at least 100 feet from a waterbody, and that hazardous materials are not stored within 100 feet of a waterbody unless the location is designated for such use by an appropriate governmental authority.

Waterbody crossings would be constructed in compliance with the *Fisheries Section, Environmental Review Best Management Practices* recommended by the MA DFW (2018). Dry-ditch, expedited crossing methods for waterbodies would reduce the impacts of waterbody crossings by reducing the amounts of turbidity, which is generally limited to short periods before and after the crossing when the dam structure is installed and removed. Tennessee Gas would also restore waterbody banks to pre-construction contours and promptly reseed and stabilize banks, in accordance with its ECMP.

Tennessee Gas has consulted with the MA DFW relative to timing restrictions associated with sensitive fisheries. Tennessee Gas anticipates in-stream construction to be allowed during periods of low flow, generally July 1 through September 30, as recommended by the Massachusetts River and Stream Crossing Standards. Any in-stream work time window restrictions would be incorporated in the Project's Clean Water Act Section 404 or 401 permitting.

Given Tennessee Gas's proposed measures, we conclude that fishery impacts would not be significant.

4.3 Wildlife

The Project consists of open upland, agricultural land, commercial/industrial land, forested upland, forested wetlands, and open wetlands habitat types. Common wildlife in the area include a wide variety of mammal, amphibian, birds, and reptile species. No significant wildlife habitats were identified in the area of the Project. Table 8 describes examples of species found within each habitat type.

Potential impacts on wildlife include habitat removal, construction-related ground disturbance, and noise. Some individuals could be inadvertently injured or killed by construction equipment. However, more mobile species such as birds and larger mammals would likely relocate to other nearby suitable habitat and avoid the Project area once construction activities commence. The temporary disturbance of local habitat is not expected to have population-level effects on wildlife because the amount of habitat crossed represents only a small portion of the habitat available to wildlife throughout the Project area, and much of the disturbed habitat would return to preconstruction condition after construction. Additionally, the Project would be mostly co-located with existing rights-of-way to the greatest extent practicable. Long-term impacts from habitat alteration would be further minimized by the implementation of Tennessee Gas's ECMP, which would ensure revegetation of most areas disturbed by construction.

Given Tennessee Gas's proposed mitigation measures, including its commitment to revegetate the right-of-way and temporary workspaces, and the abundance of similar habitat adjacent to the Project area, we conclude that the Project would not have a significant impact on wildlife or wildlife habitat in the Project area.

Migratory Birds

Migratory birds are species that nest in the United States and Canada during the summer and then migrate to and from the 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). The MBTA, as amended, prohibits the intentional taking, killing, possession, transportation, and importation of migratory birds, their eggs, parts, and nests. Executive Order 13186 requires that all federal agencies undertaking activities that may negatively affect migratory birds take a prescribed set of actions to further implement the MBTA, and directs federal agencies to develop a memorandum of understanding (MOU) with the FWS that promotes the conservation of migratory birds through enhanced collaboration between the two agencies. In 2011, FERC entered into a MOU with the FWS, which focuses on avoiding or minimizing adverse impacts on migratory birds

and strengthening migratory bird conservation through enhanced collaboration between the two agencies.

Though all migratory birds are afforded protection under the MBTA, both Executive Order 13186 and the MOU require that Birds of Conservation Concern and federally listed species be given priority when considering effects on migratory birds. Birds of Conservation Concern are a subset of MBTA-protected species identified by the FWS as those in the greatest need of additional conservation action to avoid future listing under the Endangered Species Act (ESA). Executive Order 13186 states that emphasis should be placed on species of concern, priority habitats, key risk factors, and that particular focus should be given to addressing population-level impacts. The Project falls within Bird Conservation Region 30: New England/Mid-Atlantic Coast Region (North American Bird Conservation Initiative, 2016). Table 11 in appendix B describes Birds of Conservation Concern with the potential to occur within the Project area.

Tennessee Gas proposes to begin construction as early as March 2020, with an in-service date of November 2020. Therefore, vegetation removal would likely be conducted prior to the breeding season for migratory birds (generally April 15 - August 1). If construction continues into the breeding season, the right-of-way would already be cleared of vegetation and any birds returning to the area to nest would likely choose other locations in the abundant habitat adjacent to the right-of-way or in the general area.

If the start of vegetation clearing were to be delayed into the breeding season, any birds in the Project area would likely be displaced or avoid the area. Migratory birds not already nesting would be able to avoid these activities and move to abundant nearby habitat. Birds fleeing an area of disturbance could be injured or suffer mortality, or abandon nests, affecting egg-laying and potentially causing the mortality of young. As such, if vegetation clearing or active construction were to begin during the breeding season, individual birds or nests could be affected, but would not have population-level impacts.

Impacts resulting from vegetation clearing within open land, developed land, and herbaceous wetland habitat types are expected to be short term because vegetation within these areas would likely return to their preconstruction conditions within 1 to 5 years. Impacts resulting from vegetation clearing within upland forests and forested wetlands would be permanent or long term. Within the permanent right-of-way, routine vegetation maintenance would preclude the growth of trees. Within temporary workspaces, impacts on forests would be considered long term because vegetation within these areas could take decades to return to preconstruction conditions. To minimize these impacts, the Project has been almost entirely co-located with existing utility rights-of-way, which would reduce overall impacts on adjacent forested communities and would minimize forest fragmentation.

Implementation of Tennessee Gas's ECMP would reduce the extent and duration of impacts on migratory bird habitat by restoring a great majority of the construction right-of-way to pre-construction conditions. During operation of the Project, vegetation maintenance clearing would occur outside of the nesting season in accordance with Tennessee Gas's ECMP. Habitat loss could have a greater impact on Birds of Conservation Concern species due to their limited populations in the area and more restrictive habitat needs. However, with the implementation of

the measures mentioned previously, we conclude that impacts on migratory birds from construction of the Project would largely be temporary and would not be significant.

According to the FWS's Information and Planning and Consultation database, bald eagles have the potential to occur in the area of the Project. Additionally, the Connecticut Department of Energy and Environmental Protection identified the bald eagle as potentially occurring within the portion of the Project in Connecticut (Hickory Street Pipeyard and associated TAR-PY). Bald eagles typically nest in forested areas within 0.5 mile of large waterbodies. Nests often occur in tall trees that offer an unobstructed view of the water. The Project are located as close as approximately 1 mile from the Connecticut River. Although bald eagles are known to occur along the Connecticut River Valley, the Project is a sufficient distance from the Connecticut River that they are unlikely to provide good nesting opportunities for this species. Further, bald eagles were not identified in the area of the Project in Massachusetts during consultation with the Massachusetts Natural Heritage and Endangered Species Program (NHESP). For these reasons, we conclude that the Project would not impact bald eagles.

Special Status Species

Special status species are those species for which state or federal agencies provide an additional level of protection by law, regulation, or policy. Included in this category are federally listed species that are protected under the ESA, species considered as candidates for such listing by the FWS, those species that are state-listed as threatened or endangered, and state species of special concern.

Federally Listed Species

Tennessee Gas, acting as a non-federal representative for FERC, in accordance with Section 7(a)(2) of the ESA initiated informal consultation with the FWS to identify federally listed threatened and endangered species that may occur in the Project area. The only federally listed species with the potential to occur in the area of the Project is the federally threatened northern long-eared bat (*Myotis septentrionalis*).

The Project area contains potentially suitable summer habitat where northern long-eared bats may roost, which includes clustered stands of large trees, especially live or dead hardwoods with large, tall cavities or exfoliating bark. The Project would result in both temporary and permanent impacts on forested land as a result of tree clearing. Although potentially suitable roosting trees may be located within forested wetlands and uplands crossed by the Looping Project and/or TAR-PY, a review of the NHESP's most recent mapping (dated November 30, 2016) indicated that there are no known hibernacula for the northern long-eared bat within 0.25-mile of the Project and no known maternity roosts within 150 feet of the Project. Therefore, we conclude that the Project *may affect, but are not likely to adversely affect* the northern long-eared bat.

While we have determined that the Project may affect the northern long-eared bat, incidental take of northern long-eared bats as a result of Project tree clearing is not prohibited under Section 9 of ESA because the Project design meets the conservation requirements of the final rule under Section 4(d) of ESA for the species (81 FR 1900). Specifically, the Project is not within 150 feet of any known, occupied maternity roosts or within 0.25-mile of any known, occupied hibernacula. Tennessee Gas submitted a description of the proposed Project and the 4(d)

Rule Streamlined Consultation Form to the FWS New England Field Office on August 16, 2018. FWS did not respond within 30 days from submittal of this form, so it is presumed that responsibilities under ESA section 7(a)(2) with respect to the northern long-eared bat are fulfilled through the FWS' January 5, 2016, Programmatic Biological Opinion. Furthermore, it is presumed that the FWS concurs and our responsibilities under ESA section 7(a)(2) with respect to the northern long-eared bat are fulfilled. The streamlined consultation form for the northern long-eared bat is included as appendix C.

State-listed Species

Massachusetts

Tennessee Gas consulted with the NHESP to determine the presence of state-listed species for the portion of the Project in Massachusetts. Approximately 0.66 mile of the proposed pipeline loop and PAR-2 cross a mapped Priority Habitat (PH) of Rare Species (PH 780). On November 21, 2017, Tennessee Gas submitted a Request for State-Listed Species Information to the NHESP. Tennessee Gas received a response from NHESP dated December 27, 2017 indicating that PH 780 provides habitat for the eastern box turtle, a state-listed reptile of special concern, and the eastern wormsnake, a state-listed threatened reptile. Tennessee Gas submitted proposed species survey protocols to NHESP for its review on September 7, 2018, and would continue to work with NHESP to conduct species-specific surveys in 2019 and develop an appropriate mitigation plan for the species. No state-listed rare species habitats are mapped in association with the HP Replacement Project or Hickory Street Pipeyard in Massachusetts.

The eastern box turtle is a small, terrestrial turtle that inhabits many types of habitats, including both dry and moist woodlands, brushy fields, thickets, marsh edges, bogs, swales, fens, stream banks, and well-drained bottomland. Eastern box turtles hibernate from late October or November to mid-March or April in upland forests, a few inches under the soil surface. They become active in the spring and females lay eggs in June or early July. Nesting areas are often in open uplands, typically early successional fields, meadows, utility rights-of-way, woodland openings, roadsides, mulch piles, lawns, or abandoned gravel pits (NHESP 2015a).

Eastern wormsnakes are small, non-venomous snakes that have been documented in only five Massachusetts towns, all within Hampden County. The eastern wormsnake prefers moist, non-saturated, sandy soil and woody debris. It occurs in deciduous hardwood forest, mixed pine-hardwoods, pine forest, and early successional fields, and is often found in edge habitats near woodland and wetland borders or woodland/grassland edges. It is a fossorial snake, spending most of the year underground. They emerge from overwintering in the spring, and mate in May. Females lay eggs under decaying woody debris or rocks from mid-June through July. Hatchlings emerge in August or September (NHESP 2015b).

Tennessee Gas submitted draft survey protocols to NESHP for the eastern box turtle and the eastern wormsnake on December 27, 2018. Tennessee Gas would continue to consult with NESHP to develop avoidance and minimization measures for these two species.

Connecticut

Tennessee Gas consulted with the Connecticut Department of Energy and Environmental Protection for the presence of state-listed species for the portion of the Project in Connecticut, the Hickory Street Pipeyard and associated TAR-PY. On November 13, 2018, the Connecticut Department of Energy and Environmental Protection responded to Tennessee Gas, identifying a total of seven state-listed species that could potentially occur in the area: six birds (northern harrier, bobolink, American kestrel, bald eagle, savannah sparrow, and eastern meadowlark) and one plant (Bush's sedge). Given that the Hickory Street Pipeyard is located within previously disturbed open upland, and given that clearing for TAR-PY is likely to occur prior to the general bird nesting season, (as previously discussed for migratory birds), no impacts are expected on any of these state-listed species. Bald eagles were also previously discussed in section B.4.3. Tennessee Gas would continue to consult with the Connecticut Department of Energy and Environmental Protection to develop any necessary avoidance and minimization measures for these species.

Given that Tennessee Gas would consult with the applicable state to develop avoidance and minimization measures to minimize impacts on state-listed species, we conclude that the Project would not adversely affect state-listed species.

5.0 CULTURAL RESOURCES

In addition to accounting for impacts to cultural resources under NEPA, Section 106 of the National Historic Preservation Act, as amended, requires FERC to take into account the effects of its undertakings on historic properties listed, or eligible for listing on the National Register of Historic Places (NRHP), and to afford the Advisory Council on Historic Preservation an opportunity to comment. An historic property is any prehistoric or historic district, site, building, structure, object, or property of traditional religious and cultural importance to an Indian tribe or Native Hawaiian organization, included in, or eligible for inclusion in, the NRHP. This term includes artifacts, records, and remains that are related to and located within such properties. Tennessee Gas, as a non-federal party, is assisting FERC in meeting our obligations under Section 106 and its implementing regulations at 36 CFR Part 800.

Area of Potential Effects

The area of potential effects (APE) is the "geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist" (36 CFR 800.16(d)). The APE for direct effects for the Project includes the areas that would be impacted by the construction, operation, and maintenance of proposed facilities (i.e., permanent and temporary workspaces). The APE for indirect effects takes into account the visual, auditory, and atmospheric effects to historic properties and is generally larger than the APE for direct effects.

The Projects' direct APE totals approximately 46.4 acres which includes all areas of construction and operations for the proposed Project. The indirect APE is comprised of a linear corridor extending 150 feet from either side of the pipeline centerline (300 feet total width), and areas adjacent to workspaces and access roads.

Cultural Resources Investigations

Tennessee Gas conducted cultural resources background research to gather information about previous cultural resources investigations and known archaeological sites and historic architectural properties within the Projects' APE. Information gathered during the background research was used to assess the sensitivity for archaeological resources in the Projects' APE. The archaeological sensitivity assessment was conducted within a 300-foot-wide corridor that encompassed the pipeline centerline and workspace associated with both the Looping Project and the HP Replacement Project.

Based on the results of the cultural resources background research and archaeological sensitivity assessment, Tennessee Gas planned an intensive archaeological survey for the proposed Looping Project. No additional archaeological survey was recommended for the HP Replacement Project due to its low archaeological sensitivity, nor for the Hickory Street Pipeyard as it had been previously surveyed as part of the Connecticut Expansion Project (Docket No. CP14-529-000). The archaeological and historic architectural surveys associated with the Hickory Street Pipeyard were conducted in both Massachusetts and Connecticut and did not result in the identification any historic properties within the yard (Doucette et al. 2014a; Doucette et al. 2014b; Miller 2014a; and Miller 2014b). The Massachusetts and Connecticut State Historic Preservation Officers (SHPO) concurred with the findings. Tennessee Gas also planned a historic architectural survey to account for all potential direct or indirect effects on historic structures from the Project.

On May 24, 2018, Tennessee Gas initiated consultation with the Massachusetts SHPO, providing information about the Project, along with a Project Notification Form, results and recommendations from the cultural resources background research and archaeological sensitivity assessment, and a technical proposal for an archaeological survey with subsurface testing for the Looping Project. The Massachusetts SHPO requested a plan showing existing and proposed conditions, with an archaeological assessment for the proposed HP Replacement Project.

The archaeological survey for the Looping Project covered all areas where ground disturbances are currently proposed or where land use may change and included a 20-foot buffer around all construction workspace. The archaeological survey began with a walkover inspection, supplemented by subsurface testing based on archaeological sensitivity. Subsurface testing consisted of the excavation of 147 test pits within the archaeologically-sensitive portions of the Looping Project survey area. Two soil augers were also undertaken within an area of low sensitivity to confirm the presence of eroded/truncated, poorly drained soils. Subsurface testing resulted in the recovery of 169 artifacts dating to the nineteenth and twentieth centuries. All of the recovered pieces of cultural material were considered non-site finds associated with agricultural field scatter, a twentieth-century dumping episode, or deposits from fill contexts that lack stratigraphic integrity. No pre-contact artifacts or features were identified during the survey.

The historic architectural survey was conducted in July 2018. The survey was accomplished from public rights-of-way and involved identifying all aboveground properties that were at least 50 years of age or were included in previous inventories occurring within the survey area as defined as including both the direct and indirect APEs. A total of five historic architectural resources were identified; one previously recorded unevaluated resource and four newly identified resources. All five historic architectural resources were recommended as not eligible for listing in

the NRHP either because they no longer retain integrity or do not possess any significant historical associations or architectural merit.

Tennessee Gas submitted their recommendations for both the archaeological and historic architectural surveys to the Massachusetts SHPO for review and comment on October 15, 2018. Tennessee Gas stated in their letter to the SHPO that no historic or archaeological resources were identified and no further cultural resources surveys were recommended. In a letter dated November 20, 2018, the SHPO concurred with Tennessee Gas's assessment and stated that no historic properties will be affected by the proposed Project. FERC staff agrees.

Tennessee Gas also initiated consultation with the Connecticut SHPO on October 15, 2018, providing an introduction to the Project and a cultural resources assessment for the Connecticut portion of the Hickory Street Pipeyard. The assessment provided an overview of previous cultural resource investigations conducted that are directly applicable to the current Project and that no historic properties were identified and no further archaeological or historic architectural surveys were recommended. In a letter dated November 2, 2018, the Connecticut SHPO concurred with Tennessee Gas's assessment that no additional cultural resources investigations are warranted and that no historic properties will be affected by the proposed Project. FERC staff agrees.

Tribal Consultation

Tennessee Gas contacted the following Native American tribes regarding the proposed Project: Delaware Nation of Oklahoma, Delaware Tribe of Indians, Mashantucket Pequot Tribal Nation, Mashpee Wampanoag Tribe, Mohegan Tribe, Narragansett Indian Tribe, Stockbridge-Munsee Community Band of Mohican Indians, and Wampanoag Tribe of Gay Head (Aquinnah). Initially, Tennessee Gas met informally with the Mashantucket Pequot Tribal Nation, the Mohegan Tribe, and the Narragansett Indian Tribe on March 27, 2018 and the Mashpee Wampanoag and the Wampanoag Tribe of Gay Head (Aquinnah) on March 29, 2018 to introduce the tribes to the Project. Subsequently, Tennessee Gas provided Project descriptions to the Stockbridge-Munsee Community Band of Mohican Indians, Delaware Tribe of Indians, and the Delaware Nation of Oklahoma via email.

On May 24, 2018, Tennessee Gas formally contacted the tribes in order to provide them an opportunity to identify concerns about properties of traditional religious or cultural significance that may be affected by the proposed Project. On May 31, 2018, Tennessee Gas again met with the tribes to provide them Project updates and to solicit information on tribal areas of interest/concern. Tennessee Gas also briefed the tribes regarding the archaeological survey plan and invited them to participate in the archaeological fieldwork activities. During the meeting, Tennessee Gas committed to maintaining communication with the tribes for the Project.

On August 20, 2018, members from the Mashantucket Pequot Tribal Nation, the Mohegan Tribe, the Narragansett Indian Tribe, and the Wampanoag Tribe of Gay Head (Aquinnah) conducted a survey to identify traditional cultural properties (TCP) along the APE. The Tribal Historic Preservation Officer (THPO) for the Wampanoag Tribe of Gay Head (Aquinnah) provided Tennessee Gas with the results of the TCP survey on October 1, 2018. Based on the results of the TCP survey, Tennessee Gas has made adjustments to the proposed Project to avoid impacting any potential TCPs identified by the tribes.

Tennessee Gas provided the tribes with copies of all correspondence sent to the Massachusetts SHPO on October 15, 2018. Tennessee Gas also emailed the tribes on December 28, 2018 as a follow-up to the October 15, 2018 correspondence and to provide access to revised cultural resources documents associated with the Project. The Stockbridge-Munsee Community Band of Mohican Indians THPO replied via email that they concurred that no additional work was necessary and based on the lack of archaeological findings, there would be no adverse effect to cultural resources, and requested to be contacted in the event of unanticipated discoveries.

FERC sent consultation letters to the tribes on January 24, 2019 regarding the Project and enclosed the NOI. FERC has not received any responses.

Unanticipated Discoveries Plan

Tennessee Gas developed a project-specific plan titled: *Procedures Guiding the Discovery of Unanticipated Historic Properties and Human Remains: Post-Review Discoveries*, which outlines the procedure to follow, in accordance with state and federal laws, in the event that unanticipated cultural resources or human remains are discovered during construction of the Project. The plan was submitted to FERC and both the Connecticut and Massachusetts SHPOs. FERC and the Massachusetts SHPO requested minor changes to the plan. The Connecticut SHPO provided no comments on the discovery plan. By January 8, 2019, Tennessee Gas provided copies of the revised plan with the requested revisions to FERC, the Massachusetts SHPO, and tribes. We find the plan acceptable.

Compliance with the National Historic Preservation Act

Tennessee Gas consulted with the Massachusetts and Connecticut SHPOs regarding the potential effects to cultural resources. The Massachusetts and Connecticut SHPOs did not object to the APE and stated that the project would have no effects on historic properties FERC has completed its compliance requirements with Section 106 of the National Historic Preservation Act.

6.0 LAND USE, RECREATION AND VISUAL RESOURCES

Land use in the Project area would consist of commercial/industrial land, open upland, wetlands, upland forest, residential land, open water, and agriculture. The Project would not be located within a coastal zone.

Looping Project

The entire pipeline route would be co-located with Tennessee Gas's existing facilities, other utilities, and roadway corridors. The proposed loop would typically be located 10 feet to the west of Tennessee Gas's existing Line 261B-100 pipeline. In two locations, the new loop would cross to the east of Line 261B-100 to avoid buildings or utilities. In the sections co-located with Line 261BP-100, the new pipeline loop would typically be located about 28 feet to the west. The overall construction workspace for the pipeline facilities would total approximately 25.2 acres.

Agricultural lands such as cropland, pasture lands, and hayfields would be temporarily affected during construction of the pipeline loop. These areas would revert to pre-construction

conditions once construction is complete, with no operational land use changes. Residential properties include single family dwellings and multi-residential buildings, but based on the route of the proposed pipeline loop, no residential impacts are anticipated.

During operation of the pipeline, land requirements would consist of the footprint of appurtenant aboveground facilities as well as the pipeline easement. Where the pipeline loop overlaps with Tennessee Gas's existing permanent easement, the existing permanent easement would need to be expanded by about 20 feet in width to allow for operation and maintenance of the pipeline loop. Where the pipeline loop deviates from the existing easement and is not co-located, a new 40-foot-wide permanent easement adjacent to the existing easement would be required.

HP Replacement Project

The proposed modifications to CS 261 would be situated entirely within the existing facility yard. No permanent expansion of the facility fenceline would be required to accommodate the new equipment. All proposed work would be entirely within existing facility fenceline and no impacts to the continued use of this property would result from proposed modifications.

Facilities Common to Both Projects

The Hickory Street Pipeyard was selected to serve as a contractor/pipe yard for temporary storage and laydown of pipe, materials, spoil storage and equipment parking during construction. The proposed yard would be 11.3 acres, of which, 3.3 acres are located in Massachusetts, while the remaining 8.0 acres are located in Connecticut. The property would be owned by Tennessee Gas. Land use impacts are quantified in table 12.

Access Roads

Access to the Hickory Street Pipeyard would be from both Hickory Street in Connecticut, and from a temporary access road (TAR-PY) located in Massachusetts. Access to both the Looping Project and HP Replacement Project construction work areas on CS 261 property would be accessed by TAR-CS, an existing paved driveway off Suffield Street. Access roads are identified in table 13.

Recreation

The Project would not cross nor would be located within 0.25 mile of any National Park System Unit, which includes national parks, monuments, preserves, historic sites, historical parks, memorials, battlefields, military parks, cemeteries, recreation areas, seashores, lakeshores, rivers, parkways, trails, and other designations. One recreational resource, Crestview Country Club and Golf Course, is directly adjacent to the proposed Project. However, the active golf area of the course is 950 feet to the west and screened by existing woody vegetation. No temporary or permanent impacts to this resource would be expected.

Residential Areas

The Project would not cross nor would be located within 0.25 mile of any currently planned residential communities. One commercial/industrial development that has been approved by the city of Agawam and one commercial building are currently under construction within 0.25 mile of the Project.

Several residences would be within 50 feet of a construction work area. Tennessee Gas would implement mitigation measures for residences within 50 feet that include landowner notification, maintaining access and traffic flow, limiting speed of vehicles during construction hours and minimizing fugitive dust. Specific mitigation plans would be utilized for those properties located within 25 feet of construction. Residences within 50 feet of Project construction are identified in table 14. There would be no structures within 50 feet of the HP Replacement Project site, or the Hickory Street Pipeyard.

The Project's aboveground facilities would be constructed on currently existing Tennessee Gas property, and the pipeline loop would be co-located in an existing transmission corridor to the extent possible. Based on the location and nature of construction activities, we conclude the Project would have no adverse impact on residences.

A comment was received by Gary B. Liquori on behalf of Edward Cecchi and Kathy Gaynor citing concerns over the proposed easement affecting their land value and hindering their ability to sell flowers and vegetables. Tennessee Gas is working with those landowners to resolve their concerns.

There have been several studies to examine the effects of pipeline easements on sales and property values and evaluated the impact of natural gas pipelines on real estate. A study by Integra Realty Resources in 2016 evaluated the impact of gas pipelines on property values in Ohio, Virginia, New Jersey, Pennsylvania, and Mississippi. This study found that the presence of a pipeline does not inhibit house sales and that homes "encumbered" by pipeline easements have an adjusted sales price higher than the average and median sales prices for "unencumbered" homes (Integra Realty Resources, 2016).

In February 2016, the Interstate Natural Gas Association of America (INGAA) published a study, *Pipeline Impact to Property Value and Property Insurability*, which studied properties in four separate areas of the country in 2015. The findings indicate that the presence of pipelines does not affect the value of a property, its insurability, its desirability, or the ability to obtain a mortgage (INGAA, 2016).

The January/February 2011 edition of the International Right of Way Association publication, *Right of Way*, includes the article *The Effect of Natural Gas Pipelines on Residential Value*. This study did not identify a systematic relationship between proximity to the pipeline and sales price or value (International Right of Way Online, 2011). Additionally, a 2012 study by Gnarus Advisors LLC, examined whether the proximity to pipelines, particularly natural gas pipelines, had an effect on residential property values. The study contained a literature review specific to pipelines and property values, with a focus on actual sales data. The authors concluded that there was "no credible evidence based on actual sales data that proximity to pipelines reduces property values" (Gnarus Advisors LLC, 2012).

Based on the research cited above, the short duration of construction activities, and since the area would be restored to pre-construction conditions after completion, we find no conclusive evidence indicating that natural gas pipeline easements would have a significant negative impact on property values.

Table 12
Land Use Acreage Affected by Construction and Operation of the Project

Facility	Commercial/ Industrial Land		Open Upland		Wetlands		Upland Forest		Residential		Open Water		Agricultural Land		Total	
	Const.	Op.	Const.	Op.	Const.	Op.	Const.	Op.	Const	Op.	Const.	Op.	Const.	Op.	Const.	Op.
Looping Project																
Pipeline Loop ROW	3.83	0.52	3.74	0	5.25	0.49	2.31	0.66	0	0	0.12	0	1.81	0	17.06	1.67
ATWS	2.67	0	1.25	0	0.61	0	0.45	0	0	0	0	0	1.03	0	6.01	0
Access Roads	1.02	0	1.10	0	0	0	0	0	0	0	0	0	0	0	2.12	0
Looping Project Total	**7.52**	**0.52**	**6.09**	**0**	**5.86**	**0.49**	**2.76**	**0.66**	**0**	**0**	**0.12**	**0**	**2.84**	**0**	**25.19**	**1.67**
HP Replacement Project																
CS 261 Upgrade	9.33	0	0	0	0.02	0	0	0	0	0	0	0	0	0	9.35	0
Facilities Common to Both Projects																
Hickory Street Pipeyard[a]	0	0	11.30	0	0	0	0	0	0	0	0	0	0	0	11.30	0
Access Roads (TAR-CS and TAR-PY)	0.40	0	0	0	0	0	0.10	0	0	0	0.01	0	0	0	0.51	0
Facilities Common to Both Projects Total	**0.40**	**0**	**11.30**	**0**	**0**	**0**	**0.10**	**0**	**0**	**0**	**0.01**	**0**	**0**	**0**	**11.81**	**0**
PROJECT TOTALS	**17.25**	**0.52**	**17.39**	**0**	**5.88**	**0.49**	**2.86**	**0.66**	**0**	**0**	**0.13**	**0**	**2.84**	**0**	**46.35**	**1.67**

a. Total acreage of Hickory Street Pipeyard is 11.3 acres, 3.3 acres of which are in Massachusetts and 8.0 acres of which are in Connecticut.

Table 13 Access Roads for the 261 Upgrade Project						
Access Road	**Milepost**	**Existing Conditions**	**Length (feet)**	**Required Modifications**	**Construction Impact (acres)**	**Operational Impact (acres)**
Looping Project						
TAR-1	0.14	Maintained Lawn	148	Temporary mats or gravel	0.08	0.00
TAR-2	0.22	Maintained Lawn	153	Temporary mats or gravel	0.09	0.00
PAR-1	0.88	Unpaved Road	266	None	0.15	0.15
TAR-3	1.12	Paved Road	701	None	0.39	0.00
PAR-2	1.26	Utility Easement	908	Temporary mats	0.52	0.52
TAR-4	1.87	Paved/Unpaved Road	799	None	0.46	0.00
PAR-3	2.10	Unpaved Road	732	None	0.43	0.43
Total					**2.12**	**1.10**
Facilities Common to Both Projects						
TAR-CS	0.06	Paved Driveway	700	None	0.40	0.00
TAR-PY	-	Paved Road	190	Temporary mats	0.11	0.00
Total	-	-	-	-	**0.51**	**0.00**
Project Total	-	-	-	-	**2.63**	**1.10**
TAR = Temporary Access Road PAR = Permanent Access Road						

Table 14 Structures Within 50 feet of Project Site						
Looping Project						
Facility	**Structure Description**	**Milepost**	**County, State**	**Distance from Construction Site (feet)**	**Distance from Pipeline Centerline (feet)**	**Residential Mitigation Plan Number[a]**
TWS	CS 261	0.16	Hampden, MA	10	63	N/A
ATWS	CS 261	0.18	Hampden, MA	35	100	N/A
TWS	Barn	0.88	Hampden, MA	37	86	N/A
TAR-3	Business	1.11	Hampden, MA	12	210	TO-SS12-261B-200-9
TWS	Business	1.33	Hampden, MA	18	65	N/A
TWS	Business	1.38	Hampden, MA	5	35	N/A
ATWS	Business	1.39	Hampden, MA	16	120	N/A
TAR-4	Business	1.83	Hampden, MA	48	215	N/A
TAR-4	Business	1.93	Hampden, MA	35	232	N/A
TWS	Residence	1.99	Hampden, MA	27	77	TO-SS12-261B-200-14
PAR-3	Residence	2.00	Hampden, MA	15	184	TO-SS12-261B-200-14
PAR-3	Storage Building	2.00	Hampden, MA	0	243	N/A
PAR-3	Storage Building	2.03	Hampden, MA	0	290	N/A
PAR-3	Storage Building	2.04	Hampden, MA	43	387	N/A
TWS	Storage Building	2.04	Hampden, MA	9	74	N/A
PAR-3	Storage Building	2.06	Hampden, MA	0	290	N/A
a. Site Specific Residential Mitigation Plans are in Appendix D						

Visual Resources

The proposed Project would not be located within any federal, state, or locally designated scenic areas. Visual impacts during construction would be limited to construction equipment and storage within designated temporary workspaces. The visual character of the Looping Project site would be an existing transmission corridor. Visual impacts due to construction would be temporary. The Project's aboveground facilities would consist of modifications at CS 261 that include abandoning two existing turbine compressor units and replacing with one new compressor unit within the existing compressor station and a new auxiliary building housing a new emergency generator unit. We conclude that impacts on visual resources would be minimal due to the similar characteristics of the Project area.

The Project was designed to minimize impacts to land uses, primarily by collocating with existing Tennessee Gas pipeline systems, property and other utility and roadway corridors. Based on the nature and location of Project activities, we conclude that the Project construction and operational activities would not adversely affect land use in the area.

7.0 AIR QUALITY AND NOISE

7.1 Air Quality

Air quality would be affected by construction and operation of the Project. During construction, short-term emissions would be generated from the usage of equipment, land disturbance, and increased traffic from worker and delivery vehicles for all locations. No operational emissions would be associated with the Looping Project, and operation of the HP Replacement Project would result in a minimal change in existing air emissions.

Ambient air quality is protected by federal and state regulations. Under the Clean Air Act (CAA) and its amendments, the EPA has established National Ambient Air Quality Standards (NAAQS)[6] for carbon monoxide (CO), lead (Pb), nitrogen dioxide ($NO_,$) ozone, particulate matter less than 10 microns (PM_{10}), particulate matter less than 2.5 microns ($PM_{2.5}$), and sulfur dioxide (SO_2). The MassDEP have the authority to implement permit programs under the CAA for the proposed Project facilities.

These standards incorporate short-term (hourly or daily) levels and long-term (annual) levels to address acute and chronic exposures to the pollutants, as appropriate. The NAAQS include primary standards, which are designed to protect human health, including the health of sensitive subpopulations such as children and those with chronic respiratory problems. The NAAQS also include secondary standards designed to protect public welfare, including economic interests, visibility, vegetation, animal species, and other concerns not related to human health. Massachusetts has adopted ambient air quality standards that differ in some respects from the current NAAQS. Table 15 presents the NAAQS, and table 16 summarizes the current Ambient Air Quality Standards for the Commonwealth of Massachusetts.

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

Table 15
National Ambient Air Quality Standards

Pollutant	Averaging Period	Standards	
		Primary	Secondary
Sulfur dioxide (SO_2)	1-hour [l,m]	75 ppb 196 µg/m³	
	3-hour [b]	--	0.5 ppm 1300 µg/m³
	Annual [a,m]	0.03 ppm 80 µg/m³	--
	24-hour [b,m]	0.14 ppm 365 µg/m³	--
PM_{10}	24-hour [d]	150 µg/m³	150 µg/m³
$PM_{2.5}$ (2012 Standard)	Annual [e]	12.0 µg/m³	15.0 µg/m³
$PM_{2.5}$ (2006 Standard)	24-hour [f]	35 µg/m³	35 µg/m³
Nitrogen Dioxide (NO_2)	Annual [a]	0.053 ppm (53 ppb) 100 µg/m³	0.053 ppm (53 ppb) 100 µg/m³
	1-hour [c]	100 ppb 188 µg/m³	--
Carbon Monoxide (CO)	8-hour [b]	9 ppm 10,000µg/m³	--
	1-hour [b]	35 ppm 40,000 µg/m³	--
Ozone (2008 Standard)	8-hour [g,h]	0.075 ppm	0.075 ppm
Ozone (2015 Standard)	8-Hour [i]	0.070 ppm	0.070 ppm
Ozone (O_3)	1-hour [j,k]	0.12 ppm	0.12 ppm
Lead (Pb)	Rolling 3-month [a]	0.15 µg/m³	0.15 µg/m³

a. Not to be exceeded
b. Not to be exceeded more than once per year
c. Compliance based on 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area
d. Not to be exceeded more than once per year on average over 3 years
e. Compliance based on 3-year average of weighted annual mean $PM_{2.5}$ concentrations at community-oriented monitors
f. Compliance based on 3-year average of 98th percentile of 24-hour concentrations at each population-oriented monitor within an area
g. Compliance based on 3-year average of fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area
h. The 2008 8-hour ozone standard would remain in effect until one year after an area is designated for the 2015 8-hour ozone standard, which corresponds with January 16, 2019 based upon attainment designations for the 2015 ozone standard issued on January 16, 2018
i. Permit applications that have not met EPA's grandfathering criteria would have to demonstrate that the proposed project does not cause or contribute to a violation of any revised ozone standards that are in effect when the permit is issued, including the 2015 revised standards
j. Maximum 1-hour daily average not to be exceeded more than one day per calendar year on average
k. The 1-hour ozone standard has been revoked in all areas in which Project activities would occur
l. Compliance based on 3-year average of 99th percentile of the daily maximum 1-hour average at each monitor within an area
m. The 24-hour and annual average primary standards for SO_2 have been revoked.
ppm = parts per million by volume; ppb = parts per billion by volume.
µg/m³ = micrograms per cubic meter.

Table 16
Massachusetts Primary and Secondary Standards

Pollutant	Averaging Period	Standard	
		Primary	Secondary
Sulfur dioxide (SO_2)	Annual [a]	80 µg/m^3 (0.03 ppm)	--
	24-hour [b]	365 µg/m^3 (0.14 ppm)	--
	3-hour [b]	--	1,300 µg/m^3 (0.5 ppm)
PM_{10}	Annual [c]	50 µg/m^3	50 µg/m^3
	24-hour [d]	150 µg/m^3	150 µg/m^3
Nitrogen Dioxide (NO_2)	Annual [a]	100 µg/m^3 (0.05 ppm)	100 µg/m^3 (0.05 ppm)
Carbon Monoxide (CO)	8-hour [b]	10 mg/m^3 (9 ppm)	10 mg/m^3 (9 ppm)
	1-hour [b]	40 mg/m^3 (35 ppm)	40 mg/m^3 (35 ppm)
Ozone (O_3)	1-hour [e]	235 µg/m^3 (0.12 ppm)	235 µg/m^3 (0.12 ppm)
Lead (Pb)	Calendar Quarter[a]	1.5 µg/m^3	1.5 µg/m^3

Notes:
a. Not to be exceeded.
b. Not to be exceeded more than once per year.
c. Standard attained when expected annual arithmetic mean is less than indicated value.
d. Standard attained when expected days per calendar year exceeding value is less than or equal to 1.
e. Standard attained when expected number of days per calendar year with maximum hourly average concentration exceeding limit is less than or equal to 1.

ppm= parts per million by volume
µg/m^3= micrograms per cubic meter
mg/m^3= milligrams per cubic meter

Air quality control regions (AQCRs) are areas established by the EPA and local agencies for air quality planning purposes, in which State Implementation Plans describe how the NAAQS would be achieved and maintained. 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 smaller portion within an AQCR (such as a county), is designated, based on compliance with the NAAQS, as attainment, unclassifiable, maintenance, or nonattainment, on a pollutant by-pollutant basis. Areas in

compliance or below the NAAQS are designated as attainment, while areas not in compliance or above the NAAQS are designated as nonattainment. Areas previously designated as nonattainment that have since demonstrated compliance with the NAAQS are designated as maintenance for that pollutant. Maintenance areas may be subject to more stringent regulatory requirements to ensure continued attainment of the NAAQS. Areas that lack sufficient data to determine attainment status are designated unclassifiable and treated as attainment areas.

Hampden County, Massachusetts, and Hartford County, Connecticut are both part of the Hartford-New Haven-Springfield Interstate Air Quality Control Region. Hampden County would be designated as in attainment for all criteria pollutants. Hampden County would be located in an Ozone Transport Region (OTR), 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, and therefore is treated as moderate ozone nonattainment for VOC and NOx.

Hartford County, Connecticut would be designated as moderate non-attainment for ozone and maintenance for CO.

Permitting/Regulatory Requirements

Prevention of Significant Deterioration and Nonattainment New Source Review

The Prevention of Significant Deterioration (PSD) and Nonattainment New Source Review (NNSR) air permit programs are designed to protect air quality when air pollutant emissions are increased either through the construction of new major stationary sources or major modifications to existing stationary sources. The MassDEP administer the PSD and NNSR permitting programs in their state. CS 261 is an existing major source under the NNSR program. The potential emissions from the modifications at CS 261 would not be considered a major modification as emissions would be less than the significant emissions threshold of 25 tons per year. Regarding the HP Replacement Project maximum potential emissions relative to recent baseline actual emissions, the HP Replacement Project would result in a decrease of NOx emissions and a small increase of VOC emissions, all well below the NNSR significance threshold. Therefore, NNSR permitting is not required.

One additional factor considered in the PSD permit review process is the potential impacts on protected Class I areas. Class I Areas were designated because the air quality was considered a special feature of the area (e.g., national parks, wilderness areas, national forests). The nearest Class I area to the Project would be the Lye Brook Wilderness Area in Vermont and the Great Gulf Wilderness and Presidential Range Dry River Wilderness Areas in northern New Hampshire. The location of the Project would be approximately 75 miles from the Lye Brook Wilderness and 155 miles from the Presidential Range. Class 1 requirements for air quality analysis apply to new sources located within 62 miles of a Class 1 area. Therefore, an assessment of the impact on Class I areas would not be required.

Title V Permitting

Title V is an operating air permit program run by each state for each facility that is considered a "major source." The existing CS 261 currently operates under a Title V permit which would need to be modified to incorporate the proposed modifications associated with the Project.

New Source Performance Standards (NSPS)

The EPA promulgates NSPS to establish emission limits and fuel, monitoring, notification, reporting, and recordkeeping requirements for stationary source types or categories that cause or contribute significantly to air pollution.

Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines) would apply to the emergency generator being replaced at CS 261.

Subpart KKKK (Standards of Performance for Stationary Combustion Turbines) would apply to the stationary combustion turbine at CS 261.

Subpart OOOOa (Standards of Performance for Crude Oil and Natural Gas Production Transmission and Distribution) would apply to pneumatic controllers, reciprocating compressors, and the collection of fugitive emissions components at compressor site. Tennessee Gas would be required to develop a fugitive emissions monitoring plan and performance of emissions monitoring surveys of fugitive emissions components at CS 261.

National Emission Standards for Hazardous Air Pollutants (NESHAP)

The 1990 CAA Amendments established a list of 189 hazardous air pollutants (HAPs), resulting in the promulgation of National Emission Standards for Hazardous Air Pollutants. The National Emission Standards for Hazardous Air Pollutants 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.

Subpart ZZZZ- National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines would apply to the new engine, but only need to meet the requirements of NSPS part JJJJ.

General Conformity

The EPA promulgated the General Conformity Rule to implement the conformity provision of Title I, Section 176(c)(1) of CAA. Section 176(c)(1) requires that the federal government not engage, support, or provide financial assistance for licensing or permitting, or approve any activity not conforming to, an approved CAA implementation plan.

The General Conformity Rule is codified in Title 40 CFR Part 51, Subpart W and Part 93, Subpart B, Determining Conformity of General Federal Actions to State or Federal Implementation Plans. A conformity determination must be conducted by the lead federal agency if a federal action's construction and operational activities is likely to result in generating direct and indirect emissions that would exceed the conformity threshold (*de minimis*) levels of the pollutant(s) for which an air basin is in nonattainment or maintenance. According to the conformity regulations, emissions from sources that are subject to any NNSR or PSD permitting/licensing (major or minor) are exempt and are deemed to have conformed.

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 determination if a federal action's construction and operational activities is likely to result in generating 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. Section 176(c)(1) states that a federal agency cannot approve or support any activity that does not conform to an approved State Implementation Plan. 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 deemed necessary. A General Conformity Determination must be completed when the total direct and indirect emissions of a project would equal or exceed the specified pollutant thresholds on a calendar year basis for each nonattainment or maintenance area.

As noted earlier, the Project facilities in Hampden would be in attainment areas within the AQCR, but would have to meet the nonattainment new source review requirements for ozone as part of the OTR. For general conformity purposes, nonattainment designations due solely to being in the OTR, would not be applicable and would not apply for Hampden County.

Hartford County is designated as non-attainment for Ozone and thus, a general conformity applicability analysis would be required for construction activities in this county if the emissions exceed the General Conformity thresholds. As shown below in table 17 and 18, the construction and operational emissions would be below the general conformity applicability thresholds in non-attainment or maintenance area for the Project. Therefore, a General Conformity Determination would not be required.

Greenhouse Gases

Greenhouse gases (GHGs) occur in the atmosphere both naturally and as a result of human activities, such as the burning of fossil fuels. GHGs are gases that absorb infrared radiation in the atmosphere, and an increase in emissions of these gasses has been determined by the EPA to endanger public health and welfare by contributing to global climate change. The most common GHGs emitted during fossil fuel combustion and natural gas transportation are carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). Emissions of GHGs are typically expressed in terms of CO_2 equivalents (CO_2e), where the potential of each gas to increase heating in the atmosphere is expressed as a multiple of the heating potential of CO_2 over a specific timeframe, or its global warming potential (GWP)[7]. The 100-year GWP of CO_2 is 1, CH_4 is 25, and N_2O is 298.

[7] These 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 the EPA has established for reporting of GHG emissions and air permitting requirements. This allows for a consistent comparison with these regulatory requirements.

During construction and operation of the Project, these GHGs would be emitted from non-electrical construction and operational equipment, as well as from fugitive CH_4 leaks from the pipeline and aboveground facilities.

Table 17
Estimated Construction Emissions (tons per year)[a]

	NO_x	CO	VOC	PM_{10}	$PM_{2.5}$	SO_2	Total HAPs	GHG[a] (CO_{2e})
Looping Project	20.00	34.50	2.27	24.21	4.67	0.04	0.13	3,079
HP Replacement Project	6.23	5.64	0.69	2.74	0.79	0.01	0.06	1,452
Project Total	**26.23**	**40.14**	**2.97**	**26.95**	**5.46**	**0.05**	**0.19**	**4,531**
General Conformity Thresholds	**100**	**100**	**50**	**100**	**100**	**100**	**100**	

a. All construction is estimated to be completed between March and November, 2020.

Table 18
Estimated Operational Emissions (tons per year)

	NO_x	CO	VOC	SO_2	PM_{10}	$PM_{2.5}$	Total HAPs	GHG
Looping Project	-	-	0.05	-	-	-	-	222
HP Replacement Project	14.64	4.99	3.41	5.60	2.64	2.64	0.28	51,484
CS 261 Potential to Emit after HP Replacement Project	52.69	34.97	16.81	1.11	6.61	6.61	0.52	61,425
Total	**67.33**	**39.96**	**20.27**	**6.61**	**9.25**	**9.25**	**0.8**	**113,131**

On November 8, 2010, the EPA signed a rule that finalizes reporting requirements for the petroleum and natural gas industry under 40 CFR 98. Subpart W of 40 CFR 98 requires petroleum and natural gas facilities that emit 25,000 metric tons or more of CO_2e per year to report annual emissions of specified GHGs from various processes within the facility. Construction emissions are not covered under the GHG Reporting Rule, but those related to the proposed Project are expected to be well below the 25,000 metric tons reporting threshold. Operational emissions from the proposed facilities are likewise not expected to exceed this threshold and be reported to the EPA. The EPA has expanded its regulations to include the emission of GHGs from major stationary sources under the PSD program. The EPA's current rules require that a stationary source that is major for a non-GHG-regulated New Source Review pollutant must also obtain a PSD permit prior to beginning construction of a new or modified major source with mass-based GHG emissions equal to or greater than 100,000 tons per year (tpy) and significant net emission increases in units of CO_2e equal to or greater than 75,000 tpy. There are no NAAQS or other significance thresholds for GHGs.

Construction Emissions

Construction of the Project would result in short-term increases in emissions of some pollutants from the use of fossil fuel-fired equipment and the generation of fugitive dust due to earthmoving activities. Some temporary indirect emissions, attributable to construction workers

commuting to and from work sites during construction and from on-road and off-road construction vehicle traffic, could also occur. Large earth-moving equipment and other mobile equipment are sources of combustion-related emissions, including criteria pollutants (i.e., NO_x, CO, VOC, SO_2, and PM_{10}).

Tennessee Gas would mitigate exhaust emissions from construction equipment by requiring contractors to meet all air quality regulations and emission standards associated with each piece of equipment, use low-sulfur diesel fuel in non-road construction equipment, and limit idling of diesel and gasoline powered on-road vehicles and non-road construction equipment operating at, or visiting, the construction site. Fugitive dust emissions during construction would be mitigated by measures outlined in the Fugitive Dust Control Plan, such as spraying water on unpaved areas subject to frequent vehicle traffic. Construction of the Project is estimated to occur between March and November 2020. These emissions present the combined emissions for each facility of construction equipment combustion, on-road vehicle travel, off-road vehicle travel, and earthmoving fugitives.

Construction related emission estimates were based on a typical construction equipment list, hours of operation, and vehicle miles traveled by the construction equipment and supporting vehicles for each area of the Project. These emission-generating activities would include earthmoving, construction equipment exhaust, on-road vehicle traffic, and off-road vehicle traffic. Tennessee Gas conservatively utilized emission factors from EPA's NONROAD2008a and MOVES2014 emission modeling software.

Construction is estimated to occur between March and November 2020. The air quality impacts of Project construction would be considered short-term and would be further minimized by Tennessee Gas's implementation of fugitive dust control measures outlined in the Fugitive Dust Control Plan. Following construction, air quality would revert back to previous conditions. Construction emissions for the Project are presented in table 17.

Given the temporary nature of construction, and the intermittent nature of construction emissions, we find that emissions from construction-related activities for the Project would not be expected to cause or significantly contribute to a violation of any applicable ambient air quality standard, or significantly affect local or regional air quality.

Operational Emissions

Emission generating modifications at CS 261 would include removing two existing compressor turbine units totaling 6,689, replaced witha new 11,107 hp Solar Taurus 70 gas-fired compressor unit and replacement emergency generator. There would be no other sources of operational emissions associated with the Project. Operational emissions for the Project facilities are presented in table 18. Considering the minimal operational emissions associated with the Project, we conclude that operational emissions would not have a significant impact on air quality.

7.2 Noise

Construction and operation of the Project would affect the local noise environment in the Project area. The ambient sound level of a region, which is defined by the total noise generated

within the specific environment, is usually comprised of sounds emanating from both natural and artificial sources. At any location, both the magnitude and frequency of environmental noise may vary considerably over the course of the day and throughout the week, in part due to changing weather conditions and the impacts of seasonal vegetative cover.

Two measurements used by some federal agencies to relate the time-varying quality of environmental noise to its known effects on people are the equivalent sound level (L_{eq}) and the day-night sound level (L_{dn}). The L_{eq} is an A-weighted sound level containing the same sound energy as the instantaneous sound levels measured over a specific time period. Noise levels are perceived differently, depending on length of exposure and time of day. The L_{dn} takes into account the duration and time the noise is encountered. Specifically, in the calculation of the L_{dn}, late night to early morning (10:00 p.m. to 7:00 a.m.) noise exposures are penalized +10 decibels (dB), to account for people's greater sensitivity to sound during the nighttime hours. The A-weighted scale (dBA) is used because human hearing is less sensitive to low and high frequencies than mid-range frequencies. For an essentially steady sound source that operates continuously over a 24-hour period and controls the environmental sound level, the L_{dn} is approximately 6.4 dB above the measured L_{eq}.

The EPA published its Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety. Noise levels are expressed as decibels on the A-weighted scale (dBA) to put more emphasis on frequencies in the range that humans hear best. Because noise levels are perceived differently, depending on length of exposure and time of day, the day-night sound level (L_{dn}) takes into account the duration and time the noise is encountered. Specifically, the L_{dn} adds 10 dBA to nighttime sound levels between the hours of 10 p.m. and 7 a.m. to account for a people's greater sensitivity to sound during the night. The EPA has indicated that an L_{dn} of 55 dBA protects the public from indoor and outdoor activity interference. We have adopted this criterion and use it to evaluate the potential noise impacts from the proposed Project at noise sensitive areas (NSAs), such as residences, schools, or hospitals. Also, in general, a person's threshold of perception for a perceivable change in loudness on the A-weighted sound level is about 3 dBA, whereas a 5 dBA change is clearly noticeable, and a 10 dBA change is perceived as either twice or half as loud.

The MassDEP Noise Policy establishes a threshold sound level and sound pressure level for sources of sound of no more than 10 dBA above ambient sound levels as well as sources that produce a "pure tone" condition.

There are no applicable county, or local noise regulations associated with the Project.

Construction Noise

Construction of the facilities would involve operation of general construction equipment and noise would be generated during the installation of the Project components. Construction of the Looping Project would include crossing Shoemaker Lane using the HDD method. Most HDD activities would be limited to a single 12-hour daytime shift, however, certain HDD activities such as pull back would require limited nighttime work. Noise from HDDs and construction activities would be episodic and temporary.

Construction noise would be highly variable because the types of equipment in use at a construction site changes with the construction phase and the types of activities. Noise from construction activities may be noticeable at nearby NSAs. However, construction equipment would be operated on an as-needed basis during the short-term construction period. Further, Tennessee Gas would limit construction activities to occur during daytime hours, except when required for activities such as hydrostatic testing, operation of pumps at waterbody crossings, and certain HDD activities that require continuous work. FERC staff considers daytime hours to be 7:00 AM to 7:00 PM. If night time construction is required, advanced notice would be provided to the residents informing them of the planned activities and duration. A 24-hour hotline would be provided for residents and abutters to work with landowners to promptly resolve any concerns.

Measures to mitigate construction noise would include compliance with federal regulations limiting noise from trucks, proper maintenance of equipment, and ensuring that sound muffling devices provided by the manufacturer are kept in good working condition. Additionally, Tennessee Gas would install temporary noise barriers and offer to temporarily relocate residents near HDD work areas for the duration of nighttime activities.

Two NSAs were identified by SLR Consulting (SLR) near the HDD sites. Predicted noise levels for HDD activities associated with the Looping Project are presented in table 19.

Table 19
HDD Noise Analysis

NSA	Distance (feet)	Site	Existing Ambient Ldn (dBA)	Estimated Construction Noise (dBA)	Mitigated Construction Noise Levels+ Ambient (dBA)	Increase in Noise Levels (dBA)
1	250	North Entry	65.5	64.2	68.0	2.5
		South Exit	64.6	59.4	65.8	1.2
2	380	South Entry	65.5	63.5	67.6	2.1
		North Exit	64.6	62.7	68.0	3.4

Ambient sound levels at affected NSAs are above 55dBA. Increases due to HDD activities after mitigation would be below the threshold of perceptible increase. Because construction of the Project would mostly be limited to daytime hours and intermittent, and with implementation of the proposed mitigation measures during construction, we conclude that construction noise would not have a significant impact on the environment.

Operation

The modified CS 261 would generate operational noise. SLR completed a pre-construction sound survey and noise analysis on April 17, 2018 for CS 261 using baseline sound surveys, sound level data for the specific equipment planned for the facility, and calculations for the noise attenuation over distance and proposed noise control measures. The existing (ambient) noise sound levels, estimated sound levels from the proposed sources, total noise sound levels, and noise increases/decreases were calculated.

SLR selected 3 measurement sampling sites based on their proximity to potentially impacted inhabited structures. As shown in table 20, the estimated noise from the modifications at the compressor station is below the FERC's noise criterion of 55 dBA and the minor Project modifications at this facility would result in a potential noise decrease from existing levels.

Table 20
Noise Quality Analysis

NSA	Distance Feet	Existing facilities + ambient Ldn (dBA)	Total L_{dn} (dBA)	Potential Noise Increase (dBA)
1- North Property Line	750	53.3	53.2	-0.1
2- North Property Line	1,060	52.2	52.2	0.0
3- West Property Line	640	52.7	52.3	-0.4
Existing station sound levels at NSAs present lower than measured sound levels, as they were influenced by other environmental noise sources not associated with the station.				

To confirm the noise modeling and verify that noise generated from the modifications would not cause an increase to the existing noise, **we recommend that:**

Tennessee Gas should file noise surveys with the Secretary no later than 60 days after placing the authorized unit at CS 261 in service. If a full load condition noise survey is not possible, Tennessee Gas 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 the station under interim or full power load conditions exceeds an Ldn of 55 dBA at any nearby NSAs, Tennessee Gas should:

a) **file a report with the Secretary of the Commission (Secretary) on what changes are needed, for review and written approval by the Director of the Office of Energy Projects (OEP);**
b) **install additional noise controls to meet that level within 1 year of the in-service date; and**
c) **confirm compliance with the Ldn of 55 dBA requirement by filing a second noise survey with the Secretary no later than 60 days after it installs the additional noise controls.**

Based on the analysis above and our recommendation, we conclude that the Project would not result in significant noise impacts on residents and the surrounding communities.

8.0 RELIABILITY AND SAFETY

A natural gas compressor station or aboveground interconnect site involves some risk to the public in the event of an accident and subsequent release of gas. The greatest hazard is a fire or explosion following a leak, or rupture at the facility. 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 breathed in high concentration, oxygen deficiency can result in serious injury or death.

The modifications to the Project facilities must be designed, constructed, operated, and maintained in accordance with the DOT Minimum Federal Safety Standards in 49 CFR Part 192. The regulations are intended to ensure adequate protection for the public and to prevent facility accidents and failures, including emergency shutdowns and safety equipment. The DOT's Pipeline and Hazardous Materials Safety Administration 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 level.

The DOT provides for a state agency to assume all aspects of the safety program for intrastate facilities by adopting and enforcing the federal standards. DOT federal inspectors perform inspections and enforce the pipeline safety regulations for interstate gas pipeline facilities. Additionally, the DOT also defines area classifications, based on population density in the vicinity of the pipeline facility, 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 in any 12-month period.
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. The existing facilities are located in Class 1 locations. Modifications to existing facilities would be designed to meet existing Class requirements.

Part 192 also requires a pipeline operator to establish a written emergency plan that includes procedures to minimize the hazards in an emergency. Additionally, the operator must establish a continuing education program to enable the public, government officials, and others to recognize an emergency at the facility and report it to appropriate public officials. Tennessee Gas would provide

the appropriate training to local emergency service personnel before the facilities are placed in service.

High Consequence Areas

Under 49 CFR 192.903, operators must develop integrity management programs for natural gas transmission pipelines located in High Consequence Areas (HCAs). Definitions and identification of HCAs as defined in 49 CFR 192.903 are as follows:

"High consequence area" means an area may be defined in one of two ways. In the first method an HCS includes:

- Class 3 location under §192.5; or
- Class 4 location under §192.5; or
- any area in a Class 1 or Class 2 location where the potential impact radius is greater than 660 feet (200 meters), and the area within a potential impact circle contains 20 or more buildings intended for human occupancy; or
- any area in a Class 1 or Class 2 location where the potential impact circle contains an identified site.

In the second method, and HCS includes any area within a potential impact circle which contains:

- 20 or more buildings intended for human occupancy, unless the exception in paragraph (4) applies; or
- an identified site.

Where a potential impact circle is calculated under either method to establish a high consequence area, the length of the high consequence area extends axially along the length of the pipeline from the outermost edge of the first potential impact circle that contains either an identified site or 20 or more buildings intended for human occupancy to the outermost edge of the last contiguous potential impact circle that contains either an identified site or 20 or more buildings intended for human occupancy.

Identified site means each of the following areas:

- An outside area or open structure that is occupied by 20 or more persons on at least 50 days in any 12-month period (days need not be consecutive). Examples include but are not limited to, beaches, playgrounds, recreational facilities, camping grounds, outdoor theaters, stadiums, recreational areas near a body of water, or areas outside a rural building such as a religious facility; or
- A building that is occupied by 20 or more persons on at least 5 days a week for 10 weeks in any 12-month period (days and weeks need not be consecutive). Examples include but are

not limited to, religious facilities, office buildings, community centers, general stores, 4-H facilities, or roller skating rinks; or

- A facility occupied by persons who are confined, are of impaired mobility, or would be difficult to evacuate. Examples include but are not limited to hospitals, prisons, schools, daycare facilities, retirement facilities, or assisted-living facilities.

There are no HCAs located near the Project.

We received a comment from Linda Grimaldi, the Pipe Line Awareness Network, City of Northampton and the Columbia Gas Resistance Campaign, citing concerns over risks of explosions, risk of injuries from gas leaks and ruptures, various health impacts, and concerns relating to the 2018 Merrimack Valley overpressure incident. This incident involved a distribution system owned and operated by Columbia Gas of Massachusetts. A series of explosions and fires occurred after high-pressure natural gas was released into a low-pressure gas distribution system in the northeast region of the Merrimack Valley. The National Transportation Safety Board (NTSB) is investigating the accident and has made safety recommendations to the state of Massachusetts and to NiSource, Inc. [8] We note that local distribution pipelines, as the one involved in this incident, are not regulated by FERC.

As discussed above, the Project facilities must be designed, constructed, operated, and maintained in accordance with the DOT Minimum Federal Safety Standards in 49 CFR 192 that are designed to minimize the risks of such impacts. The DOT specifies material selection and qualification; minimum design requirements; and protection from internal, external, and atmospheric corrosion. The requirements include provisions for written emergency plans and emergency shutdowns. Tennessee Gas would provide the appropriate training to local emergency service personnel before the facilities are placed into service.

The DOT has the exclusive authority to promulgate federal safety standards used in the transportation of natural gas. Section 157.14(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 it 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. Under a Memorandum of Understanding on Natural Gas Transportation Facilities (Memorandum) dated January 15, 1993, between the DOT and the FERC, the FERC accepts this certification and does not impose additional safety standards.

The available data from the DOT's Pipeline and Hazardous Materials Safety Administration show that natural gas transmission pipelines continue to be a safe, reliable means of energy transportation. The construction and operation of the modified facilities would represent a minimum increase in risk to the nearby public and we are confident that with implementation of the required design criteria for the design of these facilities, that they would be constructed and operated safely.

[8] See https://www.ntsb.gov/investigations/AccidentReports/Pages/PLD18MR003-preliminary-report.aspx.

9.0 CUMULATIVE IMPACTS

In accordance with NEPA and with FERC policy, we identified other actions in the vicinity of the proposed Project facilities and evaluated the potential for a cumulative impact on the environment. As defined by the Council on Environmental Quality (CEQ), a cumulative effect is the impact on the environment that results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of the agency or party undertaking such other actions. Cumulative impacts can result from individually minor, but collectively significant actions, taking place over time. The CEQ guidance states that an adequate cumulative effects analysis may be conducted by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions.

In this analysis, we consider the impacts of past projects within defined geographic scopes as part of the affected environment (environmental baseline) which were described and evaluated in the preceding environmental analysis. However, present effects of past actions that are relevant and useful are also considered. Our cumulative effects analysis focuses on potential impacts from the proposed project on resource areas or issues where the incremental contribution could result in cumulative impacts when added to the potential impacts of other actions. To avoid unnecessary discussions of insignificant impacts and projects and to adequately address and accomplish the purposes of this analysis, an action must first meet the following three criteria to be included in the cumulative analysis:

- affects a resource also potentially affected by the Project;
- causes this impact within all, or part of, the Project area defined by the resource-specific geographic scope; and
- causes this impact within all, or part of, the time span of the proposed Project's estimated impacts.

As described in section B of this EA, constructing and operating the Project would temporarily and permanently affect the environment. However, with the exceptions noted below, we concluded that most of the Project-related impacts would be contained within or adjacent to the temporary construction workspaces, existing pipeline and roadway corridors, or utility easements. Based on this, along with the proposed minimization and mitigation measures described in Tennessee Gas's construction procedures, we have concluded that most of the Project impacts would be limited to workspaces and adjacent areas.

Resources that could be affected outside the immediate Project area and are subject to our cumulative impacts review include surface water and fisheries, wetlands, and air quality. However, for some resources, the contribution to regional cumulative impacts is lessened by the expected recovery of ecosystem function. For example, erosion control measures included in FERC's Plan would keep disturbed soils within the work areas and would therefore not contribute to cumulative impacts on soil resources. Non-forested vegetation communities and wildlife habitats would be cleared, but restoration would proceed immediately following construction. Land use impacts are negligible as all of the impacts would occur on paved, industrial, or previously used areas and within existing Tennessee Gas owned facilities, or co-located to the extent possible with existing easements and utility corridors. Additionally, we determined that there would be no significant noise impacts during construction or operation of the Project as there

are no projects near the Project site identified would be constructed during the Project construction timeline, and once completed, the station would have a decrease in operational noise levels. Furthermore, no cultural resources were identified. Because the Project would have no or only minimal, localized, and/or temporary impacts impact on these resources, cumulative impacts have not been assessed further for geology and soils, vegetation, wildlife, cultural resources, land use, visual impacts, and operational and construction noise for the Project.

Based on the impacts of the Project as identified and described in this EA and consistent with CEQ guidance, we have determined that the resource-specific geographic scope described below are appropriate to assess cumulative impacts.

- impacts on surface water, fisheries and wetlands were assessed within the HUC 12 watershed;
- impacts on air quality, including fugitive dust, would be largely limited to areas immediately around active construction. We searched for other projects and actions that overlap in time and are located within 0.25 mile of construction activities; and
- impacts on operational air quality. We searched for other projects and actions that overlap in time and located within a 30.1 mile (50 kilometer) radius.

The actions considered in our cumulative impact analysis may vary from the Project in nature, magnitude, and duration. These actions are included based on the likelihood of their impacts coinciding with the Project, meaning the other actions have current or ongoing impacts or are "reasonably foreseeable." The actions we considered are those that could affect similar resources during the same timeframe as the Project, and they are listed in appendix E. The majority of projects are upgrades to existing manufacturing facilities, and construction of municipal facilities. Multiple projects were identified as possible contributors to cumulative impacts in the area, these can be seen in table 21 in appendix E. The anticipated cumulative impacts of the Project and these other actions are discussed below.

Multiple comments were received from the Energy Facilities Siting Board, Pipe Line Awareness Network, and Berkshire Environmental Action Team requesting the inclusion of the construction of the Longmeadow Meter Station in assessing cumulative impacts. The Longmeadow Meter Station would be constructed under Tennessee Gas's blanket construction certificate and is not within the scope of the Project. Based on the location, construction timelines, and operational nature of the facility, the Longmeadow Meter Station would not be within the geographic scope for any resources analyzed in our cumulative impacts analysis with the exception of construction air quality. As the construction timeline for the Longmeadow meter station indicates completion by November 2019, there would be no overlap of construction timelines, and is therefore not addressed further.

Comments received from the Pipe Line Awareness Network, Berkshire Environmental Action Team and the Attorney General Office regarding the Springfield Area Reliability Plan state that the potential infrastructure projects in the Springfield area should be considered together. The

potential reliability projects referenced in November 2017[9] would be designed to address deficiencies in the existing reliability system and would be presented in Columbia of Massachusetts's Forecast and Supply Plan to the Massachusetts Department of Public Utilities when finalized. To date, there is not enough available information on these projects to consider them alongside the Project.

Surface Water and Fisheries

As discussed in sections B.3.2 of this EA, the Project's impacts on surface water resources and fisheries are expected to be short term and minor. Cumulative impacts would be limited primarily to the waterbodies that are affected by other actions within the same HUC-12 watershed that are constructed in a similar timeframe as the 261 Upgrade Project. Two projects were identified within the geographic scope: Tennessee Gas's Connecticut Loop of the Connecticut Expansion Project and a new residential subdivision. Tennessee Gas's Connecticut Loop was completed in 2017; therefore, it is not expected to contribute to cumulative impacts. The planning status and timeline for the residential subdivision is unknown and no information was attainable regarding the surface water impacts. The subdivision would be constructed about 230 feet east of TAR-2. Desktop review indicates that an unnamed tributary to Worthington Brook (MA-2) is located near TAR-2 in this area of the Project, but is not directly crossed and only lies within a state-defined buffer zone. This is an intermittent waterbody that may not maintain sufficient flow to support fish. Tennessee Gas would prevent any indirect impacts on this waterbody from run-off and sedimentation with the installation of erosion control devices (e.g. silt fence). Should the subdivision be constructed in a similar timeframe as the 261 Upgrade Project, it is expected that the impacts would be minimized through the various permitting processes, which may require best management practices during construction, also including the use of erosion control devices, and that adequate stabilization would be attained through successful revegetation of disturbed areas. Because of the minimal and temporary impacts of the 261 Upgrade Project on water resources, along with Tennessee Gas's proposed measures, we conclude that any impact contribution by the Project on waterbodies and the fisheries they contain would also be temporary and minor and not be cumulatively significant with any of the other projects listed in table 21.

Wetlands

The Project's impacts on wetlands range from short-term to permanent. Specifically, impacts on PFO wetlands include long-term construction impacts and permanent operational impacts from clearing and routine maintenance activities. PEM and PSS wetlands would also be impacted by the Project, but are expected to transition relatively quickly back to a community with functionality similar to that of the preconstruction state (typically within 1 to 5 years). Potential cumulative impacts on PFO wetlands in the geographic scope could occur from construction and operation of the 261 Upgrade Project in combination with the identified past, present, or reasonably foreseeable projects within the HUC-12 watersheds crossed by the Project. These include Tennessee Gas's Connecticut Loop and a new residential subdivision. The Connecticut Loop was completed in 2017, and about 0.3 acres of wetlands within the HUC 12 as the 261

[9] https://www.columbiagasma.com/our-company/news-room/article/columbia-gas-of-massachusetts-plans-reliability-projects

Upgrade Project are within the operational right-of-way. No information was attainable regarding the wetland impacts of the residential subdivision. However, each proponent for the identified projects that affects wetlands would be required to comply with applicable federal and state permit requirements. It is assumed each of the project proponents would take steps to minimize these impacts by implementing wetland construction and mitigation measures, potentially including compensatory mitigation for permanent impacts on wetlands. Measures may include, but are not limited to, the installation and monitoring of temporary and permanent erosion controls. These efforts are expected to minimize the cumulative impacts on wetlands affected by the Project. As a result, although Project impacts include long-term and permanent impacts on wetlands, the extent of these impacts would be minimal and would not contribute to a significant cumulative impact on wetland resources.

Forested Areas

The primary impact on vegetation would be a result of the permanent loss of forested areas as a result of mowing and maintenance of the permanent pipeline right-of-way. Long-term impacts would occur where forested areas are cleared for temporary workspace because these areas could take decades to return to pre-construction conditions. Forested impacts associated with the Project include less than 3.0 acres of impacts during construction, with about 0.7 acre of this being permanently maintained for operation.

Potential cumulative impacts on forested areas in the geographic scope could occur from construction and operation of the Project in combination with the identified projects within the HUC-12 watersheds if the other projects also involve tree clearing. According to the EA, Tennessee Gas's Connecticut Loop of the Connecticut Expansion Project included about 13 acres of tree clearing for the entire loop, of which about 6 acres were permanently removed for operation. No information was attainable regarding the impacts on forested areas for the residential subdivision. These projects are in or near developed areas that are already fragmented with residences, businesses, and infrastructure. Although Tennessee Gas's Connecticut Loop was completed in 2017 and the subdivision may be completed after the construction of the Project, forested areas may take several years to return to preconstruction conditions, and the effects of tree clearing would continue beyond restoration.

Although the identified projects and the 261 Upgrade Project could result in some forest fragmentation within the HUC-12 watershed, this would only incrementally affect the cumulative impacts on regional forests. As similarly proposed for the 261 Upgrade Project, Tennessee Gas's Connecticut Loop was co-located with an existing line and used best management practices during construction to limit the extent of impacts on forested areas (e.g., minimizing tree clearing). Additionally, all areas not necessary for operation were revegetated. Similar measures are expected for the construction of the subdivision. For the 261 Upgrade Project, Tennessee Gas has minimized potential impacts on forested lands by collocating the all of the Project entirely with existing utility rights-of-way. Therefore, we conclude that the projects considered in this analysis would not have a significant cumulative impact on forested lands.

Air Quality

Multiple projects were identified within the vicinity of the Project with the potential contribute to cumulative impacts to air quality during construction. Construction of these projects

would involve the use of heavy equipment that would generate emissions of air pollutants and fugitive dust. Fugitive dust emissions would settle quickly and dust suppression measures would be implemented at the Project site as necessary to ensure the Project-related effects from fugitive dust are intermittent and temporary and would occur within or very near the construction area. The potential cumulative impacts from the Project and recently completed, current, and reasonably foreseeable projects in the vicinity would be temporary and minor. Primary factors associated with the Project that would minimize the contribution to cumulative impacts are that all proposed construction activities are either located on existing Tennessee Gas property, or co-located with existing pipelines, utilities or easements. Due to the timing of construction, minimization of fugitive dust as a result of the dust suppression measures, and the highly localized nature of construction emissions, there would be no significant cumulative impacts on air quality during construction.

Several projects were identified within the vicinity of the Project that could contribute to cumulative impacts to air quality during operation which include: assorted manufacturing facilities ranging from textiles to golf ball production, electric and solar generating plants, new cogeneration facilities, new university facilities, municipal wastewater processing and waste production facilities. Each of these projects would be required to meet applicable state and federal air quality regulations to avoid significant impacts on air quality, and therefore we conclude there would be no significant cumulative impacts on air quality during operation of the Project.

Climate Change

Climate change is the variation in climate (including temperature, precipitation, humidity, wind, and other meteorological variables) over time, whether due to natural variability, human activities, or a combination of both, and cannot be characterized by an individual event or anomalous weather pattern. For example, a severe drought or abnormally hot summer in a particular region is not a certain indication of climate change. However, a series of severe droughts or hot summers that statistically alter the trend in average precipitation or temperature over decades may indicate climate change. Recent research has begun to attribute certain extreme weather events to climate change (USGCRP 2018).

The leading U.S. scientific body on climate change is the U.S. Global Change Research Program (USGCRP), composed of representatives from 13 federal departments and agencies.[10] The Global Change Research Act of 1990 requires the USGCRP to submit a report to the President and Congress no less than every four years that "1) integrates, evaluates, and interprets the findings of the USGCRP; 2) analyzes the effects of global change on the natural environment, agriculture, energy production and use, land and water resources, transportation, human health and welfare, human social systems, and biological diversity; and 3) analyzes current trends in global change, both human-induced and natural, and projects major trends for the subsequent 25 to 100 years." These reports describe the state of the science relating to climate change and the effects of climate change

[10] The USGCRP member agencies are: Department of Agriculture, Department of Commerce, Department of Defense, Department of Energy, Department of Health and Human Services, Department of the Interior, Department of State, Department of Transportation, Environmental Protection Agency, National Aeronautics and Space Administration, National Science Foundation, Smithsonian Institution, and U.S. Agency for International Development.

on different regions of the U.S. and on various societal and environmental sectors, such as water resources, agriculture, energy use, and human health.

In 2017 and 2018, the USGCRP issued its *Climate Science Special Report: Fourth National Climate Assessment*, Volumes I and II (Fourth Assessment Report) (USGCRP, 2017; and USGCRP, 2018, respectively). The Fourth Assessment Report states that climate change has resulted in a wide range of impacts across every region of the country. Those impacts extend beyond atmospheric climate change alone and include changes to water resources, transportation, agriculture, ecosystems, and human health. The U.S. and the world are warming; global sea level is rising and acidifying; and certain weather events are becoming more frequent and more severe. These changes are driven by accumulation of GHG in the atmosphere through combustion of fossil fuels (coal, petroleum, and natural gas), combined with agriculture, clearing of forests, and other natural sources. These impacts have accelerated throughout the end 20th and into the 21st century (USGCRP 2018).

Climate change is a global phenomenon; however, for this analysis, we will focus on the existing and potential cumulative climate change impacts in the Project area. The USGCRP's Fourth Assessment Report notes the following observations of environmental impacts are attributed to climate change in the Northeast region (USGCRP, 2017; USGCRP 2018):

- average annual temperatures across the Northeast have increased from less than 1°F in West Virginia to about 3°F or more in New England since 1901;
- seasonal differences in Northeast temperature have decreased in recent years as winters have warmed three times faster than summers;
- early emergence from winter dormancy causes plants to lose their tolerance to cold temperatures and risk damage by temperatures they would otherwise tolerate. Early budbreak followed by hard freezes has led to widespread loss of fruit crops and reduced seasonal growth of native tree species in the Northeast;
- storm flood heights driven by hurricanes in New York City increased by more than 3.9 feet over the last thousand years. When coupled with storm surges, sea level rise can pose severe risks of flooding;
- the strongest hurricanes are anticipated to become both more frequent and more intense in the future, with greater amounts of precipitation;
- projections for the region suggest that sea level rise in the Northeast will be greater than the global average of approximately 0.12 inches (3 mm) per year.

The USGCRP's Fourth Assessment Report notes the following projections of climate change impacts in the Project region (Northeast U.S.) with a high or very high level of confidence[11] (USGCRP, 2018):

[11] The report authors assessed current scientific understanding of climate change based on available scientific literature. Each "Key Finding" listed in the report is accompanied by a confidence statement indicating the consistency of evidence or the consistency of model projections. A high

- ocean and coastal temperatures along the Northeast Continental Shelf have warmed by 0.06°F per year over the period 1982–2016, which is three times faster than the 1982–2013 global average rate of 0.018°F per year;

- at the coastal margins, acidification is exacerbated by nutrient loading from land-based runoff and atmospheric deposition during heavy rainfall events. When added to the system, these nutrients promote the growth of algae that release carbon dioxide, which contributes to acidification, as they decay;

- other coastal species may also be stressed by sea level rise and warmer temperatures, prompting migration out of the area; and

- storm flood heights driven by hurricanes in New York City increased by more than 3.9 feet over the last thousand years.

It should be noted that while the impacts described above taken individually may be manageable for certain communities, the impacts of compound extreme events (such as simultaneous heat and drought, wildfires associated with hot and dry conditions, or flooding associated with high precipitation on top of saturated soils) can be greater than the sum of the parts (USGCRP 2018).

The GHG emissions associated with construction and operation of the Project were identified and quantified in section B.7.1. Construction and operation of the Project would increase the atmospheric concentration of GHGs in combination with past, current, and future emissions from all other sources globally and contribute incrementally to future climate change impacts.

Currently, there is no universally accepted methodology to attribute discrete, quantifiable, physical effects on the environment to the Project's incremental contribution to GHGs. We have looked at atmospheric modeling used by the EPA, National Aeronautics and Space Administration, the Intergovernmental Panel on Climate Change, and others, and we found that these models are not reasonable for project-level analysis for a number of reasons. For example, these global models are not suited to determine the incremental impact of individual projects, due to both scale and overwhelming complexity. We also reviewed simpler models and mathematical techniques to determine global physical effects caused by GHG emissions, such as increases in global atmospheric CO_2 concentrations, atmospheric forcing, or ocean CO_2 absorption. We could not identify a reliable, less complex model for this task and we are not aware of a tool to meaningfully attribute specific increases in global CO_2 concentrations, heat forcing, or similar global impacts to project-specific GHG emissions. Similarly, it is not currently possible to determine localized or regional impacts from GHG emissions from the Project.

---

level of confidence results from "moderate evidence (several sources, some consistency, methods vary and/or documentation limited, etc.), medium consensus." A *very* high level of confidence results from "strong evidence (established theory, multiple sources, consistent results, well documented and accepted methods, etc.), high consensus." https://science2017.globalchange.gov/chapter/front-matter-guide/

Absent such a method for relating GHG emissions to specific resource impacts, we are not able to assess potential GHG-related impacts attributable to this project. Additionally, we have not been able to find any GHG emission reduction goals established at the federal level.[12] The State of Massachusetts has set GHG emission reduction requirements.[13] Without the ability to determine discrete resource impacts, we are unable to determine the significance of the Project's contribution to climate change.

Conclusion

The cumulative impacts review as part of the NEPA process evaluates the incremental effects of a proposed project and multiple similar projects in the same region at the same time, or in a similar timeframe, to determine whether the additive effect of those projects would result in significant impacts to the regional environment. As discussed previously, the Project and other projects in the area would have or have had minimal cumulative impacts because the other projects are predominately outside the cumulative impact area and those projects in the area are likely to occur in areas that are already developed. As a result, no significant cumulative impacts are anticipated when combining the Project with other identified projects.

Additionally, we identified planned activities in the Project area that met the criteria for inclusion in the cumulative impact analysis. Implementation of BMPs and proposed mitigation plans would minimize environmental impacts and when the impacts of the Project are added to the impacts from the other identified projects, the cumulative impacts would be minimal. We conclude that impacts would be temporary in nature and no significant cumulative impacts would be incurred from the Project.

---

12 The national emissions reduction targets expressed in the EPA's Clean Power Plan and the Paris climate accord are pending repeal and withdrawal, respectively.

13 We reviewed the U.S. State Greenhouse Emission Targets site for individual state requirements located at: https://www.c2es.org/document/greenhouse-gas-emissions-targets/

C. ALTERNATIVES

In accordance with NEPA and Commission policy, we considered and evaluated alternatives to the proposed action, including the no-action alternative, system alternatives, and aboveground facility alternatives. These alternatives were evaluated using a specific set of criteria. The evaluation criteria applied to each alternative include a determination whether the alternative:

- meets the objective of the proposed Project;
- is technically and economically feasible and practical; and
- offers a significant environmental advantage over the proposed Project.

Through environmental comparison and application of our professional judgment, each alternative is considered to a point where it becomes clear if the alternative could or could not meet the three evaluation criteria. To ensure a consistent environmental comparison and to normalize the comparison factors, we generally use desktop sources of information (e.g., publicly available data, geographic information system data, aerial imagery) and assume the same general workspace requirements. Where appropriate, we also use site-specific information (e.g., field surveys or detailed designs). Our environmental analysis and this evaluation consider quantitative data (e.g., acreage) and uses common comparative factors such as total length, amount of collocation, and land requirements.

The alternatives were reviewed against the evaluation criteria in the sequence presented above. The first consideration for including an alternative in our analysis is whether or not it could satisfy the stated purpose of the project. An alternative that cannot achieve the purpose for the project cannot be considered as an acceptable replacement for the project. Many alternatives are technically and economically feasible. Technically practical alternatives, with exceptions, would generally require the use of common construction methods. An alternative that would require the use of a new, unique or experimental construction method may not be technically practical because the required technology is not available or is unproven. Economically practical alternatives would result in an action that generally maintains the price competitive nature of the proposed action. Generally, we do not consider the cost of an alternative as a critical factor unless the added cost to design, permit, and construct the alternative would render the project economically impractical.

Alternatives that would not meet the Project's objective or were not feasible were not brought forward to the next level of review (i.e., the third evaluation criterion). Determining if an alternative provides a significant environmental advantage requires a comparison of the impacts on each resource as well as an analysis of impacts on resources that are not common to the alternatives being considered. The determination must then balance the overall impacts and all other relevant considerations. In comparing the impact between resources, we also considered the degree of impact anticipated on each resource. Ultimately, an alternative that results in equal or minor advantages in terms of environmental impact would not compel us to shift the impacts from the current set of landowners to a new set of landowners.

One of the goals of an alternatives analysis is to identify alternatives that avoid significant impacts. In section B, we evaluated each environmental resource potentially affected by the Project and concluded that constructing and operating the Project would not significantly impact these resources. Consistent with our conclusions, the value gained by further reducing the (not

significant) impacts of the Project when considered against the cost of relocating the facilities to a new set of landowners was also factored into our evaluation.

No Action Alternative

The no-action alternative would consist of not constructing the Project and continuing with the facilities as-is. If the proposed facilities are not constructed, the impacts identified would be avoided. The no action alternative does not meet the purpose and need of the Project to provide necessary natural gas capacity to meet existing customer demand in the northeast.

If the purpose and need of the Project is not met under the no-action alternative, other projects and activities would be needed to meet the market energy needs and these projects could result in their own environmental impacts that could be equal to or greater than the proposed action and might not meet the Project's objectives. Therefore, we do not recommend the no-action alternative.

Energy Alternatives

A comment was received by Corinne Wingard stating the proposed replacement unit should be an electric motor-driven unit. Tennessee Gas evaluated the use of electric motor driven compression as opposed to the proposed natural gas turbine driven compressor unit and determined it not feasible. Electric driven compression would eliminate certain stationary source emissions at CS 261, but these emissions would be transferred to electric generation facilities in the area, which also use natural gas, coal, oil or other methods of electrical generation that yield their own environmental impacts. Electric transmission is subject to power line outages, power plant outages, or lack of generating capacity and is not as reliable as natural gas driven compression.

Utilizing electric driven compression for the Project would require construction of a new building, electric substation, and ancillary equipment within the CS 261 site. Areas available for these additional facilities would impact a large wetland system associated with Worthington Brook, whereas modifications proposed at the CS 261 site do not require construction beyond the existing developed portion of the site, and minimal temporary wetland disturbance during construction.

Renewable alternative measures such as electric, wind and solar were eliminated from further consideration as they would not meet the Project objectives to transport natural gas supplies to customers in the northeast.

System Alternatives

The purpose of identifying and evaluating system alternatives is to determine whether the environmental impacts associated with the construction and operation of the Project could be avoided or reduced by using existing, modified, or other proposed facilities rather than constructing new facilities. System alternatives are alternatives that are able to meet the objectives of the Project, but use a different facility (existing or proposed), or are able to otherwise use existing infrastructure to eliminate the need for the proposed facility. However, a viable system alternative must be technically and economically feasible and practicable, and must satisfy

interconnect requirements and the anticipated in-service date to fulfill commitments made to the Project customers.

A comment was received from the Pipe Line Awareness Network regarding the feasibility of a Longmeadow Alternative under CMA. The alternative being referenced is the construction of the Longmeadow meter station, which would be constructed under CMA's blanket certificate and is not a part of the Project. As a transporter, Tennessee has no oversight over the natural gas system of a Project shippers facilities. A discussion or review of potential projects proposed by other companies, even Tennessee Gas's customers, is outside the scope of the Commission's review of the Projects.

Modifications to Other Pipeline Systems

No pipeline systems were identified for modification that have the ability to provide the incremental supply that is to be provided under the Project without the construction of additional facilities, which would create greater environmental impacts. Therefore, we do not recommend the use of any other existing systems.

Looping Project Alternatives

Three alternatives were evaluated to avoid the need for the pipeline loop:

- compression only option;
- lifting the existing 10-inch-diameter 261B-100 pipeline to relay it with a larger diameter pipe, and
- uprating the operating pressure of the existing 10-inch-diameter line.

The HP Replacement Project at CS 261 would maximize capacity of the existing 10-inch-diameter pipeline. The required transportation capacity for Project shippers would exceed the transportation capacity that the HP Replacement Project would provide, necessitating the Looping Project. If the pipeline loop is not constructed, a portion of the required transportation capacity of the Project' shippers would not be available. Based on this, the compression only option is not a viable alternative to the Looping Project and is not recommended.

The lift and relay option would involve replacing Tennessee Gas's existing 10-inch-diameter pipeline with a larger diameter pipe. To construct the lift and relay options, Tennessee Gas would need to take the existing pipeline out of service for approximately two months during construction. This activity would require a temporary LNG truck terminal to be constructed and trucks be dispatched to the area on a 24-hour basis for the anticipated two-month construction timeline. Greater environmental impacts to air quality and noise would occur during LNG regasification activities. Based on these factors, the lift and relay option is not a viable alternative to the Looping Project and is not recommended.

Uprating is a process used to increase the allowable operating pressure in a pipeline that is not being used to its full design capability. This would allow the existing infrastructure to transport more natural gas and reduce the need to build additional pipeline facilities. Uprating the existing 10-inch-diameter pipeline is not a feasible alternative to increase firm transportation capacity to meet the needs of the Project shippers since the existing pipeline is not designed to

operate at the pressure that would be required to transport the required incremental natural gas. The existing pipeline has a maximum allowable operating pressure (MAOP) of 700 pounds per square inch (psi), while 815 psi would be required to achieve the same delivery pressures as the proposed Looping Project. Additionally, CS 261 feeds the existing pipeline with a common discharge, supplying two mainline pipelines and the 10-inch-diameter lateral, all of which have an MAOP of 700 psi. Increasing the discharge cannot be applied to just one of the pipelines served by this common discharge, and additional facilities would need to be built to discharge only to the existing 10-inch-diameter pipeline, which would have associated environmental impacts. Based on these factors, uprating is not a viable alternative for the Looping Project and is not recommended.

HP Replacement Project Alternatives

Three alternatives were evaluated for the HP Replacement Project:

- pipeline looping option;
- re-wheeling the existing compressor units; and
- electric driven compression.

In lieu of the HP Replacement Project, an extension of the proposed Looping Project was considered as an option to add additional natural gas transportation capacity to Tennessee Gas's System. To avoid the need for the HP Replacement Project, the proposed pipeline loop would need to be extended an additional 2.1 miles and have an additional 5.0 miles of 36-inch-diameter mainline loop. This would create greater environmental impacts than the proposed HP Replacement Project and is not recommended as a viable alternative for the Project.

Re-wheeling can be used on compressor units to accommodate different processes within certain design and performance limits. The age of the existing compressor units at CS 261 limits the engineering options to meet the design conditions needed to provide the additional natural gas capacity requested by the Project' shippers, furthermore, reliability issues associated with the use of these existing older compressor engines would remain. Re-wheeling would eliminate the emissions and noise reductions expected from the proposed Project. We do not recommend this alternative as a viable alternative for the Project.

Locations of the proposed facilities were chosen to produce minimum environmental impacts. The modifications are limited to modifications to the existing facilities, to be constructed within the existing fence lines or co-located to the extent possible with existing utility and Tennessee Gas property. Alternatives identified would not fulfill the purpose and need of the project, and would result in greater environmental impacts than anticipated by the Project. In summary, we have determined that Tennessee Gas's proposed Project would be the preferred alternative that can meet the Project objectives.

D. CONCLUSIONS AND RECOMMENDATIONS

Based on the analysis in this EA, we have determined that if Tennessee Gas constructs and operates the proposed facilities in accordance with its application and supplements, approval of this proposal would not constitute a major federal action significantly affecting the quality of the human environment. We recommend that the Commission's Order contain a finding of no significant impact and include the mitigation measures listed below as conditions to any Certificate the Commission may issue.

1. Tennessee Gas 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. Tennessee Gas 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 Office of Energy Projects (OEP) **before using that modification.**

2. The Director of OEP, or the Director's designee, has delegated authority to address any requests for approvals or authorizations necessary to carry out the conditions of the Order, and take whatever steps are necessary to ensure the protection of environmental resources during construction and operation of the project. This authority shall allow:

    a. the modification of conditions of the Order;

    b. stop-work authority; and

    c. the imposition of any additional measures deemed necessary to ensure continued compliance with the intent of the conditions of the Order as well as the avoidance or mitigation of unforeseen adverse environmental impact resulting from project construction and operation.

3. **Prior to any construction**, Tennessee Gas shall each file an affirmative statement with the Secretary, certified by a senior company official, that all company personnel, environmental inspectors (EIs), and contractor personnel would be informed of the EI's authority and have been or will 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 Project figures. **As soon as they are available, and before the start of construction**, Tennessee Gas shall file with the Secretary any revised detailed survey maps/figures 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 Project figures.

Tennessee Gas's exercise of eminent domain authority granted under the Natural Gas Act (NGA) section 7(h) in any condemnation proceedings related to the Order must be consistent with these authorized facilities and locations. Tennessee Gas's right of eminent domain granted under the NGA section 7(h) does not authorize it to increase the size of its natural gas facilities to accommodate future needs or to acquire a right-of-way for a pipeline to transport a commodity other than natural gas.

5. Tennessee Gas shall file with the Secretary detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all facility relocations, and staging areas, pipe storage 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/figures/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 FERC's 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 authorization and before construction begins**, Tennessee Gas shall file an Implementation Plan with the Secretary for review and written approval by the Director of OEP. Tennessee Gas must file revisions to their plan as schedules change. The plan shall identify:

   a. how Tennessee Gas 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 Tennessee Gas 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 the company 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 (if known) and specific portion of the company's organization having responsibility for compliance;

g. the procedures (including use of contract penalties) the company will follow if noncompliance occurs; and

h. for each discrete facility, a Gantt or PERT chart (or similar project scheduling diagram), and dates for:

i. the completion of all required surveys and reports;

ii. the environmental compliance training of onsite personnel;

iii. the start of construction; and

iv. the start and completion of restoration.

7. Tennessee Gas shall employ at least one EI for the Project. The EI 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 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 the 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, Tennessee Gas shall file updated status reports for the Project with the Secretary on a **weekly** 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 Tennessee Gas's efforts to obtain the necessary federal authorizations;

b. the construction status of the Project, work planned for the following reporting period and any scheduled 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;

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 the company from other federal, state, or local permitting agencies concerning instances of noncompliance, and Tennessee Gas response.

9. Tennessee Gas must receive written authorization from the Director of OEP **before commencing construction of any Project facilities**. To obtain such authorization, Tennessee Gas must file with the Secretary documentation that it has received all applicable authorizations required under federal law (or evidence of waiver thereof).

10. Tennessee Gas must receive written authorization from the Director of OEP **before placing the pipeline loop and modified compressor station facilities into service**. Such authorization will only be granted following a determination that rehabilitation and restoration of the areas affected by the Project are proceeding satisfactorily.

11. **Within 30 days of placing the authorized facilities in service**, Tennessee Gas shall file an affirmative statement with the Secretary, certified by a senior company official

a. that the facilities have been constructed in compliance with all applicable conditions, and that continuing activities will be consistent with all applicable conditions; or

b. identifying which of the conditions in the Order Tennessee Gas 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. Tennessee Gas shall file noise surveys with the Secretary **no later than 60 days** after placing the authorized unit at CS 261 in service. If a full load condition noise survey is not possible, Tennessee Gas shall 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 the station under interim or full power load conditions exceeds an Ldn of 55 dBA at any nearby NSAs, Tennessee Gas shall:

a. file a report with the Secretary on what changes are needed, for review and written approval by the Director of OEP;

b. install additional noise controls to meet that level **within 1 year** of the in-service date; and

c. confirm compliance with the Ldn of 55 dBA requirement by filing a second noise survey with the Secretary **no later than 60 days** after it installs the additional noise controls.

E. REFERENCES

Agawam Health Department. 2018. Correspondence from Kathleen Auer dated March 6, 2018.

Cowardin, L.M., V. Carter, F.C. Golet, and E.T. LaRoe. 1979. The Classification of Wetlands and Deepwater Habitats of the United States. US Fish and Wildlife Service, Washington, D.C. FWS/OBS-79/31.

Doucette, Dianna L., Jenifer Elam, Jennifer Ort, and Michael Duffin. 2014a. Archaeological Overview and Identification Survey, Tennessee Gas Pipeline Company, L.L.C., Connecticut Expansion Project: Connecticut Facilities, FERC Docket No. CP14-529-000. Prepared for Tennessee Gas Pipeline Company, L.L.C., Houston, TX.

Doucette, Dianna L., Jenifer Elam, Jennifer Ort, and Michael Duffin. 2014b. *Archaeological Overview and Identification Survey, Tennessee Gas Pipeline Company, L.L.C., Connecticut Expansion Project: Massachusetts Facilities, FERC Docket No. CP14-529-000*. Prepared for Tennessee Gas Pipeline Company, L.L.C., Houston, TX.

EPA. 2018. Sole Source Aquifer Locations. https://epa.maps.arcgis.com/apps/webappviewer/index.html?id=9ebb047ba3ec41ada1877155fe31356b. Accessed January 2019.

FERC. 2015. Environmental Assessment for Tennessee Gas Pipeline Company, L.L.C.'s Connecticut Expansion Project under CP14-529. FERC accession number 20151023-4001.

INGAA. 2016. *Pipeline Impact to Property Value and Property Insurability*. https://www.ingaa.org/File.aspx?id=27480&v=cac46a26

Integra Realty Resources. 2016. 2016 Annual Viewpoint. http://walter-unger.com/wp-content/uploads/2016/02/IRR-2016-Annual-VIEWPOINT-%E2%80%93-2016-COMMERCIAL-REAL-ESTATE-TRENDS-REPORT.pdf

International Right of Way Association. 2011. *The Effect of Natural Gas Pipelines on Residential Value*. http://www.rightofwaymagazine-digital.org/row/20110102?pg=4

Massachusetts Department of Environmental Protection. 2017. MassDEP Waste Site/Reportable Releases Lookup Tool Definitions of Fields Listed in Search Results. https://www.mass.gov/files/2017-08/MassDEP%20Waste%20Site%20-%20Reportable%20Release%20Look%20Up%20Terms.pdf . Accessed February 2019.

Massachusetts Geological Survey. 2013. Slope Stability Map of Massachusetts. https://mgs.geo.umass.edu/biblio/slope-stability-map-massachusetts . Accessed February 2019.

Massachusetts Geographic Information System (MassGIS). 2005. MassGIS Data: Land Use. https://docs.digital.mass.gov/dataset/massgis-data-land-use-2005. Accessed November 2018.

MA DFW. 2018. Email correspondence from MA DFW (Caleb Slater) to Kinder Morgan (Deborah McCartney) dated March 15, 2018.

MassGIS. 2015. USGS 1:24,000 Surficial Geology. https://docs.digital.mass.gov/dataset/massgis-data-usgs-124000-surficial-geology. Accessed February 2019.

MassGIS. 2018. MassGIS Data: Aquifers. https://docs.digital.mass.gov/dataset/massgis-data-aquifers . Accessed February 2019.

Mass.gov. 2018. Prohibited Plant List. Available at: https://www.mass.gov/massachusetts-prohibited-plant-list. Accessed July 2018.

McPhee, E. 2014. Connecticut Department of Health Drinking Water Section. Letter response dated March 3, 2014.

Miller, Kathleen M. 2014a. *Historic Architectural Properties Overview and Identification Survey, Tennessee Gas Pipeline Company, L.L.C., Connecticut Expansion Project: Connecticut Facilities, FERC Docket No. CP14-529-000*. Prepared for Tennessee Gas Pipeline Company, L.L.C., Houston, TX.

Miller, Kathleen M. 2014b. *Historic Architectural Properties Overview and Identification Survey, Tennessee Gas Pipeline Company, L.L.C., Connecticut Expansion Project: Massachusetts Facilities, FERC Docket No. CP14-529-000*. Prepared for Tennessee Gas Pipeline Company, L.L.C., Houston, TX.

Natural Resources Conservation Service. 2018. Web Soil Survey Geographic Database. https://websoilsurvey.sc.egov.usda.gov/App/WebSoilSurvey.aspx. Accessed February 2019.

National Heritage and Endangered Species Program (NHESP). 2015a. Eastern Box Turtle (Terrapene carolina) Fact Sheet. Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries & Wildlife, Westborough, MA.

NHESP. 2015b. Eastern Wormsnake (Carphophis amoenus) Fact Sheet. Natural Heritage & Endangered Species Program, Massachusetts Division of Fisheries & Wildlife, Westborough, MA.

Olcott, P.G. 1995. Ground Water Atlas of the United States: Connecticut, Maine, Massachusetts, New Hampshire, New York, Rhode Island, Vermont. HA 730-M. U.S. Geological Survey. Available at: https://pubs.usgs.gov/ha/ha730/ch_m/index.html. Accessed February 2019.

O'Rourke, T.D. and M. C. Palmer. 1996. Earthquake Performance of Gas Transmission Pipelines. Earthquake Spectra: August 1996, Vol. 12, No. 3, pp. 493-527.

Simcox, A.C. 1992. Water Resources of Massachusetts: U.S. Geological Survey Water-Resources Investigations Report 90-4144, 94 pp.

USACE. 2011a. Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region Version 2.0. Available online at: https://usace.contentdm.oclc.org/utils/getfile/collection/p266001coll1/id/7640.

USACE. 1987. Corps of Engineers Wetlands Delineation Manual. TR Y- 87-1. Vicksburg, MS: Environmental Laboratory, U.S. Army Corps of Engineers Waterways Experiment Station.

U.S. North American Bird Conservation Initiative Committee. 2016. Bird Conservation Regions Map. http://nabci-us.org/resources/bird-conservation-regions-map/#bcr30. Accessed March 2019.

United States Energy Information Administration. 2018a. Massachusetts Profile Analysis. https://www.eia.gov/state/analysis.php?sid=MA. Accessed February 2019.

United States Energy Information Administration. 2018b. Connecticut Profile Analysis. https://www.eia.gov/state/analysis.php?sid=CT. Accessed February 2019.

University of Massachusetts. 2014. Correspondence from Stephen Mabee dated February 7, 2014.

U.S. Environmental Protection Agency (EPA). 2018a. Ecoregions. Available at: https://www.epa.gov/eco-research/ecoregions. Accessed July 2018.

U.S. Geological Survey (USGS). 1983. Bedrock geologic map of Massachusetts. https://ngmdb.usgs.gov/Prodesc/proddesc_16357.htm. Accessed February 2019.

USGS. 1999. Water Quality Assessment of the New England Coastal Basins in Maine, Massachusetts, New Hampshire, and Rhode Island: Chapter 4 Environmental Setting. Report 98-4249. Available online at http://pubs.usgs.gov/wri/wri984249/pdf/. Accessed February 2019.

USGS. 2000. Land Subsidence in the United States. Available at: https://water.usgs.gov/ogw/pubs/fs00165/SubsidenceFS.v7.PDF. Accessed February 2019.

USGS. 2003. Active Mines and Mineral Plants in the United States. Available at: http://mrdata.usgs.gov/mineplant/. Accessed November 2018.

USGS. 2014. Seismic-Hazards Maps for the Conterminous United States. https://pubs.usgs.gov/sim/3325/. Accessed November 2018.

USGS. 2018a. Magnitude/Intensity Comparison. https://earthquake.usgs.gov/learn/topics/mag_vs_int.php. Accessed February 2019.

USGS. 2018b. Quaternary fault and fold database for the United States. https://earthquake.usgs.gov/hazards/qfaults/ . Accessed January 2019.

USGS. 2018c. National Water Information System: Web Interface. Available at: https://waterdata.usgs.gov/nwis. Accessed July 2018.

F. LIST OF PREPARERS

McDaniel, Nina C. – ***Project Manager: Air Quality and Noise, Safety and Reliability, Alternatives, Land Use, Cumulative Impacts***
M.S., Engineering Management, 2012, University of New Orleans
B.S., Civil Engineering, 2010, University of New Orleans

Wachholder, Joanne – ***Deputy Project Manager***
M.S., Crop and Soil Sciences/Environmental Toxicology, 1997, Michigan State University
B.S., Biology, 1994, University of Wisconsin – Stevens Point

Crumpton, Christine- ***Water Resources, Wildlife and Vegetation***
B.S., Biology, 2012, Stillman College
M.S., Environmental Management, 2013, Samford University

Jensen, Andrea – ***Geology, Mineral Resources, Geologic Hazards, Soils, and Groundwater Resources.***
B.S., Environmental Geology, 2012, College of William and Mary

Ramsey, Dawn – ***Cultural Resources***
B.A., History and Anthropology, 1997, Texas State University
M.A., Anthropology, 2000, University of Memphis

Appendix A

Project Maps

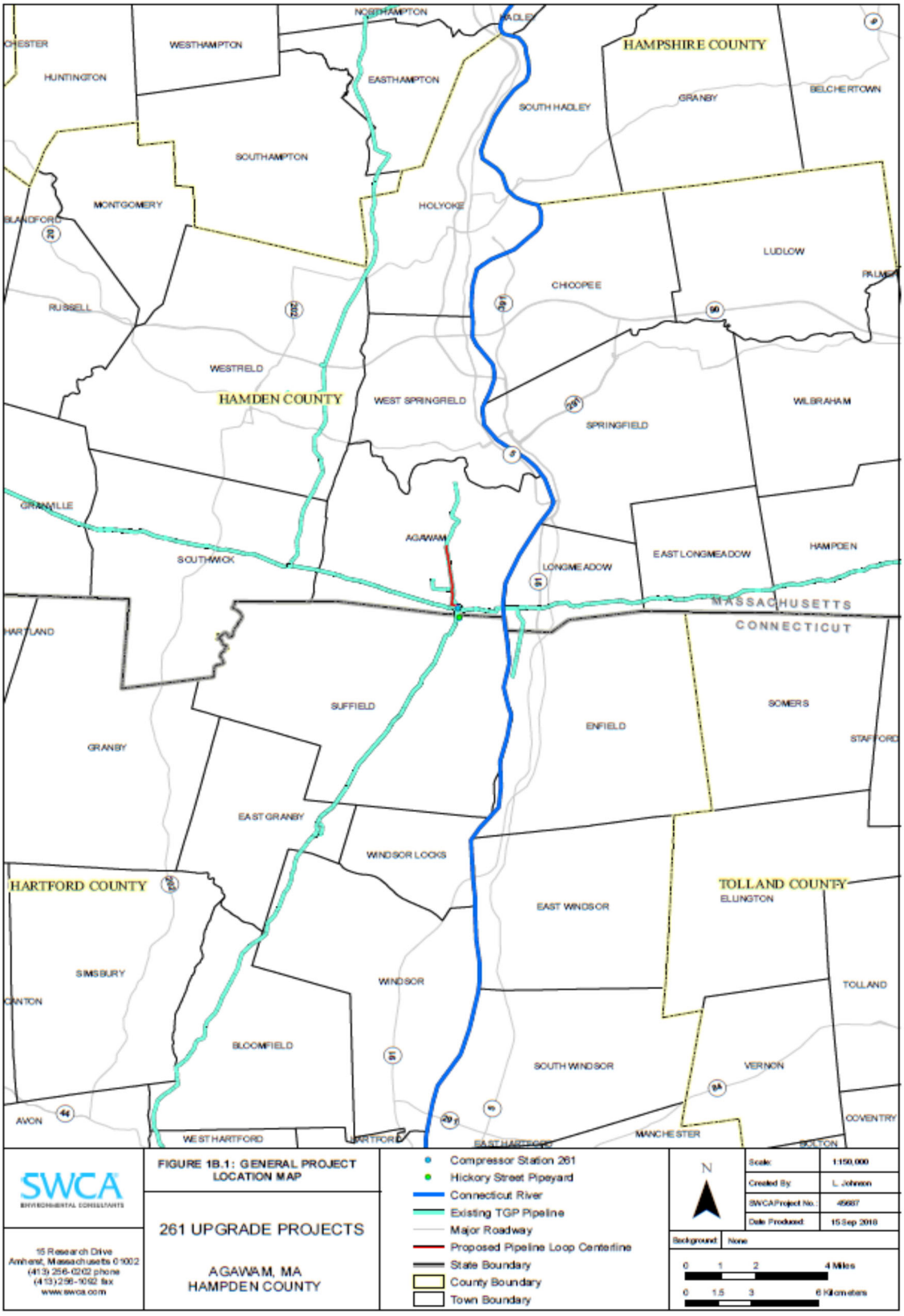


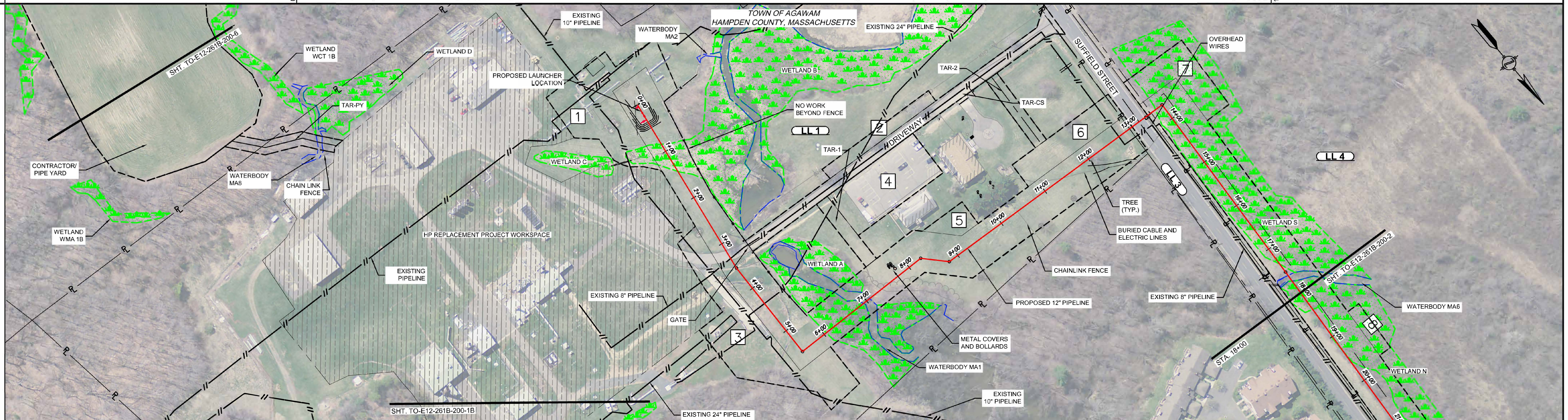
Figure 2
Vicinity Map

OWNERS LINE LIST	0+00	LL 1 1294'	12+94	LL 3 50'	13+44	LL 4 456'	18+00

PIPELINE STATIONING

0+00
0+85 ENTER WETLAND B
1+05 STREAM
1+43 EXIT WETLAND B
2+59 ELECTRIC VAULT 23' RT
2+91 UTILITY POLE 19' LT
2+92 GUY ANCHOR 5' LT
3+14 EDGE OF DRIVEWAY
3+24 EDGE OF DRIVEWAY
3+36 EXISTING 8" PIPELINE
3+47 MH 10' LT
3+98 CONC VAULT 13' LT
4+36 EXISTING 24" PIPELINE
6+05 ENTER WETLAND A
6+93 EDGE STREAM MA1
7+07 EDGE STREAM MA1
7+07 EXIT WETLAND A
7+29 TOP OF BANK
7+41 TREELINE
7+64 UTILITY BOX 4' RT
7+78 MH 14' LT
10+37 CHAINLINK FENCE
11+40 BURIED COMM LINES
12+04 MAPLE TREE 3' RT
12+75 EXISTING 8" PIPELINE
13+00 EDGE OF ROAD
13+10 CL SUFFIELD STREET
13+32 EDGE OF ROAD
13+33 OVERHEAD WIRES
13+54 ENTER WETLAND S
17+34 EXIT WETLAND S
17+61 EDGE STREAM MA6
17+71 EDGE STREAM MA6
17+73 ENTER WETLAND N
18+00

ALIGNMENT STRIP MAP

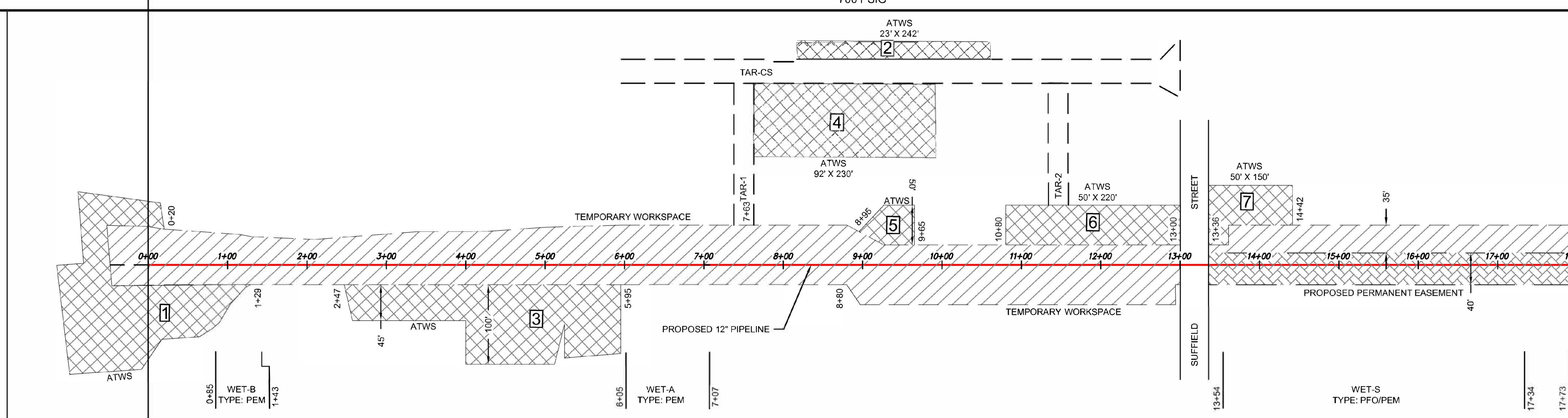


COVER	3'	5'	4'

MATERIAL	0+00	1A 1276'	12+76	1B 80'	13+56	1A 444'	18+00

CLASS LOCATION	CLASS 3
MAOP	700 PSIG

WORKSPACE SCHEMATIC



LEGEND

LEGEND
AREA OF PROPOSED PERMANENT EASEMENT
AREA OF EXISTING PERMANENT EASEMENT
AREA OF PROPOSED TEMPORARY WORKSPACE
AREA OF PROPOSED ADDITIONAL TEMPORARY WORKSPACE
DELINEATED VEGETATED WETLAND
AREA OF EXISTING COMPRESSOR STATION WORKSPACE
PROPOSED PIPELINE
EXISTING PIPELINE
TREE LINE
PROPERTY LINE
MAJOR CONTOUR
MINOR CONTOUR
PROPOSED CONTOUR
DELINEATED WATERBODY
LOD
ATWS NUMERATION

CONTOUR SOURCE
CONTOURS DEVELOPED USING A COMBINATION OF PUBLICLY AVAILABLE LIDAR DATA AND LIMITED FIELD TOPOGRAPHIC SURVEY.

MILE POST
MAINLINE VALVE (MLV)
WATER VALVE
CONTROL POINT
PIPELINE MARKER
AERIAL MARKER
METER HOUSE
PIN FOUND SYMBOL
LINE LIST NUMBER
STATION EQUATION
UTILITY POLE
HDD
SEWER MANHOLE
STORM DRAINAGE MANHOLE
ELECTRIC VAULT
STORMWATER DRAIN
TREE
BORE
HYDRANT
ELECTRIC
WATER LINE
FIBER OPTIC CABLE
EXISTING PIPELINE
C/L ROAD
PROPERTY LINE
POWER LINE
FENCE LINE
RAILROAD
RIGHT OF WAY

SCALE
100' 50' 0' 100' 200'
FOR SHEET SIZE 24" X 36" SCALE AS NOTED

Figure 3
Alignment

ISSUED FOR FILING
October 19th, 2018

LL. NO.
1
3
4

GENERAL NOTES

1. PIPELINE DEPTH AT ROADS TO BE AS INDICATED ON ROAD CROSSING PERMIT AS MEASURED FROM THE TOP OF PIPE TO THE LOWEST POINT ON GRADE IN THE ROAD RIGHT-OF-WAY.

2. DEPTH OF BORE PIPES TO BE MINIMUM OF 2'-0" CLEARANCE FROM ALL FOREIGN UTILITY CROSSINGS. CONTRACTOR TO DETERMINE DEPTHS OF ALL FOREIGN UTILITIES PRIOR TO CONSTRUCTION.

3. CONTRACTOR IS TO BE RESPONSIBLE FOR DETERMINING DEPTH OF COVER AND LOCATION OF ALL UTILITIES CROSSED PRIOR TO CONSTRUCTION. IN ADDITIONTO THE SITE-SPECIFIC INFORMATION PROVIDED IN THIS DRAWING GENERAL REQUIREMENTS INCLUDED IN PERMITS AND APPROVAL FROM FEDERAL, STATE, AND LOCAL AGENCIES ALSO APPLY.

4. CONTRACTOR SHALL USE THE "ONE CALL" SYSTEM PRIOR TO BEGINNING WORK.

PIPE SUMMARY

ITEM	DESCRIPTION	QTY
1	PIPE, 12.750" OD	1,800'

COATING/PADDING SUMMARY

EXTERNAL:	A - FBE	B - FBE/ARO
INTERNAL:		

FIELD NOTES

TEST:
RADIOGRAPH:

REFERENCE DRAWINGS

REVISIONS

NO	PROJ ID	DESCRIPTION	DATE	BY	CK	APPR
0	211890	ISSUED FOR FILING	10/19/18	J A	CG	

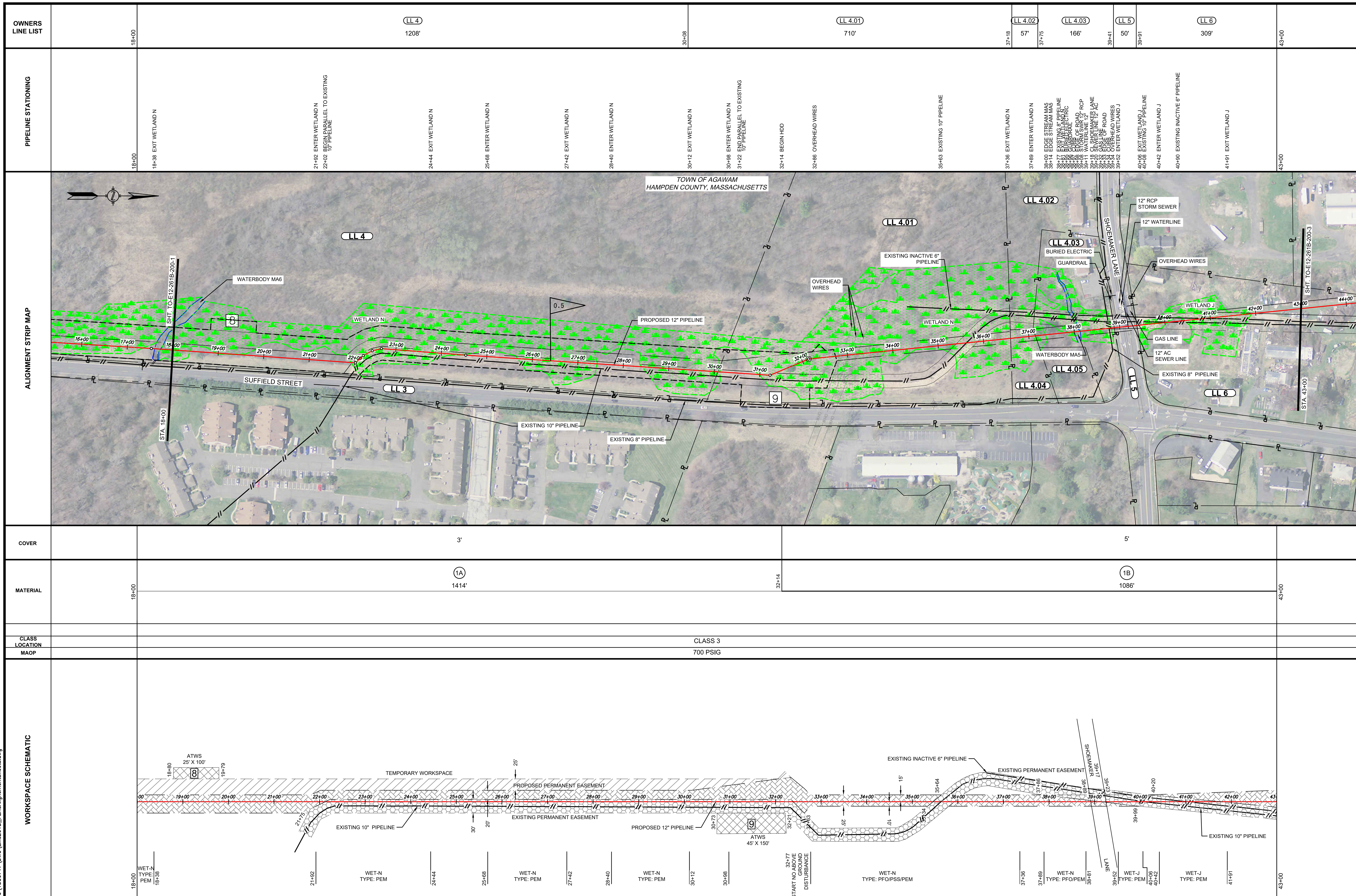
AREA: AGAWAM	DIV.: NORTHERN (10)		
DRAFTER: JA	DATE: 10/15/18		
DRAFT. COORD: CG	DATE: 10/15/18		
DESIGN COORD:	DATE:	SCALE: 1" = 100'	PROJ. ID.: 211890
PROJECT COORD:	DATE:		
OPER APPR:	DATE:	TO-E12-261B-200-1	0

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

LINE 261B PIPELINE LOOPING PROJECT
PROPOSED 12" NATURAL GAS PIPELINE
FERC ALIGNMENT SHEETS
STA. 0+00 TO STA. 18+00
HAMPDEN COUNTY, MASSACHUSETTS

Drawing Location & Name: G:\JOBS\18\18C\18C5717\DWG\Line261B_FERCAlignmentSheets.dwg

AUG 2016



LEGEND

- AREA OF PROPOSED PERMANENT EASEMENT
- AREA OF EXISTING PERMANENT EASEMENT
- AREA OF PROPOSED TEMPORARY WORKSPACE
- AREA OF PROPOSED ADDITIONAL TEMPORARY WORKSPACE
- DELINEATED VEGETATED WETLAND
- PROPOSED PIPELINE
- EXISTING PIPELINE
- TREE LINE
- PROPERTY LINE
- MAJOR CONTOUR
- MINOR CONTOUR
- DELINEATED WATERBODY
- LOD
- ATWS NUMERATION

CONTOUR SOURCE

CONTOURS DEVELOPED USING A COMBINATION OF PUBLICLY AVAILABLE LIDAR DATA AND LIMITED FIELD TOPOGRAPHIC SURVEY.

- MILE POST
- MAINLINE VALVE (MLV)
- WATER VALVE
- CONTROL POINT
- PIPELINE MARKER
- AERIAL MARKER
- METER HOUSE
- PIN FOUND SYMBOL
- LINE LIST NUMBER
- STATION EQUATION
- UTILITY POLE
- HDD
- SEWER MANHOLE
- STORM DRAINAGE MANHOLE
- ELECTRIC VAULT
- STORMWATER DRAIN
- TREE
- BORE
- HYDRANT
- ELECTRIC
- WATER LINE
- FIBER OPTIC CABLE
- EXISTING PIPELINE
- C/L ROAD
- PROPERTY LINE
- POWER LINE
- FENCE LINE
- RAILROAD
- RIGHT OF WAY

SCALE

100' 50' 0' 100' 200'

FOR SHEET SIZE 24" X 36" SCALE AS NOTED

Figure 4
Alignment

ISSUED FOR FILING
October 19th, 2018

LL. NO.
4
4.01
4.02
4.03
4.04
4.05
5
6

GENERAL NOTES

1. PIPELINE DEPTH AT ROADS TO BE AS INDICATED ON ROAD CROSSING PERMIT AS MEASURED FROM THE TOP OF PIPE TO THE LOWEST POINT ON GRADE IN THE ROAD RIGHT-OF-WAY.

2. DEPTH OF BORE PIPES TO BE MINIMUM OF 2'-0" CLEARANCE FROM ALL FOREIGN UTILITY CROSSINGS. CONTRACTOR TO DETERMINE DEPTHS OF ALL FOREIGN UTILITIES PRIOR TO CONSTRUCTION.

3. CONTRACTOR IS TO BE RESPONSIBLE FOR DETERMINING DEPTH OF COVER AND LOCATION OF ALL UTILITIES CROSSED PRIOR TO CONSTRUCTION. IN ADDITIONTO THE SITE-SPECIFIC INFORMATION PROVIDED IN THIS DRAWING. GENERAL REQUIREMENTS INCLUDED IN PERMITS AND APPROVAL FROM FEDERAL, STATE, AND LOCAL AGENCIES ALSO APPLY.

4. CONTRACTOR SHALL USE THE "ONE CALL" SYSTEM PRIOR TO BEGINNING WORK.

PIPE SUMMARY

ITEM	DESCRIPTION	QTY
1	PIPE, 12.750" OD	2,500'

COATING/PADDING SUMMARY

EXTERNAL:	A - FBE	B - FBE/ARO
INTERNAL:		

FIELD NOTES

TEST: ______

RADIOGRAPH: ______

REFERENCE DRAWINGS

REVISIONS

NO	PROJ ID	DESCRIPTION	DATE	BY	CK	APPR
0	211890	ISSUED FOR FILING	10/19/18	JA	CG	KH

AREA: AGAWAM	DIV.: NORTHERN (10)
DRAFTER: JA	DATE: 10/15/18
DRAFT. COORD: CG	DATE: 10/15/18

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

LINE 261B PIPELINE LOOPING PROJECT
PROPOSED 12" NATURAL GAS PIPELINE
FERC ALIGNMENT SHEETS
STA. 18+00 TO STA. 43+00
HAMPDEN COUNTY, MASSACHUSETTS

DESIGN COORD:	DATE:	SCALE: 1" = 100'	PROJ. ID.: 211890
PROJECT COORD:	DATE:	TO-E12-261B-200-2	0
OPER. APPR:	DATE:		

Drawing Location & Name: G:\JOBS\18\18C671?\DWG\Line261B_FERCAlignmentSheets.dwg

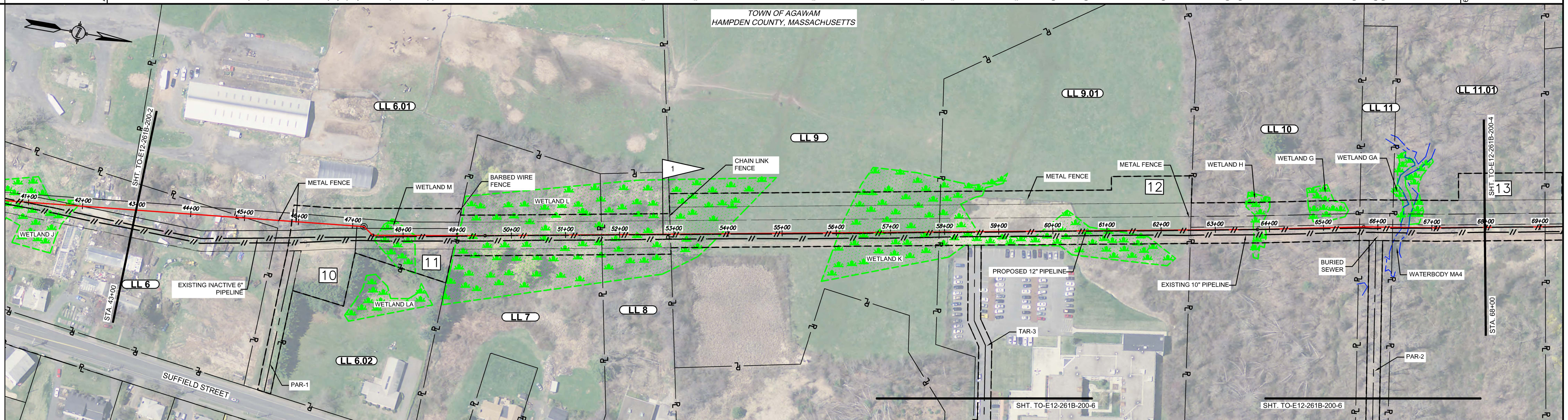
OWNERS LINE LIST

43+00		46+31		49+64		52+33		53+60		58+56		63+21		66+33		66+93		68+00
	LL 6 331'		LL 6.01 333'		LL 7 269'		LL 8 127'		LL 9 496'		LL 9.01 465'		LL 10 312'		LL 11 60'		LL 11.01 107'	

PIPELINE STATIONING

43+00
45+61 FENCE
45+96 FENCE
47+07 PROPERTY CORNER 49' RT.
47+21 END HDD
47+44 REMOVAL OF EXISTING INACTIVE 6" PIPELINE START
47+53 ENTER WETLAND M
48+22 EXIT WETLAND M
48+91 FENCE
49+00 ENTER WETLAND L
52+92 FENCE
53+88 EXIT WETLAND L
56+06 ENTER WETLAND K
58+06 FENCE
58+61 EXIT WETLAND K
59+80 ENTER WETLAND K
60+48 FENCE
61+08 EXIT WETLAND K
62+51 FENCE
63+70 ENTER WETLAND H
63+97 EXIT WETLAND H
66+01 SEWER LINE
66+43 EDGE STREAM MA4
66+57 EDGE STREAM MA4
68+00

ALIGNMENT STRIP MAP

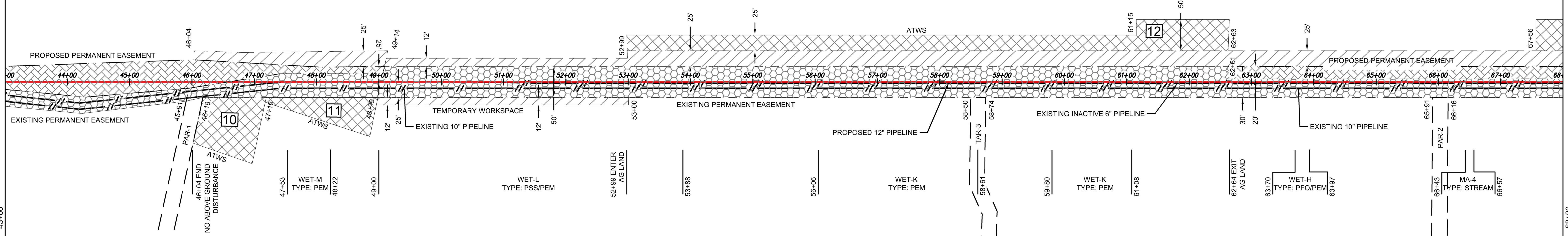


COVER	5'	3'

MATERIAL	43+00	1B 421'	47+21	1A 2082'	68+00

CLASS LOCATION	CLASS 3
MAOP	700 PSIG

WORKSPACE SCHEMATIC



LEGEND

AREA OF PROPOSED PERMANENT EASEMENT
AREA OF EXISTING PERMANENT EASEMENT
AREA OF PROPOSED TEMPORARY WORKSPACE
AREA OF PROPOSED ADDITIONAL TEMPORARY WORKSPACE
DELINEATED VEGETATED WETLAND
PROPOSED PIPELINE
EXISTING PIPELINE
TREE LINE
PROPERTY LINE
MAJOR CONTOUR
MINOR CONTOUR
DELINEATED WATERBODY
LOD
ATWS NUMERATION

CONTOUR SOURCE
CONTOURS DEVELOPED USING A COMBINATION OF PUBLICLY AVAILABLE LIDAR DATA AND LIMITED FIELD TOPOGRAPHIC SURVEY.

MILE POST
MAINLINE VALVE (MLV)
WATER VALVE
CONTROL POINT
PIPELINE MARKER
AERIAL MARKER
METER HOUSE
PIN FOUND SYMBOL
LINE LIST NUMBER
STATION EQUATION
UTILITY POLE
HDD
SEWER MANHOLE
STORM DRAINAGE MANHOLE
ELECTRIC VAULT
STORMWATER DRAIN
TREE
BORE
HYDRANT
ELECTRIC
WATER LINE
FIBER OPTIC CABLE
EXISTING PIPELINE
C/L ROAD
PROPERTY LINE
POWER LINE
FENCE LINE
RAILROAD
RIGHT OF WAY

SCALE
100' 50' 0' 100' 200'
FOR SHEET SIZE 24" X 36" SCALE AS NOTED

Figure 5
Alignment

ISSUED FOR FILING
October 19th, 2018

LL. NO.
6
6.01
6.02
7
8
9
9.01
10
11
11.01

GENERAL NOTES

1. PIPELINE DEPTH AT ROADS TO BE AS INDICATED ON ROAD CROSSING PERMIT AS MEASURED FROM THE TOP OF PIPE TO THE LOWEST POINT ON GRADE IN THE ROAD RIGHT-OF-WAY.

2. DEPTH OF BORE PIPES TO BE MINIMUM OF 2'-0" CLEARANCE FROM ALL FOREIGN UTILITY CROSSINGS. CONTRACTOR TO DETERMINE DEPTHS OF ALL FOREIGN UTILITIES PRIOR TO CONSTRUCTION.

3. CONTRACTOR IS TO BE RESPONSIBLE FOR DETERMINING DEPTH OF COVER AND LOCATION OF ALL UTILITIES CROSSED PRIOR TO CONSTRUCTION. IN ADDITIONTO THE SITE-SPECIFIC INFORMATION PROVIDED IN THIS DRAWING, GENERAL REQUIREMENTS INCLUDED IN PERMITS AND APPROVAL FROM FEDERAL, STATE, AND LOCAL AGENCIES ALSO APPLY.

4. CONTRACTOR SHALL USE THE "ONE CALL" SYSTEM PRIOR TO BEGINNING WORK.

PIPE SUMMARY

ITEM	DESCRIPTION	QTY
1	PIPE, 12.750" OD	2,500'

COATING/PADDING SUMMARY

EXTERNAL:	A - FBE	B - FBE/ARO
INTERNAL:		

FIELD NOTES

TEST: ____________
RADIOGRAPH: ____________

REFERENCE DRAWINGS

REVISIONS

NO	PROJ ID	DESCRIPTION	DATE	BY	CK	APPR
0	211890	ISSUED FOR FILING	10/19/18	JA	CG	KH

AREA: AGAWAM	DIV.: NORTHERN (10)
DRAFTER: JA	DATE: 10/15/18
DRAFT. COORD: CG	DATE: 10/15/18

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

LINE 261B PIPELINE LOOPING PROJECT
PROPOSED 12" NATURAL GAS PIPELINE
FERC ALIGNMENT SHEETS
STA. 43+00 TO STA. 68+00
HAMPDEN COUNTY, MASSACHUSETTS

DESIGN COORD:	DATE:	SCALE: 1" = 100'	PROJ. ID.: 211890
PROJECT COORD:	DATE:	TO-E12-261B-200-3	0
OPER. APPR:	DATE:		

Drawing Location & Name: G:\JOBS18\18C\18C5717\DWG\Line261B_FERCAlignmentSheets.dwg

AUG 2016

Figure 6
Alignment

ISSUED FOR FILING
October 19th, 2018

LL. NO.
11.01
12
12.01
12.02
12.03
12.04
13
14
15

GENERAL NOTES

1. PIPELINE DEPTH AT ROADS TO BE AS INDICATED ON ROAD CROSSING PERMIT AS MEASURED FROM THE TOP OF PIPE TO THE LOWEST POINT ON GRADE IN THE ROAD RIGHT-OF-WAY.

2. DEPTH OF BORE PIPES TO BE MINIMUM OF 2'-0" CLEARANCE FROM ALL FOREIGN UTILITY CROSSINGS. CONTRACTOR TO DETERMINE DEPTHS OF ALL FOREIGN UTILITIES PRIOR TO CONSTRUCTION.

3. CONTRACTOR IS TO BE RESPONSIBLE FOR DETERMINING DEPTH OF COVER AND LOCATION OF ALL UTILITIES CROSSED PRIOR TO CONSTRUCTION. IN ADDITIONTO THE SITE-SPECIFIC INFORMATION PROVIDED IN THIS DRAWING. GENERAL REQUIREMENTS INCLUDED IN PERMITS AND APPROVAL FROM FEDERAL, STATE, AND LOCAL AGENCIES ALSO APPLY.

4. CONTRACTOR SHALL USE THE "ONE CALL" SYSTEM PRIOR TO BEGINNING WORK.

PIPE SUMMARY

ITEM	DESCRIPTION	QTY
1	PIPE, 12.750" OD	2,500'

COATING/PADDING SUMMARY

EXTERNAL: A - FBE | B - FBE/ARO
INTERNAL:

FIELD NOTES

TEST: ______
RADIOGRAPH: ______

REFERENCE DRAWINGS

REVISIONS

NO	PROJ ID	DESCRIPTION	DATE	BY	CK	APPR
0	211890	ISSUED FOR FILING	10/19/18	JA	CG	KH

AREA: AGAWAM | DIV.: NORTHERN (10)
DRAFTER: JA | DATE: 10/15/18
DRAFT. COORD: CG | DATE: 10/15/18

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

LINE 261B PIPELINE LOOPING PROJECT
PROPOSED 12" NATURAL GAS PIPELINE
FERC ALIGNMENT SHEETS
STA. 68+00 TO STA. 93+00
HAMPDEN COUNTY, MASSACHUSETTS

DESIGN COORD: | DATE: | SCALE: 1" = 100' | PROJ. ID.: 211890
PROJECT COORD: | DATE:
OPER. APPR: | DATE:

TO-E12-261B-200-4 | 0

Drawing Location & Name: G:\JOBS18\18C\18C6717\DWG\Line261B_FERCAlignmentSheets.dwg

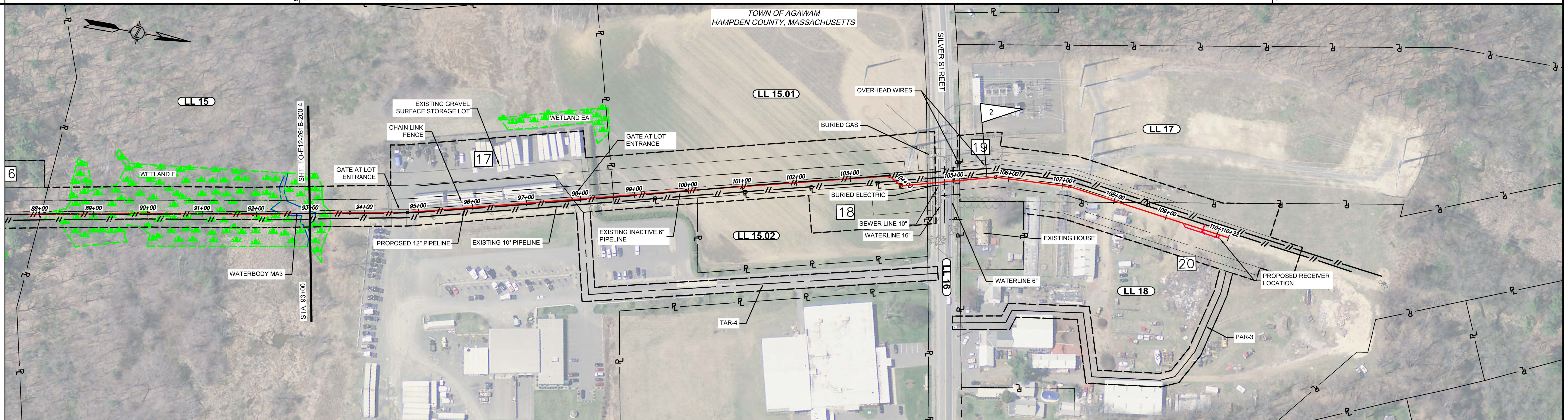
AUG 2016

OWNERS LINE LIST	93+00	LL 15 627'	99+27	LL 15.01 588'	105+15	LL 16 60'	105+75	LL 17 300'	108+75	LL 18 213'	110+88

PIPELINE STATIONING

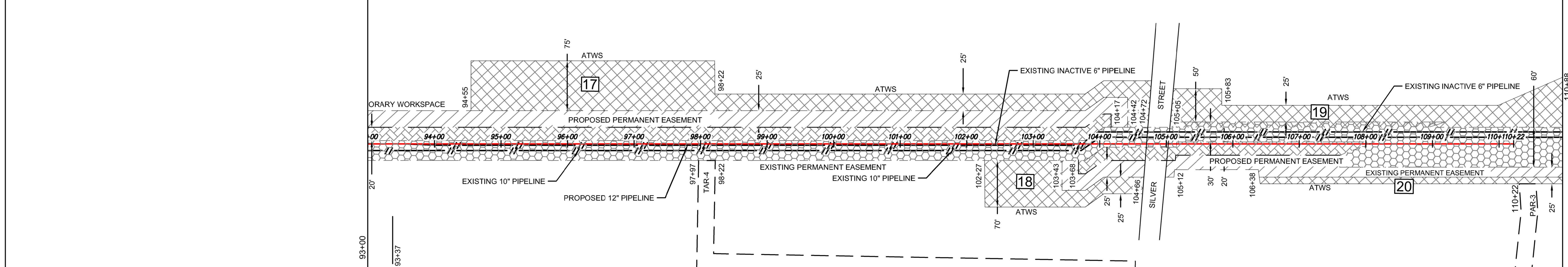
93+00
93+10 EDGE STREAM MA3
93+37 EXIT WETLAND E
94+44 FENCE CORNER 8' LT.
94+48 EDGE OF ROAD
94+78 EDGE OF ROAD
94+94 GATE POST 10' LT
97+69 GATE POST 12' LT
97+83 EDGE OF ROAD
98+13 EDGE OF ROAD
98+16 TREELINE
98+30 TREELINE
103+72 REMOVAL OF EXISTING INACTIVE 6" PIPELINE END
103+86 EXISTING 10" PIPELINE
104+45 GAS PIPELINE 2"
104+46 SIDEWALK
104+49 SIDEWALK
104+52 BURIED ELECTRIC
104+54 CURB
104+55 EDGE OF ROAD
104+60 SEWER LINE 10"
104+63 WATERLINE
104+71 CL SILVER STREET
104+76 STORM SWR 18" RCP
104+84 WATERLINE
104+87 EDGE OF ROAD
104+88 CURB
104+93 OVERHEAD WIRES
104+93 UTILITY POLE 5' RT
105+02 OVERHEAD WIRES
110+88

ALIGNMENT STRIP MAP



COVER		3'	5'	3'	
MATERIAL	93+00	1A 1207'	105+07 1B 80' 105+87	1A 435'	110+88
CLASS LOCATION		CLASS 3			
MAOP		700 PSIG			

WORKSPACE SCHEMATIC



LEGEND

LEGEND

- AREA OF PROPOSED PERMANENT EASEMENT
- AREA OF EXISTING PERMANENT EASEMENT
- AREA OF PROPOSED TEMPORARY WORKSPACE
- AREA OF PROPOSED ADDITIONAL TEMPORARY WORKSPACE
- DELINEATED VEGETATED WETLAND
- PROPOSED PIPELINE
- EXISTING PIPELINE
- TREE LINE
- PROPERTY LINE
- MAJOR CONTOUR
- MINOR CONTOUR
- DELINEATED WATERBODY
- LOD
- 2 ATWS NUMERATION

CONTOUR SOURCE

CONTOURS DEVELOPED USING A COMBINATION OF PUBLICLY AVAILABLE LIDAR DATA AND LIMITED FIELD TOPOGRAPHIC SURVEY.

- MILE POST
- MAINLINE VALVE (MLV)
- WATER VALVE
- CONTROL POINT
- PIPELINE MARKER
- AERIAL MARKER
- METER HOUSE
- PIN FOUND SYMBOL
- XXX.XX LINE LIST NUMBER
- STATION EQUATION
- UTILITY POLE
- HDD
- SEWER MANHOLE
- STORM DRAINAGE MANHOLE
- ELECTRIC VAULT
- STORMWATER DRAIN
- TREE
- BORE
- HYDRANT
- UE ELECTRIC
- W WATER LINE
- FO FIBER OPTIC CABLE
- EXISTING PIPELINE
- C/L ROAD
- PROPERTY LINE
- P POWER LINE
- X FENCE LINE
- RR RAILROAD
- R/W RIGHT OF WAY

SCALE

100' 50' 0' 100' 200'

FOR SHEET SIZE 24" X 36" SCALE AS NOTED

Figure 7
Alignment

ISSUED FOR FILING
October 19th, 2018

LL. NO.
15
15.01
15.02
16
17
18

GENERAL NOTES

1. PIPELINE DEPTH AT ROADS TO BE AS INDICATED ON ROAD CROSSING PERMIT AS MEASURED FROM THE TOP OF PIPE TO THE LOWEST POINT ON GRADE IN THE ROAD RIGHT-OF-WAY.

2. DEPTH OF BORE PIPES TO BE MINIMUM OF 2'-0" CLEARANCE FROM ALL FOREIGN UTILITY CROSSINGS. CONTRACTOR TO DETERMINE DEPTHS OF ALL FOREIGN UTILITIES PRIOR TO CONSTRUCTION.

3. CONTRACTOR IS TO BE RESPONSIBLE FOR DETERMINING DEPTH OF COVER AND LOCATION OF ALL UTILITIES CROSSED PRIOR TO CONSTRUCTION. IN ADDITIONTO THE SITE-SPECIFIC INFORMATION PROVIDED IN THIS DRAWING. GENERAL REQUIREMENTS INCLUDED IN PERMITS AND APPROVAL FROM FEDERAL, STATE, AND LOCAL AGENCIES ALSO APPLY.

4. CONTRACTOR SHALL USE THE "ONE CALL" SYSTEM PRIOR TO BEGINNING WORK.

PIPE SUMMARY

ITEM	DESCRIPTION	QTY
1	PIPE, 12.750" OD	2,500'

COATING/PADDING SUMMARY

EXTERNAL:	A - FBE	B - FBE/ARO
INTERNAL:		

FIELD NOTES

TEST: ____________

RADIOGRAPH: ____________

REFERENCE DRAWINGS

REVISIONS

NO	PROJ ID	DESCRIPTION	DATE	BY	CK	APPR
0	211890	ISSUED FOR FILING	10/19/18	JA	CG	KH

AREA: AGAWAM	DIV.: NORTHERN (10)
DRAFTER: JA	DATE: 10/15/18
DRAFT. COORD: CG	DATE: 10/15/18

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

LINE 261B PIPELINE LOOPING PROJECT
PROPOSED 12" NATURAL GAS PIPELINE
FERC ALIGNMENT SHEETS
STA. 93+00 TO STA. 110+88
HAMPDEN COUNTY, MASSACHUSETTS

DESIGN COORD:	DATE:	SCALE: 1" = 100'	PROJ. ID.: 211890
PROJECT COORD:	DATE:	TO-E12-261B-200-5	0
OPER. APPR:	DATE:		

Drawing Location & Name: G:\JOBS18\18C\18C6717\DWG\Line261B_FERCAlignementSheets.dwg

AUG 2016

OWNERS LINE LIST	
PIPELINE STATIONING	
ALIGNMENT STRIP MAP	
COVER	
MATERIAL	
CLASS LOCATION	
MAOP	
WORKSPACE SCHEMATIC	

LEGEND

LEGEND

- AREA OF PROPOSED PERMANENT EASEMENT
- AREA OF EXISTING PERMANENT EASEMENT
- AREA OF PROPOSED TEMPORARY WORKSPACE
- AREA OF PROPOSED ADDITIONAL TEMPORARY WORKSPACE
- DELINEATED VEGETATED WETLAND
- PROPOSED PIPELINE
- EXISTING PIPELINE
- TREE LINE
- PROPERTY LINE
- MAJOR CONTOUR
- MINOR CONTOUR
- DELINEATED WATERBODY
- LOD
- 2 ATWS NUMERATION

CONTOUR SOURCE

CONTOURS DEVELOPED USING A COMBINATION OF PUBLICLY AVAILABLE LIDAR DATA AND LIMITED FIELD TOPOGRAPHIC SURVEY.

- MILE POST
- MAINLINE VALVE (MLV)
- WATER VALVE
- CONTROL POINT
- PIPELINE MARKER
- AERIAL MARKER
- METER HOUSE
- PIN FOUND SYMBOL
- XXX.XX LINE LIST NUMBER
- STATION EQUATION
- UTILITY POLE
- HDD
- SEWER MANHOLE
- STORM DRAINAGE MANHOLE
- ELECTRIC VAULT
- STORMWATER DRAIN
- TREE
- BORE
- HYDRANT
- ELECTRIC
- WATER LINE
- FIBER OPTIC CABLE
- EXISTING PIPELINE
- C/L ROAD
- PROPERTY LINE
- POWER LINE
- FENCE LINE
- RAILROAD
- RIGHT OF WAY

SCALE

100' 50' 0' 100' 200'

FOR SHEET SIZE 24" X 36" SCALE AS NOTED

Figure 8
Alignment

ISSUED FOR FILING
October 19th, 2018

LL. NO.
9
9.01
10
11
11.01
1
825
825.01

GENERAL NOTES

1. PIPELINE DEPTH AT ROADS TO BE AS INDICATED ON ROAD CROSSING PERMIT AS MEASURED FROM THE TOP OF PIPE TO THE LOWEST POINT ON GRADE IN THE ROAD RIGHT-OF-WAY.

2. DEPTH OF BORE PIPES TO BE MINIMUM OF 2'-0" CLEARANCE FROM ALL FOREIGN UTILITY CROSSINGS. CONTRACTOR TO DETERMINE DEPTHS OF ALL FOREIGN UTILITIES PRIOR TO CONSTRUCTION.

3. CONTRACTOR IS TO BE RESPONSIBLE FOR DETERMINING DEPTH OF COVER AND LOCATION OF ALL UTILITIES CROSSED PRIOR TO CONSTRUCTION. IN ADDITIONTO THE SITE-SPECIFIC INFORMATION PROVIDED IN THIS DRAWING. GENERAL REQUIREMENTS INCLUDED IN PERMITS AND APPROVAL FROM FEDERAL, STATE, AND LOCAL AGENCIES ALSO APPLY.

4. CONTRACTOR SHALL USE THE "ONE CALL" SYSTEM PRIOR TO BEGINNING WORK.

PIPE SUMMARY

ITEM	DESCRIPTION	QTY
1	PIPE, 12.75" OD X .375" WT, API 5L X 52	0'

COATING/PADDING SUMMARY

EXTERNAL:	A - FBE	B - FBE/ARO
INTERNAL:		

FIELD NOTES

TEST: _____

RADIOGRAPH: _____

REFERENCE DRAWINGS

REVISIONS

NO	PROJ ID	DESCRIPTION	DATE	BY	CK	APPR
0	211890	ISSUED FOR FILING	10/19/18	JA	CG	KH

AREA:	AGAWAM	DIV.: NORTHERN (10)	
DRAFTER:	JA	DATE:	10/15/18
DRAFT. COORD:	CG	DATE:	10/15/18

Tennessee Gas Pipeline Company, L.L.C.
a Kinder Morgan company

LINE 261B PIPELINE LOOPING PROJECT
PROPOSED 12" NATURAL GAS PIPELINE
FERC ALIGNMENT SHEETS
CONTINUATION SHEET
HAMPDEN COUNTY, MASSACHUSETTS
HARTFORD COUNTY, CONNECTICUT

DESIGN COORD:	DATE:	SCALE: 1" = 100'	PROJ. ID.: 211890
PROJECT COORD:	DATE:	TO-E12-261B-200-6	0
OPER. APPR:	DATE:		

Drawing Location & Name: C:\JOBS\18C\18C6717\DWG\Line261B_FERCAlignmentSheets.dwg

AUG 2016

Appendix B

Migratory Birds Potentially Occurring in the Area of the Project

Table 11

Migratory Birds Potentially Occurring in the Area of the projects and their Nesting Habitat

Common Name	Scientific Name	Seasonal Occurrence In Projects' Area	Nesting Habitat**	Potential for Occurrence In Looping Project Area	Potential for Occurrence in HP Replacement Project Area
Black-billed Cuckoo	*Coccyzuserythropthalmus*	Breeding	Deciduous and mixed deciduous-coniferous woods	May Occur, deciduous woods are present.	Unlikely to occur. No nesting or foraging habitat available in project area.
Bobolink	*Dolichonyxoryzivorus*	Breeding, nonbreeding	Open fields, tall grass parries	Unlikely to occur. Open fields are not present.	Unlikely to occur. Open grassland
Buff-breasted Sandpiper	*Tryngitessubruficolis*	Nonbreeding	Shortgrass prairies, plowed fields, sometimes coastal flats	May occur. Agricultural land is present	May occur. Foraging habitat present.
Canada Warbler	*Wilsoniacanadensis*	Breeding, nonbreeding	Cavities, hollows	May occur, fallen trees may present	Unlikely to occur
Cerulean Warbler	*Dendroica cerulea*	Breeding	Tall hardwoods (deciduous)	May occur. Tall hardwoods present for nesting and foraging.	Unlikely to occur, no nesting or foraging habitat present
Dunlin	*Calidris alpinearcticola*	N/A	Sandy beaches and mudflats	Unlikely to occur. Shoreline not present	Unlikely to occur. Shoreline not present.
Eastern Whip-poor-will	*Caprimulgusvociferus*	Breeding	Edge of leafy woodlands, deciduous or mixed, on the ground	May occur, nesting and foraging habitat is present.	Unlikely to occur, no nesting or foraging habitat present.
Evening Grosbeak	*Coccothraustesvespertinus*	Nonbreeding	Coniferous forest and mixed forests	May occur, spend more time in deciduous woodlands during migration, foraging habitat present.	Unlikely to occur.No nesting or foraging habitat present.
Lesser Yellowlegs	*Tringaflavipes*	N/A	Tidal flats and shallow lagoons	Unlikely to occur. No nesting or foraging habitat present.	Unlikely to occur. No nesting or foraging habitat present.
Prairie Warbler	*Dendroica discolor*	Breeding	Mangroves	Unlikely to occur. No nesting or foraging habitat	Unlikely to occur. No nesting or foraging habitat

Prothonotary Warbler	*Protonotariacitrea*	Breeding	Boarders of lakes	Unlikely to occur. No lakes in project area.	Unlikely to occur. No lakes in project area.
Red-headed Woodpecker	*Melanerpeserythrocephalus*	Nonbreeding	Cavities in fragmented forests, or large trees	May occur, foraging habitat present.	Unlikely to occur. No nesting or foraging habitat present.
Rusty Blackbird	*Euphaguscarolinus*	Nonbreeding	Dense coniferous cover near waterbodies	May occur. Potential foraging habitat present.	May occur, foraging habitat present.
Semipalmated Sandpiper	*Calidrispusilla*	N/A	Ground, Beaches or mudflats	Unlikely to occur. Shoreline habitat does not occur in the Project area.	Unlikely to occur. Shoreline habitat does not occur in the Project area.
Wood Thrush	*Hylocichlamusteli na*	Breeding	Deciduous trees	May occur, nesting and foraging habitat present.	May occur, foraging habitat present.

Appendix C

Northern Long-Eared Bat Streamlined Consultation Form

Northern Long-Eared Bat 4(d) Rule Streamlined Consultation Form

Federal agencies should use this form for the optional streamlined consultation framework for the northern long-eared bat (NLEB). This framework allows federal agencies to rely upon the U.S. Fish and Wildlife Service's (USFWS) January 5, 2016, intra-Service Programmatic Biological Opinion (BO) on the final 4(d) rule for the NLEB for section 7(a)(2) compliance by: (1) notifying the USFWS that an action agency will use the streamlined framework; (2) describing the project with sufficient detail to support the required determination; and (3) enabling the USFWS to track effects and determine if reinitiation of consultation is required per 50 CFR 402.16.

This form is not necessary if an agency determines that a proposed action will have no effect to the NLEB or if the USFWS has concurred in writing with an agency's determination that a proposed action may affect, but is not likely to adversely affect the NLEB (i.e., the standard informal consultation process). Actions that may cause prohibited incidental take require separate formal consultation. Providing this information does not address section 7(a)(2) compliance for any other listed species.

Information to Determine 4(d) Rule Compliance:	**YES**	**NO**
1. Does the project occur wholly outside of the WNS Zone[1]?	☐	☒
2. Have you contacted the appropriate agency[2] to determine if your project is near known hibernacula or maternity roost trees?	☒	☐
3. Could the project disturb hibernating NLEBs in a known hibernaculum?	☐	☒
4. Could the project alter the entrance or interior environment of a known hibernaculum?	☐	☒
5. Does the project remove any trees within 0.25 miles of a known hibernaculum at any time of year?	☐	☒
6. Would the project cut or destroy known occupied maternity roost trees, or any other trees within a 150-foot radius from the maternity roost tree from June 1 through July 31.	☐	☒

You are eligible to use this form if you have answered yes to question #1 **or** yes to question #2 **and** no to questions 3, 4, 5 and 6. The remainder of the form will be used by the USFWS to track our assumptions in the BO.

Agency and Applicant[3] (Name, Email, Phone No.): Tennessee Gas Pipeline Company, L.L.C.

Project Name: 261 Upgrade Projects

Project Location (include coordinates if known): Latitude: Start: 42.034291˚; End: 42.062360˚
Longitude: Start:-72.634335˚; End: -72.640291˚

Basic Project Description (provide narrative below or attach additional information):
Tennessee Gas Pipeline Company, L.L.C. proposes the 261 Upgrade Projects consisting of (i) the Line 261B Pipeline Looping Project, which involves approximately 2.1 miles of pipeline loop, and (ii) the Compressor Station 261 Horsepower Replacement Project, which involves equipment upgrades at Tennessee's existing Compressor Station 261. Additional information is provided in the attached cover letter.

General Project Information	**YES**	**NO**

[1] http://www.fws.gov/midwest/endangered/mammals/nleb/pdf/WNSZone.pdf
[2] See http://www.fws.gov/midwest/endangered/mammals/nleb/nhisites.html
[3] If applicable - only needed for federal actions with applicants (e.g., for a permit, etc.) who are party to the consultation.

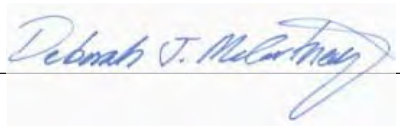
Does the project occur within 0.25 miles of a known hibernaculum?	☐	☒
Does the project occur within 150 feet of a known maternity roost tree?	☐	☒
Does the project include forest conversion[4]? (if yes, report acreage below)	☒	☐
Estimated total acres of forest conversion	4.22 ac (temp) + 3.02 ac (perm)	
If known, estimated acres[5] of forest conversion from April 1 to October 31	Unknown	
If known, estimated acres of forest conversion from June 1 to July 31[6]	Unknown	
Does the project include timber harvest? (if yes, report acreage below)	☐	☒
Estimated total acres of timber harvest		
If known, estimated acres of timber harvest from April 1 to October 31		
If known, estimated acres of timber harvest from June 1 to July 31		
Does the project include prescribed fire? (if yes, report acreage below)	☐	☒
Estimated total acres of prescribed fire		
If known, estimated acres of prescribed fire from April 1 to October 31		
If known, estimated acres of prescribed fire from June 1 to July 31		
Does the project install new wind turbines? (if yes, report capacity in MW below)	☐	☒
Estimated wind capacity (MW)		

Agency Determination:

By signing this form, the action agency determines that this project may affect the NLEB, but that any resulting incidental take of the NLEB is not prohibited by the final 4(d) rule.

If the USFWS does not respond within 30 days from submittal of this form, the action agency may presume that its determination is informed by the best available information and that its project responsibilities under 7(a)(2) with respect to the NLEB are fulfilled through the USFWS January 5, 2016, Programmatic BO. The action agency will update this determination annually for multi-year activities.

The action agency understands that the USFWS presumes that all activities are implemented as described herein. The action agency will promptly report any departures from the described activities to the appropriate USFWS Field Office. The action agency will provide the appropriate USFWS Field Office with the results of any surveys conducted for the NLEB. Involved parties will promptly notify the appropriate USFWS Field Office upon finding a dead, injured, or sick NLEB.

Signature:  Date Submitted: 8/16/18

[4] Any activity that temporarily or permanently removes suitable forested habitat, including, but not limited to, tree removal from development, energy production and transmission, mining, agriculture, etc. (see page 48 of the BO).
[5] If the project removes less than 10 trees and the acreage is unknown, report the acreage as less than 0.1 acre.
[6] If the activity includes tree clearing in June and July, also include those acreage in April to October.

Appendix D

Site Specific Construction Plans for Residences within 50 feet of Project Site

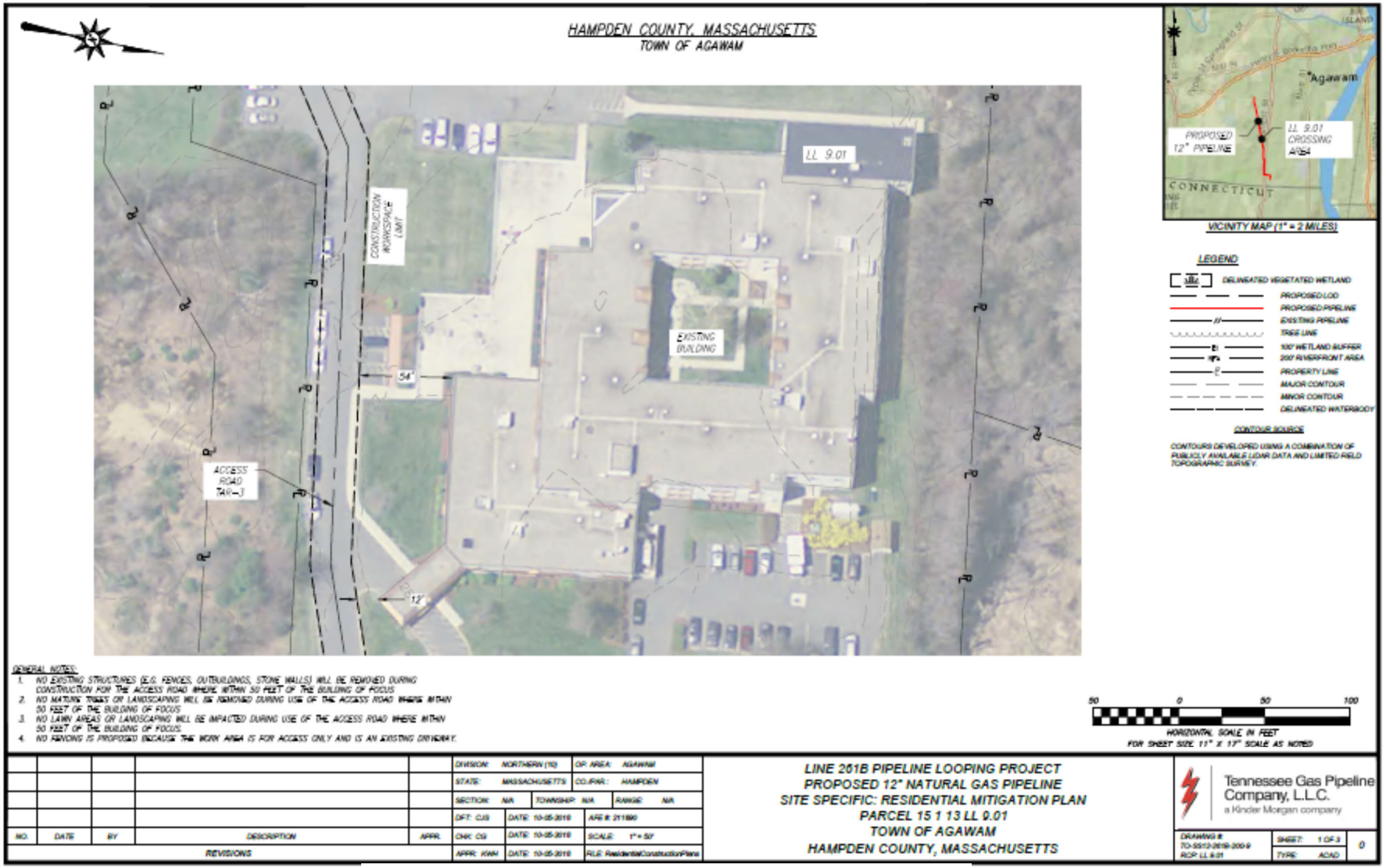


Figure 9
Site Specific Residential Construction Plan

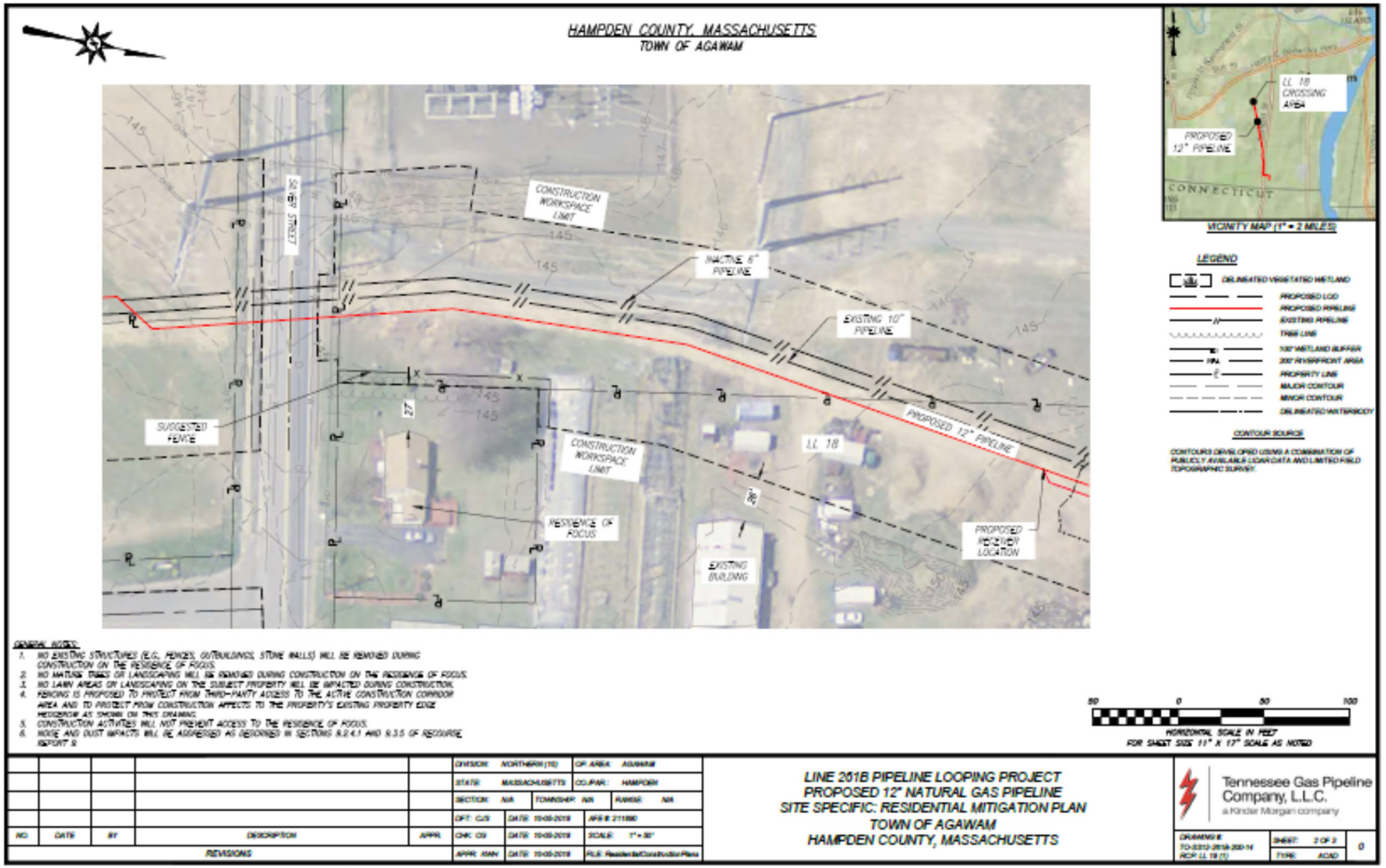


Figure 10
Site Specific Residential Construction Plan

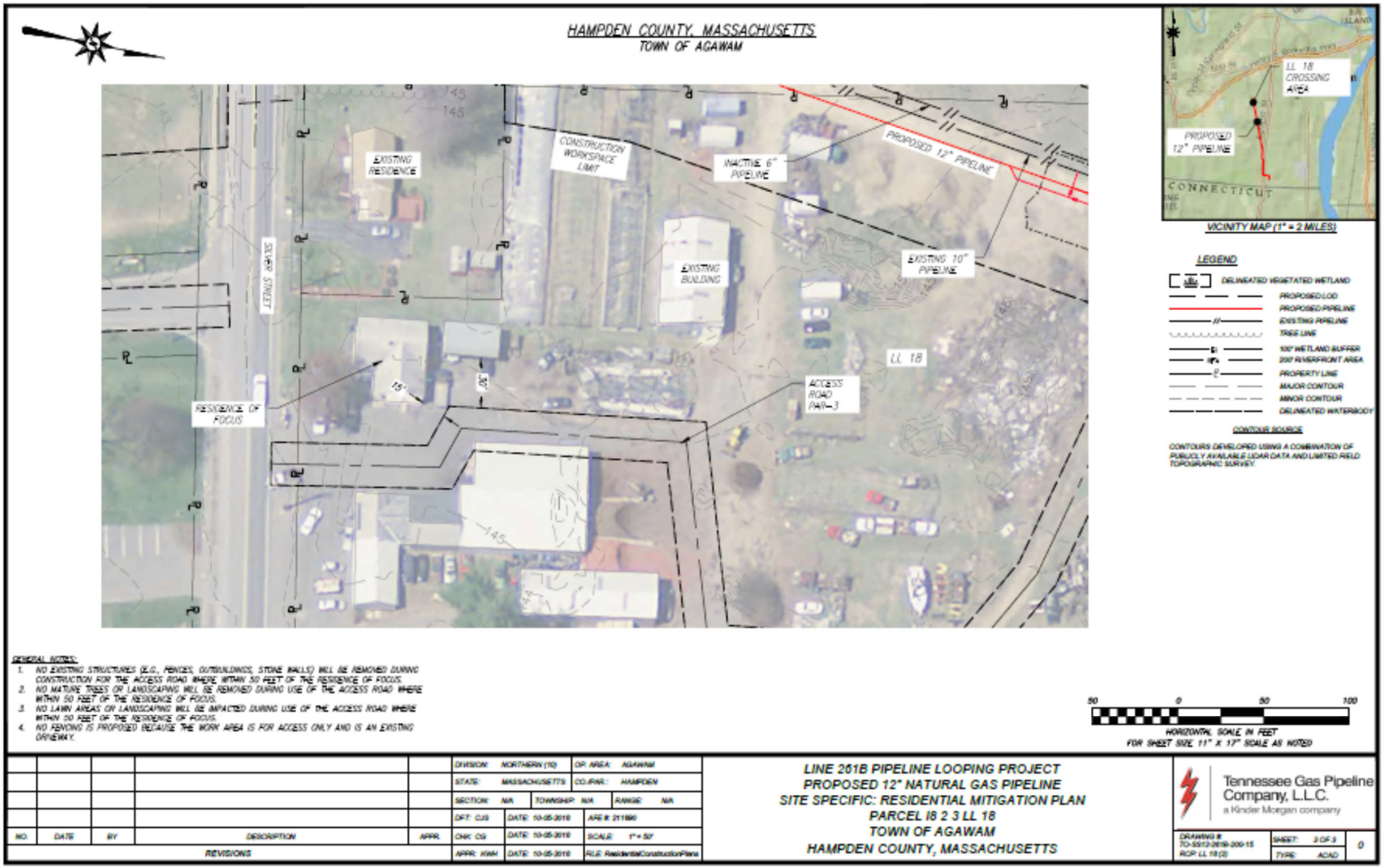


Figure 11
Site Specific Residential Construction Plan

Appendix E

Cumulative Impact Table

Table 21 Projects with Potential Cumulative Impacts				
Project/Company	**Description**	**Distance from Nearest Project Facility**	**Status**	**Potentially Affected Resource Areas**
TJA Solar/TJA Solar LLC	Ground mounted solar energy system	0.69 mile west of MP 0.78	Unknown	Air, Noise
Loop of Connecticut Expansion Project/ Tennessee Gas	0.11 mile of new 24-inch pipeline adjacent to Agawam right-of-way. Minor modification to CS 261	0.00	Completed	Wetlands, Air, Noise, Forest, Land use
Electric Generation Facility/ Millennium Power Partners	Electric generating facility	25 miles west of CS 261	Completed	Air
Ameresco Chicopee Energy LLC	Landfill gas to energy plant	10 miles northeast of CS 261	Complete	Air
Berkshire Power Company LLC	Electric power generating facility	1.2 miles northeast of CS 261	Complete	Air
Industrial Power Services Corporation	Landfill gas to energy plant	14 miles northeast of CS 261	Complete	Air
Stony Brook Energy Center	Electric power generation facility	13 miles northeast of CS 261	Complete	Air
Exxon Mobil Oil Springfield Terminal	Fuel product storage and distribution facility	6 miles north of CS 261	Complete	Air
Essential Power Massachusetts, LLC	Electric power generating station	5 miles north of CS 261	Complete	Air
MASSPOWER	Combined cycle cogeneration electric power plant	10 miles northeast of CS 261	Complete	Air
Chicopee Electric Light	Diesel engine electric power generating plant	8 miles northeast of CS 261	Complete	Air
Solutia Inc.	Manufacturing facility	10 miles north of CS 261	Complete	Air
Suddekor, LLC	Manufacturing facility	2 miles northeast of CS 261	Complete	Air
Eastern Etching and Manufacturing	Manufacturing facility	8 miles north of CS 261	Complete	Air
INEOS Melamines, LLC	Manufacturing facility	10 miles north of CS 261	Complete	Air
Rexam Image Products	Manufacturing facility	13 miles north of CS 261	Complete	Air
Mustang Motorcycle Products, LLC	Manufacturing facility	17 miles northeast of CS 261	Complete	Air
Hazen Paper Company	Paper processing center	11 miles north of CS 261	Complete	Air
Calloway Golf Ball Operations, Inc.	Manufacturing facility	10 miles north of CS 261	Complete	Air
Ace Precision, Inc.	Subdivision	230 feet east of TAR-2	Unknown	Surface water, Wetlands, Forest, Land Use, Air, Noise
Western Ave Improvements/ City of Westfield	Safety and access improvements to Route 20 in Westfield	8.3 miles northwest of Station 110+88	Under construction	Air

Table 21 Projects with Potential Cumulative Impacts				
Project/Company	**Description**	**Distance from Nearest Project Facility**	**Status**	**Potentially Affected Resource Areas**
Pioneer Valley Resource Recovery	Municipal waste combustion plant	5 mile northeast of CS 261	Complete	Air
Covanta Bristol, Inc.	Municipal waste processing facility	30 miles southwest of CS 261	Complete	Air
Chicopee Landfill	Sanitary landfill facility	10 miles north of CS 261	Complete	Air
University of Massachusetts	University facilities	25.3 miles north of CS 261	Complete	Air
Connecticut Green Bank	Solar generating facility	12 miles southwest of Hickory Street Pipeyard	Unknown	Air
Manchester Landfill	Regional Landfill	5 miles south of Hickory Street Pipeyard	Under construction	Air
Connecticut Solid Waste System Resources Recovery Facility	Solid waste system recovery facility	20 miles south of CS 261	Complete	Air
Hartford Water Pollution Control Facility	Activated sludge municipal wastewater treatment facility	21 miles south of CS 261	Complete	Air
University of Connecticut	University facilities	24 miles southeast of CS 261	Complete	Air