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FERC EIS
No. 0249F

Final Environmental Impact Statement
Constitution Pipeline and Wright Interconnect Projects

Vol. 1 of 2

Docket Nos.
CP13-499-000
CP13-502-000
PF12-9-000

October 2014

Federal Energy Regulatory Commission
Office of Energy Projects
Washington, DC 20426

Final Environmental Impact Statement – Vol. 1

FERC EIS 0249F

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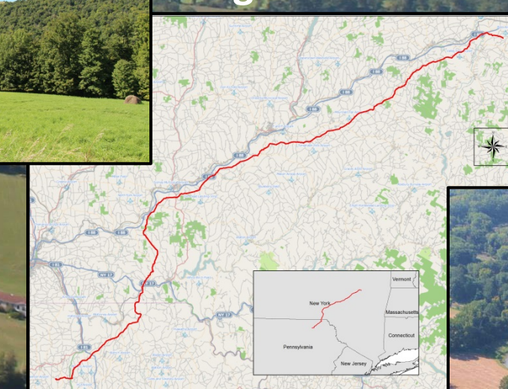

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Docket Nos.:
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Cooperating Agencies

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply Refer To:
OEP/DG2E/Gas 4
Constitution Pipeline Company, LLC
Constitution Pipeline Project
Iroquois Gas Transmission System, L.P.
Wright Interconnect Project
Docket Nos. CP13-499-000
CP13-502-000

TO THE PARTY ADDRESSED:

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared a final environmental impact statement (EIS) for the Constitution Pipeline Project and Wright Interconnect Project (projects), proposed by Constitution Pipeline Company, LLC (Constitution) and Iroquois Gas Transmission System, L.P. (Iroquois), respectively, in the above-referenced dockets. Constitution and Iroquois request authorization to construct and operate certain interstate natural gas pipeline facilities in Pennsylvania and New York to deliver up to 650,000 dekatherms per day[1] (Dth/d) of natural gas supply to markets in New York and New England.

The final EIS assesses the potential environmental effects of the construction and operation of the projects in accordance with the requirements of the National Environmental Policy Act (NEPA). The FERC staff concludes that approval of the projects, would have some adverse environmental impacts; however, these impacts would be reduced to less than significant levels with the implementation of Constitution's and Iroquois' proposed mitigation and the additional measures recommended by staff in the final EIS.

The U.S. Environmental Protection Agency, the U.S. Army Corps of Engineers (COE), the Federal Highway Administration, and the New York State Department of Agriculture and Markets participated as cooperating agencies in the preparation of the EIS. 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

[1] A dekatherm is a unit of heating value often used by natural gas companies instead of volume for billing purposes. A dekatherm is equivalent to 10 therms or one million British thermal units. For conceptualization purposes only, a natural gas capacity of 650,000 Dth/d would be sufficient to power roughly 6.2 million homes annually (if it were used solely for residential energy production). This estimate assumes an average household energy consumption of 11,000 kilowatt hours per year. If these projects are approved, the natural gas could be used in a variety of applications, not solely for residential energy generation.

COE would adopt the final EIS if, after an independent review of the document, it concludes that its comments and suggestions have been satisfied.

The final EIS addresses the potential environmental effects of the construction and operation of the following project facilities in Susquehanna County, Pennsylvania and Broome, Chenango, Delaware, and Schoharie Counties, New York:

- 124.4 miles of new 30-inch-diameter natural gas pipeline and appurtenant facilities that include two new meter stations, two pipe interconnections, ten communication towers, eleven mainline valves, and one pig launcher and receiver[2];
- expansion of the existing Wright Compressor Station with the addition of 22,000 horsepower of incremental compression and other miscellaneous modifications; and
- modification and upgrade of the existing delivery meter to the Tennessee Gas Pipeline or construction of a new delivery meter.

The FERC staff mailed copies of the final EIS to federal, state, and local government representatives and agencies; elected officials; environmental and public interest groups; Native American tribes; potentially affected landowners and other interested individuals and groups; newspapers and libraries in the area of the projects; and parties to this proceeding. Paper copy versions of this EIS were mailed to those specifically requesting them; all others received a CD version. In addition, the EIS is available for public viewing on the FERC's website (www.ferc.gov) using the eLibrary link. A limited number of copies are available for distribution and public inspection at:

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

In accordance with the Council on Environmental Quality's (CEQ) regulations implementing NEPA, no agency decision on a proposed action may be made until 30 days after the U.S. Environmental Protection Agency publishes a notice of availability of the final EIS in the federal register. However, the CEQ regulations provide an exception to this rule when an agency decision is subject to a formal internal appeal process that allows other agencies or the public to make their views known. In such cases, the agency decision may be made at the same time the notice of the final EIS is published, allowing

[2] A pig is an internal tool that can be used to clean and dry a pipeline and/or to inspect it for damage or corrosion.

both periods to run concurrently. The Commission decision for this proposed action is subject to a 30-day rehearing period.

Questions?

Additional information about the projects 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. Click on the eLibrary link, click on "General Search," and enter the docket number excluding the last three digits in the Docket Number field (i.e., CP13-499 and CP13-502). 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; for TTY, contact (202) 502-8659. The eLibrary link also provides access to the texts of formal documents issued by the Commission, such as orders, notices, and rulemakings.

In addition, the Commission offers a free service called eSubscription that 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.

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TECHNICAL ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	micrograms per cubic meter
ACHP	Advisory Council on Historic Preservation
AI	Agricultural Inspector
AQCR	air quality control regions
BA	Biological Assessment
BACT	Best Available Control Technology
BCC	Birds of Conservation Concern
bcf/d	billion cubic feet per day
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practices
BOEM	Bureau of Ocean Energy Management
Btu	British thermal unit
CAA	Clean Air Act
CEQ	Council on Environmental Quality
CFR	Code of Federal Regulations
CGR	Center for Government Research
CH_4	methane
CHP	combined heat and power
Class I	Mandatory Federal Class I Areas
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
COE	U.S. Army Corps of Engineers
Contamination Plan	Constitution's Unanticipated Discovery of Contamination Plan
CWA	Clean Water Act
CWF	coldwater fisheries
dB	decibel
dBA	decibels on the A-weighted scale
Discovery Plan	Constitution's Unanticipated Cultural and Paleontological Resources and Human Remains Discovery Plan
DOE	U.S. Department of Energy
DOT	U.S. Department of Transportation
DRBC	Delaware River Basin Commission
Dth/d	dekatherms per day
ECP	Environmental Construction Plan
EI	Environmental Inspector
EIA	Energy Information Administration
EPA	U.S. Environmental Protection Agency
ESA	Endangered Species Act of 1973
EV	Exceptional Value (waterbody)
FEMA	Federal Emergency Management Agency

TECHNICAL ACRONYMS AND ABBREVIATIONS

FHWA	Federal Highway Administration
FWS	U.S. Fish and Wildlife Service
GHG	greenhouse gas
gpm	gallons per minute
GW	gigawatt
GWP	global warming potential
HAP	hazardous air pollutant
HCA	high consequence area
HDD	horizontal directional drill
HQ	High-Quality (waterbody)
IBA	Important Bird Areas
kV	kilovolt
L_{dn}	day-night sound level
L_{eq}	equivalent sound level
LNG	liquefied natural gas
LPG	liquefied petroleum gas
LTA	Land Title Association
M&R	meter and regulation
MACT	Maximum Achievable Control Technology
MAOP	maximum allowable operating pressure
MBTA	Migratory Bird Treaty Act
mgd	million gallons per day
MLV	mainline valves
MMI	Modified Mercalli Intensity
MW	megawatt
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAP	National Emission Standards for Hazardous Air Pollutants
NGA	Natural Gas Act
NHPA	National Historic Preservation Act
NNSR	Nonattainment New Source Review
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOAA Fisheries	National Oceanic and Atmospheric Administration's National Marine Fisheries Service
NO_x	nitrogen oxides
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSA	noise sensitive area
NSPS	New Source Performance Standards

TECHNICAL ACRONYMS AND ABBREVIATIONS

NSR	New Source Review
NWI	National Wetlands Inventory
NYCDEP	New York City Department of Environmental Protection
NYCRR	New York Codes, Rules and Regulations
NYCWSW	New York City Water Supply Watershed
NYISO	New York Independent System Operator
NYPA	New York Power Authority
NYSDAM	New York State Department of Agriculture and Markets
NYSDEC	New York State Department of Environmental Conservation
NYSDOH	New York State Department of Health
NYSDOT	New York State Department of Transportation
O_3	ozone
OPRHP	Office of Parks, Recreation and Historic Preservation
OTR	Ozone Transport Region
PADCNR	Pennsylvania Department of Conservation and Natural Resources
PADEP	Pennsylvania Department of Protection
pCi/L	picocuries per liter
PEM	palustrine emergent
PennDOT	Pennsylvania Department of Transportation
PFBC	Pennsylvania Fish and Boat Commission
PGC	Pennsylvania Game Commission
PHMC	Pennsylvania Historical and Museum Commission
PHMSA	Pipeline and Hazardous Materials Safety Administration
Plan	Constitution's Upland Erosion Control, Revegetation, and Maintenance Plan
PM	particulate matter
PM_{10}	particulate matter with a diameter of 10 microns or less
$PM_{2.5}$	particulate matter with a diameter of 2.5 microns or less
ppb	parts per billion by volume
ppm	parts per million by volume
Procedures	Constitution's Wetland and Waterbody Construction and Mitigation Procedures
PSD	Prevention of Significant Deterioration
psig	pounds per square inch
PSS	palustrine scrub-shrub
PTE	potential-to-emit
PVR	PVR Partners
RPS	renewable portfolio standard
SFHA	Special Flood Hazard Area
SHPO	State Historic Preservation Office
SIL	Significant Impact Level
SIP	State Implementation Plan

TECHNICAL ACRONYMS AND ABBREVIATIONS

SO_2	sulfur dioxide
SPCC Plan	Iroquois' Spill Prevention, Control and Countermeasure Plan
Spill Plan	Constitution's Spill Plan for Oil and Hazardous Materials
SRBC	Susquehanna River Basin Commission
SSA	sole source aquifer
SSURGO	Soil Survey Geographic Database
tcf	trillion cubic feet
TDS	total dissolved solids
TGP	Tennessee Gas Pipeline Company, LLC
tpy	tons per year
UHF	ultra-high frequency
USC	United States Code
USDA	U.S. Department of Agriculture
USGCRP	U.S. Global Change Research Program
USGS	U.S. Geological Survey
VOC	volatile organic compounds
WHPA	wellhead protection areas

EXECUTIVE SUMMARY

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared this final Environmental Impact Statement (EIS) to fulfill requirements of the National Environmental Policy Act of 1969 (NEPA) and the Commission's implementing regulations under Title 18 of the Code of Federal Regulations Part 380 (18 CFR 380). On June 13, 2013, Constitution Pipeline Company, LLC (Constitution) and Iroquois Gas Transmission System, L.P. (Iroquois), filed applications with the FERC under Section 7(c) of the Natural Gas Act (NGA) and Part 157 of the Commission's regulations to construct, install, own, operate, and maintain certain interstate natural gas pipeline facilities in Pennsylvania and New York.

The FERC is the federal agency responsible for authorizing interstate natural gas transmission facilities under the NGA, and is the lead federal agency for the preparation of this EIS in compliance with the requirements of NEPA. The U.S. Environmental Protection Agency (EPA), the U.S. Army Corps of Engineers (COE), the Federal Highway Administration, and the New York State Department of Agriculture and Markets (NYSDAM) participated as cooperating agencies in the preparation of this EIS. A cooperating agency has jurisdiction by law or has special expertise with respect to environmental resource issues associated with a project.

PROPOSED ACTION

Constitution's proposal, referred to as the Constitution Pipeline Project, would involve the construction and operation of 124.4 miles of new 30-inch-diameter natural gas pipeline and associated equipment and facilities in Pennsylvania and New York. Constitution also proposes to construct and operate 2 new metering and regulating (M&R) stations; 2 tie-ins, 10 communication towers, and 11 mainline valves (MLVs); and would install a pig[1] launcher and a pig receiver at the M&R stations.

Iroquois' Wright Interconnect Project, also referred to as the compressor transfer station, would involve the construction and operation of new compressor facilities adjacent to Iroquois' existing Wright Compressor Station and modifications to the existing Wright Compressor Station. Iroquois' proposed expansion would be constructed completely within the property boundaries of its existing Wright Compressor Station.

According to Constitution, the proposed pipeline project was developed in response to natural gas market demands in the New York and the New England areas, and interest from natural gas shippers that require transportation capacity from Susquehanna County, Pennsylvania to the existing Tennessee Gas Pipeline Company LLC (TGP) and Iroquois systems in Schoharie County, New York.

The proposed projects would deliver up to 650,000 dekatherms per day (Dth/d) of natural gas supply from Susquehanna County, Pennsylvania to the interconnect with the TGP and Iroquois systems at the existing Wright Compressor Station (to markets in New York and New England).

Dependent upon Commission approval, Constitution and Iroquois (collectively Applicants) originally proposed to begin construction in the second quarter of 2014 and third quarter of 2014, respectively, and place the projects in service by March of 2015. However, we[2] acknowledge that the proposed dates for the start of construction are no longer feasible. Constitution and Iroquois would seek approval to begin construction of their projects as soon as possible upon receiving all necessary federal

[1] A pig is an internal tool that can be used to clean and dry a pipeline and/or to inspect it for damage or corrosion.

[2] "We," "us," and "our" refer to the environmental staff of the FERC's Office of Energy Projects.

authorizations. Constitution now proposes to start construction in February of 2015 and continue through the end of 2015, pending receipt of all applicable federal authorizations. The applicants would request to place the facilities into service following a determination that restoration is proceeding satisfactorily. We expect an in-service request would follow shortly after the end of construction.

PUBLIC INVOLVEMENT

On April 5, 2012, Constitution filed a request with the FERC to implement the Commission's pre-filing process for its pipeline project. At that time, Constitution was in the preliminary design stage of its project and no formal application had been filed. The purpose of the pre-filing process is to encourage the early involvement of interested stakeholders, facilitate interagency cooperation, and identify and resolve issues before an application is filed with the FERC. On April 16, 2012, the FERC granted Constitution's request and established a pre-filing docket number (PF12-9-000) to place information related to the pipeline project into the public record. The cooperating agencies agreed to conduct their environmental reviews of the pipeline project in conjunction with the Commission's environmental process.

On September 7, 2012, the Commission issued a *Notice of Intent to Prepare an Environmental Impact Statement for the Planned Constitution Pipeline Project, Request for Comments on Environmental Issues, and Notice of Public Scoping Meetings.* The notice was published in the *Federal Register* on September 14, 2012, and mailed to more than 2,100 interested parties, including federal, state, and local government representatives and agencies; elected officials; environmental and public interest groups; Native American Tribes; affected property owners; other interested parties; and local libraries and newspapers. We initially held three public scoping meetings in the project area to provide an opportunity for agencies, stakeholders, and the general public to learn more about the proposed pipeline project and participate in the environmental analysis by commenting on the issues to be addressed in the draft EIS. On October 9, 2012, the Commission subsequently issued a *Notice of Public Scoping Meeting and Extension of Scoping Period for the Planned Constitution Pipeline Project.* The notice was published in the *Federal Register* on October 16, 2012, and mailed to more than 3,300 interested parties on our mailing list. The notice listed the date and location of one additional public scoping meeting to be held in the pipeline project area and extended the closing date for receipt of comments from October 9, 2012 to November 9, 2012. On July 10, 2013, the Commission issued an additional *Notice of Intent to Prepare an Environmental Impact Statement for the Proposed Wright Interconnect Project and Request for Comments on Environmental Issues.* The notice was published in the *Federal Register* on July 16, 2013, and mailed to 74 interested parties.

We issued a *Notice of Availability of the Draft Environmental Impact Statement and Public Comment Meetings for the Proposed Constitution Pipeline and Wright Interconnect Projects* on February 12, 2014. The draft EIS was sent to our environmental mailing list. The draft EIS was filed with the EPA and a formal notice of availability was issued in the Federal Register, which established a 45-day comment period on the draft EIS that ended on April 7, 2014. We held four public comment meetings for the draft EIS from March 31, 2014 through April 3, 2014.

In response to our notices and at our public meetings, we received over 4,000 comments from landowners, public officials, non-governmental organizations, and government agencies regarding the projects. These comments expressed concerns with the proposed location of the pipeline route and the effects of the projects on resources, including, but not limited to waterbodies, wetlands, wildlife, vegetation, threatened and endangered species, property values, homeowners insurance, project safety, blasting, air quality, exportation of natural gas, hydraulic fracturing, cumulative impacts, and alternatives. These issues are addressed in this final EIS. Specific comments regarding the draft EIS, along with our responses, are presented in appendix S of this EIS.

PROJECT IMPACTS AND MITIGATION

Construction and operation of the projects could result in numerous impacts on the environment. We evaluated the impacts of the projects, taking into consideration Constitution's and Iroquois' proposed impact avoidance, minimization, and mitigation measures on geology, soils, groundwater, surface water, wetlands, vegetation, wildlife, fisheries, special status species, land use, visual resources, socioeconomics, cultural resources, air quality, noise, and safety. We based our analysis on field survey data where survey permission was granted. Constitution has field surveyed approximately 534 of 707 land tracts, or about 76 percent of the total number of tracts (approximately 94 miles) along the project route. We used desktop data where survey data was not available. Where necessary, we are recommending additional mitigation to minimize or avoid these impacts. Cumulative impacts of these projects with other past, present, and reasonably foreseeable actions in the projects' area were also assessed. In section 3 of this EIS, we summarize the evaluation of over 400 alternatives to the projects, including the no-action alternative, system alternatives, major and minor route alternatives, and minor route variations.

Based on scoping comments, agency consultations, and our independent evaluation of resource impacts, the major issues identified in our analysis are in regard to waterbodies, wetlands, vegetation including interior forests, wildlife habitat, socioeconomics, and alternatives. Our analysis of these issues is summarized below and is discussed in detail in the appropriate resource sections in sections 3 and 4 of this EIS. Sections 5.1 and 5.2 of this EIS contain our conclusions and a compilation of our recommended mitigation measures, respectively.

Geology and Soils

The primary effect of construction of the projects on geologic resources would be disturbances to steep topographic features found along the construction right-of-way. A well-defined landslide feature was identified in the area of milepost 30.3 of the pipeline route, for which Constitution intended to perform a formal slope stability analysis. However, following issuance of the draft EIS, Constitution proposed a minor route change that would avoid the landslide feature at MP 30.3. Therefore, our recommendation in the draft EIS for a slope stability study is no longer applicable and has been removed.

Constitution performed geotechnical feasibility studies to evaluate subsurface conditions at the sites where specialized crossing methods are proposed for features including wetlands, waterbodies and roads; however, we have not received the results of all of the investigations. Therefore, we are recommending that Constitution provide geotechnical feasibility studies for all trenchless crossing locations.

Flash flooding is a potential hazard in the area of the proposed projects. Constitution would design all waterbody crossings to minimize potential impacts from flash flooding, scouring, and high flow velocities during project operation. There are also several areas where karst topography may be present along the proposed pipeline route. Constitution has not yet indicated whether it would implement all of the listed potential mitigation measures discussed in its environmental reports. Therefore, we are recommending that Constitution implement the above-mentioned mitigation measures for karst terrain.

Constitution's Environmental Inspectors (EIs) and construction crews would be responsible for identifying potential landslide conditions. Constitution would provide a geotechnical specialist if necessary. Due to the specialized nature of identifying landslide areas and Constitution's lack of a firm commitment, we are recommending that Constitution employ a geotechnical expert to identify and develop mitigation measures regarding potential landslide hazards.

The projects would traverse a variety of soil types and conditions. Construction activities associated with the projects, such as clearing, grading, trenching, and backfilling, could adversely affect soil resources by causing erosion, compaction, and introducing excess rock or fill material to the surface, which could hinder the restoration of the disturbed areas. However, Constitution and Iroquois would implement the mitigation measures contained in their respective environmental construction plans to control erosion, enhance successful revegetation, and minimize any potential adverse impacts on soil resources. Such measures include topsoil segregation, temporary and permanent erosion controls, and post-construction restoration and revegetation of construction work areas. Additionally, Constitution and Iroquois would implement their respective spill plans during construction and operation to prevent, contain, and clean-up accidental spills. To further protect soils, we are recommending that Constitution adhere to a maximum allowable rutting depth of 4 inches in agricultural areas and that Constitution consult with the NYSDAM and Constitution's agricultural inspector prior to conducting any agricultural restoration of New York agricultural parcels between October 1 and May 15 to determine soil workability during winter conditions.

Most impacts on soil would be temporary and short-term. Permanent impacts on soils would occur at the aboveground facilities where the sites would be covered with gravel and converted to natural gas facility use. With the implementation of Constitution's state-specific Environmental Construction Plans (ECPs), its *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan), *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures), and Iroquois' Plan as well as our additional recommendations, we concluded that impacts on geological and soil resources would be adequately minimized.

Groundwater, Waterbody Crossings, Water Use, and Wetlands

The proposed pipeline would cross approximately 4 miles of the Clinton Street Ballpark sole source aquifer in Broome County, New York as well as Principal Aquifers, and wellhead protection areas in New York (WHPA). The construction workspaces would be within 150 feet of 2 water monitoring wells, 4 private water wells used for drinking water, and 18 private water supply wells or springs that are not used for drinking water. Constitution has not, however, completed identifying water wells and springs within 150 feet of the proposed pipeline and contractor yards. Therefore, we are recommending that Constitution determine the location of all water wells and springs within 150 feet of the proposed pipeline and aboveground facilities prior to construction. Constitution has agreed to test all water wells within 150 feet of the construction workspace for water quality and quantity prior to and after construction, and provide an alternative water source or a mutually agreeable solution in the event of construction-related impacts.

Construction activities would not significantly impact groundwater resources because the majority of construction would involve shallow, temporary, and localized excavation. These potential impacts would be avoided or further minimized by the use of construction techniques and mitigation described in Constitution's ECPs and Iroquois' Procedures. Constitution and Iroquois would prevent or adequately minimize accidental spills and leaks of hazardous materials during construction and operation by adhering to their spill prevention plans.

The pipeline project would cross a total of 289 surface waterbodies, one of which is considered a major waterbody (greater than 100 feet wide). Constitution is proposing to use trenchless crossing methods for 21 of the crossings, including the major waterbody, and dry crossing methods for the remaining 268 waterbodies. Constitution would use construction techniques that avoid in-stream work. None of the aboveground facilities, including Iroquois' proposed project, would impact waterbodies. Use of trenchless crossing methods to cross waterbodies and implementation of the mitigation measures

outlined in Constitution's ECPs and other project-specific plans would avoid or adequately minimize impacts on surface water resources.

In the draft EIS, we reviewed Constitution's proposed measures and determined that impacts on waterbodies not crossed by the pipeline, but affected by workspaces during construction, should be quantified on a waterbody-specific basis. This information was provided by Constitution in April 2014. Constitution has adjusted its proposed route and extra workspaces in numerous locations to better avoid waterbodies. We have reviewed Constitution's proposed mitigation measures and find them acceptable.

Construction of the Constitution Pipeline Project would impact a total of 95.3 acres of wetlands, including 33.8 acres of forested wetlands, 35.4 acres of herbaceous wetlands, and 26.1 acres of shrub-scrub wetlands. The majority of the project's wetland impacts would be located in temporary workspaces (76.1 acres) and these areas would eventually return to pre-construction conditions following construction. For the operation of the pipeline Constitution would maintain 14.5 acres of previously forested wetlands in a scrub-shrub or herbaceous state. No wetlands would be impacted by construction of Iroquois' proposed project.

Constitution also proposes to permanently fill 0.1 acre of wetlands for the purposes of constructing access roads. In the draft EIS, we asked Constitution to provide us with sufficient detail for these proposed permanent crossings of wetlands, and sufficient justification for the use of permanent fill. This information was provided in April 2014. However, based on our experience with similar projects in similar terrain, we conclude that the use of permanent fill is not justified for access to the permanent right-of-way. Therefore we are recommending that Constitution not permanently fill any waterbodies or wetland for the use of access roads.

Based on the avoidance and minimization measures developed by Constitution, including the ECPs, we conclude that impacts on groundwater, surface water, and wetland resources would be effectively minimized or mitigated, and would be largely temporary in duration. Construction and operation-related impacts on wetlands would be further minimized or mitigated by Constitution's compliance with the conditions imposed by the COE, the Pennsylvania Department of Environmental Protection (PADEP), and the New York State Department of Environmental Conservation (NYSDEC).

Vegetation, Wildlife, Fisheries, and Federally Listed and State-Sensitive Species.

The proposed projects' impacts on vegetation would range from short-term to permanent due to the varied amount of time required to reestablish certain community types, as well as the maintenance of grassy vegetation within the permanent right-of-way and the conversion of aboveground facility locations to non-vegetated areas. The pipeline project would also affect vegetation communities of special concern, including a limestone/calcareous talus slope woodland and large tracts of interior forest. Interior forests are quality habitat for wildlife and migratory birds, and fragmentation of large blocks of interior forest has the potential to effectively disconnect forested tracts. To minimize impacts on interior forest which would account for 439.7 acres during construction and 217.7 acres during operations, Constitution would reduce the construction right-of-way from 110 feet wide to 100 feet wide , where feasible, avoiding impacts on approximately 52 acres of forestlands (forested areas would be subject to 50-foot-wide permanent easement). To further mitigate impacts from fragmentation, we recommended in the draft EIS that Constitution develop an Upland Forest Mitigation Plan prepared in consultation with the applicable federal and state agencies to minimize forest impacts. Based on our recommendation, Constitution proposed compensatory mitigation to offset impacts on interior forests, including allocation of funds for acquisition of lands for conservation and/or restoration, grants for habitat conservation, and long-term management of lands for migratory birds. We are now recommending that Constitution finalize the plan

prior to construction for our written review and approval. Although some impacts would occur on forested lands at the Iroquois site, the adjacent area is already industrially developed.

Invasive plant species are a threat to colonize areas disturbed by construction of the pipeline. Potential impacts from invasive species would be minimized due to rapid revegetation of the right-of-way during restoration, our recommendation that Constitution extend monitoring for invasive species based on FERC staff's inspections, and the recommendation to properly clean maintenance equipment during operations.

The projects would affect wildlife and wildlife habitats along the pipeline route and at the compressor transfer station. These impacts would be temporary, short-term, long-term, or permanent, depending on the habitat type impacted, proposed facility type, as well as the location of that habitat within project workspaces. The proposed project would impact four designated high-quality wildlife areas, including an area of potential timber rattlesnake habitat, two state forests, and an Important Bird Area. We recognize that other areas along the proposed route could contain high quality wildlife habitat. Constitution has routed the pipeline to minimize impacts where possible and would implement its Plan, Procedures, and ECPs to minimize the effects of the project on wildlife and their habitats.

Construction could cause direct and indirect impacts on raptors, including bald eagles, and other migratory birds. Constitution has surveyed, and would continue to survey, for bald eagles at specific locations along the proposed project and has located three nests identified by the agencies, two of which are within 0.5-mile of project areas that may require blasting. We are recommending that Constitution consult with the applicable agencies to complete required surveys, develop mitigation for nests that may be close to areas requiring blasting, and finalize a bald eagle mitigation plan. Constitution would conduct the majority of tree-clearing activities within the U.S. Fish and Wildlife Service's (FWS) recommended clearing window for the protection of migratory birds. As noted above, we are recommending that Constitution finalize its draft Upland Forest Mitigation Plan that would specifically address impacts on migratory bird habitat (in addition to forested areas) for forest lands that would be cleared outside of the FWS-recommended clearing window.

As noted above, the pipeline project would cross 289 waterbodies, most of which are classified as coldwater fisheries; 118 support trout populations. Schoharie Creek, the only warmwater fishery that would be crossed by the pipeline project, contains potential habitat for the state-listed yellow lampmussel. Constitution indicated that it would cross all fisheries of special concern, including trout fisheries and Schoharie Creek within state-designated dates for crossing windows. In addition, Constitution would use a dry crossing method for all waterbodies, which would avoid in-stream construction, and allow flow to be maintained, and minimize downstream sedimentation and turbidity. There are no aquatic habitats present at the proposed compressor transfer station site. No in-water blasting is expected to be required for any of the pipeline crossings. However, if it is later determined that in-water blasting is required, Constitution would develop a detailed in-water blasting plan that complies with state-specific regulations and permit conditions. We are recommending that Constitution provide the FERC with any site-specific blasting plans that include protocols for in-water blasting and the protection of aquatic resources and habitats.

Constitution and Iroquois would use surface water and municipal sources totaling approximately 22.7 million gallons for hydrostatic testing. Constitution proposes to use five waterbodies as sources of hydrostatic test water, all of which contain sensitive fisheries: Starrucca Creek in Pennsylvania, and Oquaga, Ouleout, Kortright, and Schoharie Creeks in New York. The Pennsylvania Fish and Boat Commission (PFBC) approved the withdrawal of water from Starrucca Creek but requested that water not be withdrawn between March 1 and June 15, which could be outside of Constitution's proposed water withdrawal window of December through March. Constitution has not received approval for water

withdrawal from the NYSDEC, nor has Constitution verified whether water withdrawals would be subject to the in-stream work windows, where applicable. Therefore, we are recommending that Constitution commit to withdrawing water within the PFBC recommended in-stream work window or provide the results of additional coordination with the PFBC. In addition, we are recommending that Constitution file written approval from the NYSDEC allowing water withdrawals, as well as listing any timing restrictions that would be placed on withdrawals at those locations.

Based on Constitution's consultations with the FWS and our review of existing records, four federally listed threatened or endangered species are potentially present in the vicinity of the pipeline project, but no critical habitat has been designated for these species in the project area. We are requesting that the FWS consider this EIS as the Biological Assessment for the projects. We have determined that construction and operation of the project in accordance with the applicant's proposed measures and our recommendations, is not likely to adversely affect the federally listed Indiana bat, dwarf wedgemussel, and Northern monkshood. We have determined that the proposed project would have no effect on the threatened bog turtle. In addition, we are recommending that Constitution not begin construction until all remaining surveys and consultations with the applicable federal and state agencies are complete, and it has received written notification from the Director of OEP. No federally listed threatened or endangered species would be affected by Iroquois' project. The northern myotis, a bat species proposed to be listed as endangered by the FWS, is found within the project area. We have included a recommendation that Constitution develop a site-specific bat tree clearing plan that includes potential impact avoidance, minimization, or mitigation measures, in anticipation that the species becomes officially listed in 2015.

Twenty-two additional species are state listed as threatened, endangered, or candidate species, or were noted by the applicable state agencies as being of special concern. We are recommending that Constitution develop appropriate mitigation for special-status bat species that were encountered during species-specific surveys. In addition, we are recommending that Constitution submit the remaining surveys for state-listed species that may be present in the pipeline project workspaces. In consideration of these recommendations, as well as those described above for the bald eagle, we concluded that impacts on state sensitive species would be avoided or adequately minimized.

Land Use and Visual Resources

Construction of the proposed projects would impact a total of 1,871.5 acres. Approximately 89 percent of this acreage would be utilized for the pipeline facilities, including the construction right-of-way (83.3 percent) and extra workspaces (5.9 percent). The remaining acreage is associated with contractor yards (5.4 percent), access roads (4.3 percent), and aboveground facilities (1.1 percent). Following construction, lands outside of the permanent right-of-way, extra workspace areas, contractor yards, and temporary access roads would be allowed to revert to their original land use type. The primary land use types impacted during construction would be forested/woodland (55.0 percent) and agriculture (23.3 percent). Open water, open land, industrial/commercial and residential make up the remaining 16.3 percent of land types.

Operation of the projects would permanently affect 761.5 of the 1,871.5 acres impacted during construction. The easement for the new permanent pipeline right-of-way would account for 711.0 acres, or 93.3 percent of the acreage. The remaining 50.5 acres (6.6 percent) are associated with aboveground facilities (including 4.5 acres for Iroquois' project) and permanent access roads.

Currently we have identified six residences and an occupied pool house that would be within 50 feet of Constitution's proposed construction work area. Three of them would be within 25 feet of the proposed work area. To limit the distance between construction and the residences, Constitution developed site-specific construction plans for them. To reduce impacts of construction, we are

recommending that Constitution more accurately classify currently unsurveyed structures, and also prepare an updated site-specific plan regarding potential impacts on a septic field located within the proposed work area.

No planned developments in Pennsylvania are within 0.5 mile of the pipeline project. In New York, four planned projects were identified as being within 0.5 mile of the pipeline project. Constitution incorporated several route variations into its proposed pipeline route to minimize or avoid impacts on the planned developments.

In general, impacts on recreational and special interest areas, including two New York State Forests, would be temporary (several days to several weeks in any one area). The pipeline project would cross 7 tracts of land supporting specialty crops as well as 33.4 miles within agricultural districts. Constitution has committed to continuing coordination with landowners to avoid and minimize impacts on specialty crops, including the use of minor route re-alignments to avoid sensitive areas. Where impacts on specialty crops cannot be avoided, Constitution would implement special construction procedures in accordance with its ECPs. Based on our recommendation in the draft EIS, Constitution committed to the use of organic straw/hay for mulch on certified organic agricultural lands.

Visual resources along the proposed pipeline route are a function of geology, climate, and historical processes, and include topographic relief, vegetation, water, wildlife, land use, and human uses and development. A portion of the pipeline (about 9 percent) would be installed within or parallel to existing pipeline and/or utility rights-of-way. As a result, the visual resources along this portion of the project have been previously affected by other similar activities. Impacts in other areas would be greatest where a conversion from forested land to a grassy, maintained right-of-way would occur, particularly at viewing locations such as roadways. We conclude that these visual impacts, however, would not be considered significant overall. Additionally, the proposed communication towers could impact the viewshed in five locations and we have included a recommendation that Constitution further assess these areas after construction and implement mitigation measures if necessary. Due to the location of the proposed compressor transfer station in an existing industrial setting surrounded by in part by forest land, it is anticipated that visual impacts on nearby visual receptors during operation would be permanent but negligible.

Socioeconomics

The primary socioeconomic impacts of the pipeline project include population effects associated with the influx of construction workers and the impact of these workers on public services and temporary housing during construction. Secondary socioeconomic effects include increased sales and property tax revenue, job opportunities, income associated with local construction employment, increased vehicle traffic, and impacts on roads.

We received comments regarding the effect of the project on property values, mortgages, and insurance policies. We determined that the project would not negatively affect property values, and subsequently the ability of an individual to obtain a mortgage. We researched the topic of homeowners and title insurance policies and conducted our own interviews with regional experts, where possible. Some experts would not authorize us to use them as references and others were unwilling to provide their professional opinion. The real potential for these impacts is unclear and would likely be highly variable. To address the insurance issue we are recommending that Constitution document any property insurance issues and describe efforts to coordinate with the affected landowners to mitigate impacts.

Construction of the projects would result in minor positive impacts due to increases in construction jobs, payroll taxes, purchases made by the workforce, and expenses associated with the

acquisition of material goods and equipment. Operation of the projects would have a minor to moderate positive effect on the local governments' tax revenues due to the increase in property taxes that would be collected.

Cultural Resources

Constitution conducted archival research and walkover surveys of the area of the proposed project to identify historic aboveground resources and locations for additional subsurface testing in areas with potential for prehistoric and historic archaeological sites. Constitution identified 138 historic aboveground resources within the area of direct impact for the proposed pipeline route. Of those, we have determined that 15 of these historic aboveground resources are eligible for listing in the National Register of Historic Places (NRHP). Two of the 15 NRHP-eligible resources would be adversely affected by the proposed pipeline. Constitution would implement measures to avoid, minimize, or mitigate any anticipated adverse effects on eligible historic aboveground resources as part of the ongoing process to comply with Section 106 of the National Historic Preservation Act.

Twenty-six archaeological sites and 17 stone pile sites would be located within the proposed pipeline construction right-of-way, one archaeological site would be located in the area of potential impact at a proposed contractor yard, and one cemetery would be within a proposed access road corridor. Constitution has recommended 17 archaeological sites that would be impacted by its project as potentially eligible for listing in the NRHP, and the New York Office of Parks, Recreation and Historic Preservation has requested further data for three sites that Constitution recommended as not eligible. If the FERC determines that any of these sites are eligible for listing, Constitution would either modify the project to avoid impacts or provide suitable mitigation. Iroquois identified a single archaeological site during its survey. The FERC has determined that the site is not eligible for listing in the NRHP, so no avoidance or mitigation would be necessary.

We consulted with federally recognized Native American tribes (15 associated with Constitution's project and 10 associated with Iroquois' project) and three tribes that are not federally recognized to provide them an opportunity to comment on the proposed projects. Several tribes and organizations requested additional consultation or information, but none have provided comments on the projects.

To ensure that our responsibilities under Section 106 of the National Historic Preservation Act are met, we are recommending that the Applicants not begin construction until any additional required surveys are completed, survey reports and treatment plans (if necessary) have been reviewed by the appropriate parties, and we provide written notification to proceed.

Air Quality and Noise

Air quality impacts associated with construction of the projects would include emissions from fossil-fueled construction equipment and fugitive dust. Such air quality impacts would generally be temporary and localized, and are not expected to cause or contribute to a violation of applicable air quality standards.

Emissions generated during operation of Constitution's project would be minimal, limited to emissions from maintenance vehicles and equipment and fugitive emissions. Operation of the new turbines at the compressor transfer station would result in the existing Wright Compressor Station becoming a "major source" of greenhouse gas emissions requiring a Title V application and permit at start-up of the new compressors. Because Title V is only required for greenhouse gas emissions, the

proposed turbines would still be permitted and regulated as "minor sources" and "minor modifications" with regard to emission controls and other requirements.

Most of the project area is in attainment for criteria pollutants. Extensions of the construction schedule past the estimated 9 months may result in increases in construction emissions that would exceed the general conformity applicability threshold. However, because the projects' emissions are conservatively estimated at only 70 percent of the applicability threshold, we conclude that a Construction Emission Plan is not needed.

Noise would be generated during construction of the pipeline and aboveground facilities for both projects. Construction activities in any one area would typically last from several days to several weeks on an intermittent basis. Construction equipment would be operated on an as-needed basis during this period, and would not be expected to exceed the FERC's noise standard of 55 decibels on a A-weighted scale – day/night average (dBA-L_{dn}) at the nearest noise sensitive areas (NSAs). However, we are recommending that Constitution provide a revised acoustical analysis for each of its Direct Pipe installations and develop a site-specific noise mitigation plan for each installation that would result in a 10 dB increase at the nearest NSA.

Some noise would be generated by the operation of Constitution's M&R Stations and Iroquois' facility. An acoustical analysis was completed to identify the estimated combined noise impacts on the nearest NSAs from both the Westfall Road M&R station and Iroquois' compressor station. The results of the acoustical analysis demonstrate compliance with the FERC's noise standard of 55 dBA (L_{dn}). However, to ensure that the actual noise levels produced by the compressor station facilities, we are recommending that Iroquois submit noise surveys and add noise mitigation until noise levels are below our acceptable thresholds.

Implementation of Constitution's and Iroquois' proposed measures such as acoustical enclosures and absorptive noise barriers as well as our additional recommendations would adequately minimize air and noise-related impacts associated with the projects.

Reliability and Safety

The pipeline and aboveground facilities associated with the proposed projects would be designed, constructed, operated, and maintained to meet the Department of Transportation's (DOT) Minimum Federal Safety Standards in 49 CFR 192 and other applicable federal and state regulations. These regulations include specifications for material selection and qualification; minimum design requirements; and protection of the pipeline from internal, external, and atmospheric corrosion.

The Applicants would also perform integrity risk assessments of the facilities, which would be instrumental in early detection of leaks and would reduce the likelihood for pipeline failure. The Applicants' representatives would meet with the emergency services departments of the municipalities and counties along the proposed pipeline facilities on an ongoing basis as part of their liaison programs. The Applicants would provide these departments with emergency contact information and verbal, written, and mapping descriptions of the pipeline systems. This liaison program would identify the appropriate fire, police, and public officials and the responsibilities of each organization that may respond to a gas pipeline emergency, and coordinate mutual assistance in responding to emergencies.

We conclude that the Applicants' implementation of the above measures would protect public safety and the integrity of the proposed facilities.

Cumulative Impacts

Three types of projects (past, present, and reasonably foreseeable projects) could potentially contribute to a cumulative impact when considered with the proposed projects. These projects include Marcellus Shale development (wells and gathering systems); natural gas facilities that are not under the Commission's jurisdiction; other FERC jurisdictional natural gas pipelines; and unrelated actions such as residential or industrial developments, transportation projects, wind farms, and utility lines. The region of influence for cumulative impacts varied depending on the resource being discussed. Specifically, we included minor projects located within 0.25 mile of the proposed area for both Constitution and Iroquois' projects; major projects located within 10 miles of the proposed area for both projects; major projects located within watersheds crossed by the proposed projects; and projects with potential to result in longer term impacts on air quality located within an air quality control region crossed by the proposed projects.

We received numerous comments about the cumulative impacts associated with development of natural gas reserves in the Marcellus Shale and hydraulic fracturing. In Pennsylvania, the permitting of upstream facilities associated with the development of the Marcellus Shale is under the jurisdiction of the PADEP Bureau of Oil and Gas Management. The PADEP has developed Best Management Practices for the construction and operation of upstream oil and gas production facilities. Further, the PADEP and the Susquehanna River Basin Commission have recently enacted regulations to specifically protect surface and groundwater resources from potential impacts associated with the unconventional development of the Marcellus Shale. Development of the Marcellus Shale is expected to continue in proximity to and during construction and operation of portions of the pipeline project in Pennsylvania (hydraulic fracturing is currently prohibited in New York). Our cumulative impacts assessment was updated to provide an estimate of the number of wells needed to provide the capacity of the proposed projects.

Our cumulative impacts assessment was also updated to assess cumulative impacts related to Tennessee Gas Pipeline Company's Northeast Energy Direct (NED) Project. The NED Project would involve upgrading its existing pipeline system in New York, Pennsylvania, Massachusetts, New Hampshire, and Connecticut to provide 2.2 billion cubic feet of natural gas per day to the New England area. As currently proposed by Tennessee Gas Pipeline Company, portions of the NED Project would be collocated with Constitution's pipeline for portions of its route.

Impacts associated with the proposed projects in combination with other projects such as residential developments, wind farms, utility lines, and transportation projects, would be relatively minor overall. We have included recommendations in the EIS to further reduce the environmental impacts associated with Constitution's and Iroquois' projects, as summarized in section 5.2. Additionally, Constitution selected a route that collocates with existing rights-of-way where feasible. Therefore, we conclude that the cumulative impacts associated with the Constitution and Iroquois projects, when combined with other known or reasonably foreseeable projects, would be effectively limited.

ALTERNATIVES CONSIDERED

The no-action alternative was considered for the projects. While the no-action alternative would eliminate the environmental impacts identified in this EIS, the user markets would be denied the projects' objective of delivering 650,000 Dth/d of natural gas from existing supplies in Susquehanna County, Pennsylvania to markets in New York and New England. This might result in greater reliance on alternative fossil fuels, such as coal or fuel oil, or both. We also considered energy conservation and efficiency, and other energy source alternatives (including renewable energy sources). Other fossil fuels are not as clean as natural gas, and renewable sources such as solar and wind power are not always reliable or available in sufficient quantities to support market requirements. We concluded that the no

action alternative, energy efficiency, and other sources of energy were not viable alternatives to the proposed projects in the required timeframe.

Any system alternative for the projects would need to be able to transport similar volumes of natural gas to the vicinity of the existing Wright compressor station or to the ultimate market destinations of New York and New England. We did not identify any existing pipeline systems that could meet the purpose and need of the projects without expansion. Based on our knowledge of other systems, construction and operational impacts associated with system alternatives would be similar to or greater than those of the proposed projects due to the amount of looping and new construction required to connect the systems to the projects' origin and terminus. Consequently, no system alternatives were identified that are environmentally preferable to the proposed projects.

After issuance of the draft EIS, we became aware of another possible project being considered by Iroquois, the South-to-North (SoNo) Project which has not yet been filed with the Commission and would involve reversing the flow of natural gas on parts of its system. If Iroquois pursues the SoNo project and it is approved, then portions of gas supplied to Iroquois could be displaced to other parts of its system. While the gas supplied by Constitution could be displaced to the northern parts of Iroquois' system, the capacity created by the Constitution project would still be realized.

We evaluated two major route alternatives to the proposed pipeline's route. Neither of these major route alternatives offered a significant environmental advantage over the proposed route. Therefore, we eliminated them from further consideration. We also evaluated 20 minor route alternatives relative to Constitution's proposed route. Although they can extend for several miles, minor route alternatives typically deviate from the proposed route less substantially than major route alternatives. Minor route alternatives are often designed to avoid larger environmental resources or engineering constraints, and typically remain within the same general area as the proposed route. Based on consultations with landowners, resource agencies, municipal governments, field review, and impact assessment, Constitution fully incorporated nine minor route alternatives and partially incorporated two additional minor route alternatives into its proposed route as a result of input during both the pre-filing and certificate application review of its project. These changes were adopted primarily to increase collocation with existing utilities, avoid or minimize impacts on natural resources, reduce or eliminate safety and constructability concerns, and/or avoid or minimize conflicts with existing or proposed residential land uses.

Constitution indicated that it had assessed numerous minor route variations over the course of project development and that over 50 percent of its proposed route had changed due to incorporation of alternatives or variations since the project was introduced during the pre-filing process in May 2012. Following issuance of the draft EIS, Constitution adopted 76 more minor route variations into its proposed route. The reasons for the minor route variations were numerous and varied, but included justifications such as accommodation of landowner concerns, avoidance of buildings or cultural resources, resolution of construction or engineering issues, and minimization of impacts on springs, waterbodies, and wetlands.

We also reviewed numerous other stakeholder-reported issues and found that 15 minor route variations and/or modifications in construction method could reduce or eliminate impacts on site-specific resources. Therefore, we are recommending that Constitution adopt there is minor route variations and/or modifications.

We also evaluated the locations of the proposed pipeline's aboveground facilities to determine whether environmental impacts would be reduced or mitigated by the use of alternative facility sites. We did not identify any alternative sites that would offer a significant environmental advantage to the

proposed sites for these facilities. Alternative locations for the proposed compressor transfer station included six parcels in the vicinity of the existing Wright Compressor Station along Westfall Road or Barton Hill Road. While these parcels were potentially viable alternative sites, locating the proposed compressor transfer station within the existing parcel owned by Iroquois and already containing a compressor facility would have numerous environmental advantages. For these reasons, we concluded that construction of the compressor transfer station on the existing Iroquois parcel was preferable to construction on a previously non-developed site.

MAJOR CONCLUSIONS

We determined that construction and operation of the projects would result in limited adverse environmental impacts. This determination is based on a review of the information provided by Constitution and Iroquois and further developed from environmental information requests; field reconnaissance; scoping; literature research; alternatives analyses; and contacts with federal, state, and local agencies, and other stakeholders. We conclude that the approval of the projects would have some adverse environmental impacts, but these impacts would be reduced to less-than-significant levels. Although many factors were considered in this determination, the principal reasons are:

- Constitution would minimize impacts on natural and cultural resources during construction and operation of its project by implementing its Plan and Procedures; Soil Protection and Subsoil Decompaction Mitigation Plan; HDD Contingency Plan; Special Crop Productivity Monitoring Procedures; Unanticipated Cultural and Paleontological Resources and Human Remains Discovery Plan; Seeding, Fertilizing, and Lime Recommendations for Gas Pipeline Right-of-Way Restoration in Farmlands; Unanticipated Discovery of Contamination Plan; Spill Plan for Oil and Hazardous Materials; Blasting Plan; Invasive Species Management Plan; Winter Construction Plan; Organic Farm Protection Plan; Migratory Bird and Upland Forest Plan, and Karst Mitigation Plan.
- Iroquois would minimize impacts on natural and cultural resources during construction and operation of its project by implementing its Plan and Procedures; Spill Prevention, Containment, and Countermeasure Plan; and Unanticipated Cultural Resource Discovery Plan.
- We would complete Endangered Species Act consultations with the FWS prior to allowing any construction to begin.
- We would complete the process of complying with Section 106 of the National Historic Preservation Act and implementing the regulations at 36 CFR 800 prior to allowing any construction to begin.
- Constitution would use trenchless crossing methods for several waterbodies and wetlands, would cross other waterbodies using dry crossing methods, and would be required to obtain applicable permits and provide mitigation for unavoidable impacts on waterbodies and wetlands through coordination with the COE, the PADEP, and the NYSDEC.
- We are recommending that Constitution finalize its Migratory Bird and Upland Forest Plan.
- We are recommending that Constitution develop a property owner insurance tracking and mitigation plan.

- Our oversight of an environmental inspection and mitigation monitoring program that would ensure compliance with all mitigation measures that become conditions of the FERC authorizations and other approvals.

In addition, we developed site-specific mitigation measures that Constitution should implement to further reduce the environmental impacts that would otherwise result from construction of its project. We determined that these measures are necessary to reduce adverse impacts associated with the project, and in part, are basing our conclusions on implementation of these measures. Therefore, we are recommending that these mitigation measures be attached as conditions to any authorization issued by the Commission. These recommended mitigation measures are presented in section 5.2 of the final EIS.

1.0 INTRODUCTION

On June 13, 2013, Constitution Pipeline Company, LLC[1] (Constitution) and Iroquois Gas Transmission System, L.P. (Iroquois); filed applications with the Federal Energy Regulatory Commission (Commission or FERC) under Section 7(c) of the Natural Gas Act (NGA) and Part 157 of the Commission's regulations to construct, install, own, operate, and maintain certain interstate natural gas pipeline facilities in Pennsylvania and New York. Constitution and Iroquois are seeking Certificates of Public Convenience and Necessity (Certificate), and were assigned Docket Nos. CP13-499-000 and CP13-502-000, respectively, for their applications, respectively. We issued a *Notice of Application* for each project on June 26, 2013, which were noticed in the *Federal Register* on July 2, 2013.

Constitution's proposal, referred to as the Constitution Pipeline Project, would involve the construction and operation of 124.4 miles of new 30-inch-diameter natural gas pipeline and associated equipment and facilities in Pennsylvania and New York. Constitution also proposes to construct and operate two new metering and regulating (M&R) stations; two tie-ins, 11 mainline valves (MLVs); and install one pig[2] launcher and one receiver at the M&R stations.

Iroquois' proposal, referred to as Iroquois' Wright Interconnect Project (or proposed compressor transfer station), would involve the construction and operation of the Constitution Transfer Station adjacent to the existing Wright Compressor Station; modifications to the existing Wright Compressor Station; installation of additional odorization pumps; upsizing of gas piping and measurement controls; and construction of an interconnect with Constitution's pipeline.

As part of their applications, Constitution and Iroquois originally proposed an in-service date of March 2015. However, we acknowledge this date is no longer feasible. Constitution has proposed to start construction in February of 2015 and continue through the end of 2015. The construction start date is dependent on: 1) Commission approval of the projects (which has not been given, and the timing of which cannot be presumed); 2) the applicants receiving all federal authorizations; and 3) the applicants meeting all pre-construction conditions of an Order. The applicants would request to place the facilities into service following a determination that restoration is proceeding satisfactorily. We expect an in-service request would follow shortly after the end of construction. The proposed facilities for both projects and their schedules are described in detail in section 2.0.

The vertical line in the margin identifies text that has been modified in this final EIS and differs materially from the corresponding text in the draft EIS.

The environmental staff of the FERC has prepared this final Environmental Impact Statement (EIS) to assess the environmental impacts associated with the construction and operation of the facilities proposed by Constitution and Iroquois in accordance with the requirements of the National Environmental Policy Act (NEPA). The U.S. Environmental Protection Agency (EPA), the U.S. Army Corps of Engineers (COE), the Federal Highway Administration (FHWA), and the New York State Department of Agriculture and Markets (NYSDAM), are participating as cooperating agencies in the

[1] Jointly owned by Williams Partners Operating, LLC; Cabot Pipeline Holdings, LLC; Piedmont Constitution Pipeline Company, LLC; and Capital Energy Ventures Corporation.

[2] A pig is an internal tool that can be used to clean and dry a pipeline and/or to inspect it for damage or corrosion.

preparation of the EIS.[3] The roles of the FERC and the cooperating agencies in the review process for both projects are described in section 1.2.

1.1 PROJECT PURPOSE AND NEED

According to Constitution, the proposed pipeline project was developed in response to market demands in New York and the New England area, and due to interest from shippers that require transportation capacity from Susquehanna County, Pennsylvania to the existing Tennessee Gas Pipeline Company LLC (TGP) systems in Schoharie County, New York. While this EIS will briefly discuss the Applicants' purpose, it will not determine whether the need for the projects exists, as this will later be determined by the Commission.

Based on information provided by Constitution and Iroquois, the purpose of the proposed projects is to:

- deliver up to 650,000 dekatherms per day[4] (Dth/d) of natural gas supply from Susquehanna County, Pennsylvania to the interconnect with the TGP and Iroquois systems at the existing Wright Compressor Station;
- provide new natural gas service for areas currently without access to natural gas;
- expand access to multiple sources of natural gas supply, thereby increasing supply diversity and improving operational performance, system flexibility, and reliability in the New York and New England market areas;
- optimize the existing systems for the benefit of both current and new customers by creating a more competitive market, resulting in enhanced market competition, reduced price volatility, and lower prices; and
- provide opportunities to improve regional air quality by utilizing cleaner-burning natural gas in lieu of fuel oil in existing and future residential, commercial, and industrial facilities, thereby reducing greenhouse gas (GHG) emissions and other pollutants.

As noted in the second bullet above, Constitution has identified that the proposed pipeline could provide natural gas service to nearby municipalities that do not currently have access to natural gas. According to Leatherstocking Gas Company, LLC (Leatherstocking), Leatherstocking has entered into a Memorandum of Understanding with Constitution, which would allow Leatherstocking to interconnect with Constitution's pipeline at several delivery points (Leatherstocking 2013). In March 2014, Leatherstocking announced plans to install four delivery taps in Delaware, Otsego, and Susquehanna Counties and one tap to provide service to the Amphenol Aerospace Plant in Sidney, New York (Leatherstocking 2014). Specific tap locations are not available. Leatherstocking would then be able to deliver gas from Constitution's pipeline to homes and businesses within communities in Pennsylvania and New York. In New York, the Town of Bainbridge, the Village of Windsor, the Town of Windsor, the

[3] A cooperating agency has jurisdiction by law or special expertise with respect to environmental impacts involved with the proposal and is involved in the NEPA analysis.

[4] A dekatherm is a unit of heating value often used by natural gas companies instead of volume for billing purposes. A dekatherm is equivalent to 10 therms or one million British thermal units. For conceptualization purposes only, a natural gas capacity of 650,000 Dth/d would be sufficient to power roughly 6.2 million homes annually (if it were used solely for residential energy production). This estimate assumes an average household energy consumption of 11,000 kilowatt hours per year. If these projects are approved, the natural gas could be used in a variety of applications, not solely for residential energy generation.

Village of Bainbridge, the Town of Unadilla, the Village of Unadilla, the Town of Sidney, the Village of Sidney, and the Village of Delhi have granted Leatherstocking approvals for the opportunity to serve their communities (Leatherstocking 2013). Leatherstocking would evaluate the need for gas in these communities and construct the necessary infrastructure as part of the New York State Department of Environmental Conservation's (NYSDEC) permitting process for natural gas gathering and local distribution lines and could be subject to other processes including review by the COE for impacts on waters of the United States.

In March 2012, Constitution executed binding precedent agreements[5] for the entire proposed 650,000 Dth/d or about 0.65 billion cubic feet per day of additional firm transportation capacity. Prior to executing these agreements, the shippers typically already have the production capacity in place to supply the full volumes for the project. As a result, the proposed pipeline is fully subscribed. Table 1.1-1 lists Constitution's shippers by contracted volumes. The non-jurisdictional facilities associated with the delivery of the proposed volumes are discussed in sections 1.4 and 4.13.

TABLE 1.1-1
Constitution Pipeline Project Precedent Agreements

Shipper	Maximum Daily Transportation Quantity (Dth/d)
Cabot Oil & Gas Corporation	500,000
Southwestern Energy Services Company	150,000
Total Volume Contracted	**650,000**

The purpose of Iroquois' project is to provide 650,000 Dth/d of leased firm capacity of natural gas from the terminus of Constitution's project in Wright, New York to downstream customers in Iroquois' existing system through the addition of system compression, interconnections (including TGP), and other necessary infrastructure. In addition, Iroquois' proposed compressor transfer station has rendered Constitution's originally planned greenfield[6] compressor station unnecessary. This is discussed in detail in section 3.5.

We received several comments on the draft EIS questioning our acceptance of the applicants' stated purpose. The Commission does not direct the development of the gas industry's infrastructure regionally or on a project-by-project basis, or re-define an applicant's stated purpose. The Commission analyzes the applicant's filed application and stated purpose in order to disclose the impacts resulting from the proposed action to inform the decisionmakers.

We also received comments on the draft EIS requesting additional information regarding need of the projects and whether it serves the public convenience and necessity. A project's need is established by the FERC when it determines whether a project is required by the public convenience and necessity, i.e., the Commission's decision is made. The FERC's Certificate Policy Statement provides guidance as to how the Commission evaluates proposals for new construction, as discussed below, 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 does not make that determination.

[5] A precedent agreement is a binding contract under which one or both parties has the ability to terminate the agreement if certain conditions, such as receipt of regulatory approvals, are not met.

[6] Greenfields are lands that do not contain existing utility rights-of-way.

The Commission's analysis of whether a proposed project is required by the public convenience and necessity consists of three steps. The Commission's Statement of Policy on the Certification of New Interstate Natural Gas Pipeline Facilities[7] explains that in deciding whether to authorize the construction of major new pipeline facilities, the Commission must first balance the public benefits against the adverse effects on specific economic interests. If the conclusion is that the public benefits would not outweigh the adverse effects on the economic interests, the Commission will deny the proposal. If, however, the conclusion that the public benefits do outweigh the adverse effects on the economic interests, the Commission next takes a "hard look" at potential environmental impacts of the proposed action under the requirements of the NEPA. If the Commission finds the potential environmental impacts to be unacceptable, it will deny authorization. If, however, the Commission determines that, based on the environmental analysis, market analysis, evaluation of rates, engineering analysis, and consideration of all comments submitted, the proposed project can be constructed and operated in an environmentally acceptable manner, the Commission will issue an Order that finds the project is required by the public convenience and necessity. That order will contain the environmental conditions the Commission deems necessary and appropriate to ensure acceptable mitigation of potential environmental harms.

In summary, if the Commission finds the proposed projects to be environmentally unacceptable based on Commission staff-prepared NEPA documents, the Commission will not approve the projects. If the Commission finds the projects to be environmentally acceptable based on the NEPA documents, as well as market analysis, evaluation of rates, and engineering analysis, the Commission will approve it, typically with conditions, provided it is otherwise required by the public convenience and necessity.

1.2 PURPOSE AND SCOPE OF THE EIS

Our [8] principal purposes for preparing the EIS are to:

- identify and assess the potential impacts on the natural and human environment that would result from the implementation of the proposed projects;
- describe and evaluate reasonable alternatives to the proposed projects that would avoid or substantially lessen adverse effects of the projects on the environment while still meeting the project objectives;
- identify and recommend specific mitigation measures, as necessary, to avoid or minimize environmental effects; and
- encourage and facilitate involvement by the public and interested agencies in the environmental review process.

The topics addressed in the EIS include alternatives; geology; soils; groundwater; surface waters; wetlands; vegetation; wildlife and aquatic resources; special status species; land use, recreation, special interest areas and visual resources; socioeconomics; cultural resources; air quality and noise; reliability and safety; and cumulative impacts. The EIS describes the affected environment as it currently exists based on available information, discusses the environmental consequences of the proposed projects, and compares the projects' potential impact to that of various alternatives. The EIS also presents our conclusions and recommended mitigation measures.

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

[8] "We," "us," and "our" refer to the environmental staff of the FERC's Office of Energy Projects.

Our description of the affected environment is based on a combination of data sources including desktop resources such as scientific literature and regulatory agency reports as well as field data collected by Constitution and Iroquois. Constitution has field surveyed approximately 534 of 707 land tracts, or about 76 percent of the total number of tracts (approximately 94 miles) along the project route. Completion of field surveys is primarily dependent upon acquisition of survey permission from landowners. If the necessary access cannot be obtained through coordination with landowners and the proposed projects are certificated by FERC, Constitution may use the right of eminent domain granted to it under Section 7(h) of the NGA to obtain a right-of-way. Therefore, if the projects are Certificated by the Commission, then it is likely that a substantial number of the outstanding surveys for Constitution's project (and associated agency permitting) would have to be completed after issuance of the Certificate. Iroquois' project would occur entirely upon land owned by Iroquois, and field surveys for the parcel have been completed.

1.2.1 Federal Energy Regulatory Commission

The FERC is the federal agency responsible for evaluating applications filed for authorization to construct and operate interstate natural gas pipeline facilities. If the Commission determines that a project is required by the public convenience and necessity, Certificates would be issued under 7(c) of the NGA and Part 157 of the Commission's regulations. The Commission bases its decision on not only environmental impact, but also technical competence, financing, rates, market demand, gas supply, long-term feasibility, and other issues concerning a proposed project. As such, the FERC is the lead federal agency for the preparation of this EIS in compliance with the requirements of NEPA, the Council on Environmental Quality (CEQ) regulations for implementing the procedural provisions of NEPA (Title 40 Code of Federal Regulations [CFR] Parts 1500-1508), and the FERC's regulations implementing NEPA (18 CFR 380).

As the lead federal agency for the projects, the FERC is required to comply with Section 7 of the Endangered Species Act of 1973 (ESA), the Magnuson-Stevens Fishery Conservation and Management Act, Section 106 of the National Historic Preservation Act (NHPA), and Section 307 of the Coastal Zone Management Act of 1972. These and other statutes have been taken into account in the preparation of the EIS.

We received comments regarding the potential impacts associated with natural gas development activities, including production of natural gas from shale formations. Our authority under the NGA relates only to natural gas facilities that are involved in interstate commerce. The permitting of oil and gas production facilities is under the jurisdiction of various state and federal agencies where those facilities are located. Thus, the facilities associated with the production of natural gas are not under FERC jurisdiction. However, to the extent the review of such facilities are relevant, they are discussed as part of our analysis of cumulative impacts.

1.2.2 U.S. Environmental Protection Agency

The EPA has delegated water quality certifications under Section 401 of the Clean Water Act (CWA) to the Pennsylvania Department of Environmental Protection (PADEP) and the NYSDEC, but the EPA may assume this authority if no state program exists, if the state program is not functioning adequately, or at the request of a state. Water used for hydrostatic testing of pipelines that is point-source discharged into waterbodies requires a National Pollutant Discharge Elimination System permit (Section 402 of the CWA) issued by the state with EPA oversight. In addition, the EPA has the authority to review and veto the COE decisions on Section 404 permits.

The EPA also has jurisdictional authority to control air pollution under the Clean Air Act (CAA) (42 United States Code [USC] Chapter 85) by developing and enforcing rules and regulations for all entities that emit toxic substances into the air. Under this authority, the EPA has developed regulations for major sources of air pollution. The EPA has delegated the authority to implement these regulations to state and local agencies, who are also allowed to develop their own regulations for non-major sources. The EPA also establishes general conformity applicability thresholds, with which a federal agency can determine whether a specific action requires a general conformity assessment.

In addition to its permitting responsibilities, the EPA is required under Section 309 of the CAA to review and publicly comment on the environmental impacts of major federal actions including actions that are the subject of draft and final EISs, and responsible for implementing certain procedural provisions of the NEPA (e.g., publishing the Notices of Availability of the draft and final EISs in the *Federal Register*) to establish statutory timeframes for the environmental review process.

1.2.3 U.S. Army Corps of Engineers

The COE has jurisdictional authority pursuant to Section 404 of the CWA (33 USC 1344), which governs the discharge of dredged or fill material into waters of the United States (including wetlands). Because the COE must comply with the requirements of the NEPA before issuing permits under this statute, it has elected to cooperate in the preparation of the EIS. The COE would adopt the EIS per 40 CFR 1506.3 if, after an independent review of the document, it concludes that its comments and suggestions have been satisfied.

As an element of its review, the COE must consider whether the proposed projects represent the least environmentally damaging practicable alternative pursuant to the CWA Section 404(b)(1) guidelines. The term practicable means available and capable of being done after taking into consideration cost, existing technology, and logistics in light of overall purposes of both projects.

Although this document addresses environmental impacts associated with the proposed projects as they relate to Section 404, it does not serve as a public notice for any of the COE's permits. Constitution filed an application for a Department of the Army Permit under Section 404 of the CWA on August 27, 2013. On March 4, 2014, the COE issued a public notice announcing public hearings and requests for public comments on the proposed projects. The COE participated in FERC's comment meetings to gather information and assist in the review of the permit application for the projects.

1.2.4 Federal Highway Administration

The FHWA is an agency within the U.S. Department of Transportation (DOT) that supports state and local governments in the design, construction, and maintenance of the Nation's highway system on various federally and tribal owned lands. Constitution developed a route alternative (alternative M) which would place the proposed route in and/or adjacent to the right-of-way for Interstate 88 which is managed by the New York State Department of Transportation but receives funding from the FHWA (section 3.4.1.2).

1.2.5 New York State Department of Agriculture and Markets

The NYSDAM is a state agency that works to promote a viable agricultural industry, foster agricultural environmental stewardship, and safeguard the food supply of New York. The NYSDAM has prepared guidance documents for construction of pipelines within agricultural areas. Constitution would adhere to the NYSDAM's guidance for construction within agricultural land.

1.3 PUBLIC REVIEW AND COMMENT

On April 5, 2012, Constitution filed a request with the FERC to implement the Commission's pre-filing process for the Constitution pipeline project. At that time, Constitution was in the preliminary design stage of the project and no formal application had been filed with the FERC. The purpose of the pre-filing process is to encourage the early involvement of interested stakeholders, facilitate interagency cooperation, and identify and resolve issues before an application is filed. On April 16, 2012, the FERC granted Constitution's request and established pre-filing docket number PF12-9-000 to place information related to the pipeline project into the public record. The cooperating agencies agreed to conduct their environmental reviews of the pipeline project in conjunction with the Commission's environmental process.

During the pre-filing process, Constitution held seven informational open houses in July and September 2012. The purpose of the open houses was to provide affected landowners, elected and agency officials, and the general public with information about the pipeline project and to give them an opportunity to ask questions and express their concerns. We participated in the open houses and provided information regarding the Commission's environmental review process to interested stakeholders and to take comments about the proposed pipeline project and the alternatives. The substantive questions and concerns raised by the public at the open houses are addressed in this EIS.

In addition, Constitution established a single point of contact to answer questions and provide information, established a website with information about the pipeline project, and sent periodic update newsletters. Constitution also communicated directly with certain landowners where specific issues were raised regarding individual properties.

On September 7, 2012, the Commission issued a *Notice of Intent to Prepare an Environmental Impact Statement for the Planned Constitution Pipeline Project, Request for Comments on Environmental Issues, and Notice of Public Scoping Meetings.* The notice was published in the *Federal Register* on September 14, 2012 and mailed to more than 2,100 interested parties, including federal, state, and local government representatives and agencies; elected officials; environmental and public interest groups; Native American Tribes; affected property owners; other interested parties; and local libraries and newspapers. The notice briefly described the project and the EIS process, provided a preliminary list of issues identified by us, invited written comments on the environmental issues that should be addressed in the draft EIS, listed the date and location of three public scoping meetings to be held in the area of the project, and established a closing date for receipt of comments of October 9, 2012.

We initially held three public scoping meetings to provide an opportunity for agencies, stakeholders, and the general public to learn more about the proposed pipeline project and participate in the environmental analysis by commenting on the issues to be addressed in the draft EIS. The first meeting was in Afton, New York on September 24, 2012; the second meeting was in Schoharie, New York on September 25, 2012; and the third meeting was in New Milford, Pennsylvania on September 26, 2012. Forty-two people commented at the meeting in Afton, 45 people commented at the meeting in Schoharie, and 14 people commented at the meeting in New Milford. Each meeting was documented by a court reporter, and the transcripts were placed into the public record for Constitution's project.

On October 9, 2012, the Commission issued a *Notice of Public Scoping Meeting and Extension of Scoping Period for the Planned Constitution Pipeline Project.* The notice was published in the *Federal Register* on October 16, 2012 and mailed to more than 3,300 interested parties as noted above. The notice listed the date and location of one additional public scoping meeting to be held in the pipeline project area and extended the closing date for receipt of comments from October 9, 2012 to November 9, 2012. The additional scoping meeting was held on October 24, 2012 in Oneonta, New York at which 70 people

commented. The meeting was documented by a court reporter and the transcript was placed into the public record for Constitution's project.

An interagency meeting in the pipeline project area was held on August 22, 2012, to solicit comments and concerns about Constitution's project from other jurisdictional agencies. The participating (either in person or via teleconference) agencies included the COE, EPA, U.S. Fish and Wildlife Service, (FWS), PADEP, NYSDEC, and NYSDAM.

In addition, during the pre-filing process, we conducted conference calls on an approximately bi-weekly basis with representatives from Constitution and interested agencies to discuss the pipeline project's progress and issues. Summaries of the calls were placed in the public record.

The transcripts of the public scoping meetings, summaries of the bi-weekly conference calls, and all written scoping comments are part of the public record for Constitution's project and are available for viewing on the FERC internet website (http://www.ferc.gov).[9] On February 21, 2013, and October 9, 2013, we issued Project Updates, which outlined the status of the environmental review process and included a summary of the issues identified through the scoping process.

On July 10, 2013, the Commission issued a *Notice of Intent to Prepare an Environmental Impact Statement for the Proposed Wright Interconnect Project and Request for Comments on Environmental Issues.* The notice was published in the *Federal Register* on July 16, 2013 and mailed to 74 interested parties, including federal, state, and local government representatives and agencies; elected officials; environmental and public interest groups; Native American Tribes; affected property owners as defined in the Commission's regulations (i.e., landowners within one-half mile of the compressor transfer station); other interested parties; and local libraries and newspapers.

We issued a *Notice of Availability of the Draft Environmental Impact Statement and Public Comment Meetings for the Proposed Constitution Pipeline and Wright Interconnect Projects* on February 12, 2014. The draft EIS was filed with the EPA, and a formal notice of availability was issued in the Federal Register on February 20, 2014, indicating that the draft EIS was available. The draft EIS was mailed to 3,402 parties, including federal, state, and local agencies; elected officials; Native American tribes; newspaper; public libraries; intervenors; and other interested parties (i.e., affected landowners, miscellaneous individuals, and environmental groups who provided scoping comments or asked to remain on or be added to the mailing list). The distribution list was included as appendix A of the draft EIS. The Federal Register notice established a 45-day comment period on the draft EIS that ended on April 7, 2014. The notice described procedures for filing comments on the draft EIS and how information about the projects could be found on the FERC's website.

We held four public comment meeting during the draft EIS comment period: one in Richmondville, New York on March 31, 2014; one in Oneonta, New York on April 1, 2014; one in Afton, New York on April 2, 2014; and one in New Milford, Pennsylvania on April 3, 2014. The meetings provided interested parties with an opportunity to present oral comments on our analysis of the environmental impacts of the projects as described in the draft EIS. A total of 246 people commented at the meetings. In addition, 630 parties submitted a total of 879 letters in response to the draft EIS. All timely environmental comments on the draft EIS have been addressed in this final EIS. A transcript of each meeting and copies of each written comment are part of the public record for the projects. Our

[9] Using the "eLibrary" link, select "General Search" from the eLibrary menu and enter the docket number excluding the last three digits in the "Docket Number" field (i.e., PF12-9). Be sure to select an appropriate date range.

responses to relevant comments are provided in appendix S of this final EIS. A keyword index is provided at the end of this volume. Substantive changes in the final EIS are indicated by vertical bars that appear in the margins. The changes were made both in response to comments received on the draft EIS and as a result of updated information that became available after the issuance of the draft EIS.

On May 15, 2014, the FERC opened a limited comment period for individuals identified as being crossed by or adjacent to a potential route alternative for the crossing between MPs 114.4 to 115.9. The limited comment period ended on June 4, 2014. On May 29, 2014 the FERC opened a limited comment period for individuals identified as being crossed by or adjacent to potential route alternatives associated with parcel NY-DE-226.000. Eight potential route alternatives were identified in the FERC's notice. The limited comment period ended on June 19, 2014. Our assessment of these route alternatives can be found in section 3.4.3.2.

This final EIS is being mailed to agencies, individuals, and organizations on the mailing list in appendix A, and was filed with the EPA for issuance of a formal public notice of availability in the Federal Register. In accordance with CEQ's regulations implementing NEPA, no agency decision on a proposed action may be made until 30 days after the EPA publishes a notice of availability for this final EIS. However, the CEQ regulations provide an exception to this rule when an agency decision is subject to a formal internal process that allows other agencies or the public to make their views known. In such cases, the agency decision may be made at the same time the notice of this final EIS is published, allowing both periods to run concurrently. Should the Commission issue Constitution and Iroquois a Certificate for the proposed actions, it would be subject to a 30-day rehearing period. Therefore, the Commission could issue its decision concurrently with issuance of the final EIS.

Table 1.3-1 lists the environmental issues that were identified during scoping and indicates the section of the EIS in which each issue is addressed. In addition to the comments received at the public scoping meetings discussed above, nearly 2,130 written comments and nearly 500 motions to intervene were filed with the FERC and place in the public record for the projects. Table 1.3-1 also lists comments that were received after the formal scoping period closed, including the relevant environmental comments raised by individuals requesting to be intervenors in the Commission's proceeding.[10] Additional issues we independently identified are also addressed in the EIS.

Several of the issues identified both during and after the pre-filing process involved alternative pipeline routes prompted by localized resources such as water wells or wetlands, as well as larger resource areas such as aquifers, watersheds, and state parks. These concerns were identified by property owners, stakeholders, the FERC staff, and other agency staff. Many of these alternative routes that avoided sensitive resources were developed early in the process and voluntarily incorporated by Constitution into its proposed route. Given this process, subsequent alternative route comparisons often were not necessary if the resource was avoided or the stakeholder's concerns were otherwise resolved. Other alternative routes, however, both small and large, remained viable throughout the course of the project. Section 3.0 presents our analysis of all the alternatives that were identified since the beginning of our review of these projects in May 2012. This section also discusses the original routes that were

[10] The FERC's *Notice of Application* (for the Constitution pipeline project and the Iroquois project), issued in the *Federal Register* on June 26, 2013, opened the 21-day period for intervention. A total of 477 groups and individuals for the Constitution pipeline project and 11 groups and individuals for the Iroquois project requested intervenor status. Interveners are official parties to the proceeding and have the right to receive copies of case-related Commission documents and filings by other intervenors. Likewise, each intervenor must provide a copy of its filings to the Secretary of the Commission and must send a copy of its filings to all other intervenors. Only intervenors have the right to seek rehearing of the Commission's decision.

discarded in favor of routes voluntarily incorporated by Constitution to reduce impacts on specific resources.

TABLE 1.3-1
Issues Identified and Comments Received During the Scoping Process for the Proposed Projects

Issue/Specific Comment	EIS Section Addressing Comment
General	
Project purpose and need	1.1
Coordination of NEPA reviews by cooperating agencies	1.2
Pre-filing process, its use in project development, agency coordination, landowner notifications and communications, public participation	1.3
Compliance with environmental permits	1.5
Right-of-way width requirements and configurations	2.2.1
Depth of cover	2.3.1
Non-jurisdictional facilities	1.4
Timeframe and schedule for the proposed facilities	2.4
Future project expansion	2.7
Measures to avoid, minimize, and mitigate adverse impacts on the environment	4.0
Development of natural gas reserves in the Marcellus Shale (fracking)	4.13
Exportation of natural gas	1.3
Alternatives	
No-action alternative	3.1
Energy conservation	3.1.1
Non-gas energy alternatives	3.1.2
Consideration of renewable energy alternatives	3.1.2
Use of other natural gas systems	3.2
Consideration of alternative routes to avoid populated areas, planned development, and critical infrastructure	3.4, 3.5, 3.6
Consideration of alternative routes and construction practices to avoid sensitive resources	3.3, 3.4, 3.5, appendix H
Evaluation of a route along the I-88 corridor	3.4.1
Workspace alternatives	2.3, 4.8
Geology	
Potential for seismic activity (earthquakes) or landslides to affect the integrity of the pipeline after construction	4.1.3
Impacts from blasting	4.1.3
Impacts due to construction in karst terrain	4.1.3
Soils	
Erosion and sediment control	4.2.1, 4.2.3, 4.2.4
Contaminated soils	2.3.1, 4.2.2, 4.8.5
Soil compaction	4.2.2

TABLE 1.3-1 (continued) Issues Identified and Comments Received During the Scoping Process for the Proposed Projects	
Issue/Specific Comment	**EIS Section Addressing Comment**
Water Quality and Aquatic Resources	
Storage of hazardous materials and fuel oil, and spill reporting procedures	2.3, 4.3.1, 4.3.2
Impacts on groundwater, existing hydrology, and drinking water supply (including public and private wells)	4.3.1
Dewatering methods and procedures	2.3.1, 2.3.2, 4.2.4,
Waterbody crossing time windows, methods, mitigation, and restoration measures	2.3.2, 4.3.3, 4.6.2, appendix K
Impacts of horizontal directional drill crossings, including inadvertent releases of drilling mud, drilling spoil management and disposal	4.3.3, 4.6.2,
Impacts on the pipeline from a flood event	4.1.3, 4.3.3
Impacts on fishery resources, including coldwater fishery streams	4.6.2
Wetlands	
Impacts on wetlands	4.4.3, appendix L
Restoration of wetlands and wetland mitigation	4.4.5
Vegetation	
Impacts on mature trees, including restoration plans	4.5.3, 4.8.1, appendix M
Revegetation of areas cleared during construction	4.5.5
Plans for invasive species control	4.5.4
Wildlife	
Timing restrictions and compliance with the Migratory Bird Treaty Act	4.6.1
Impacts on wildlife from forest fragmentation/forest edge effect	4.6.1
Impacts on Important Bird Areas	4.6.1
Special Status Species	
Agency coordination and requirements	4.7.1
Evaluation of potential impacts on threatened or endangered species and their habitat	4.7.2, 4.7.3
Land Use	
Impacts on future development plans	4.8.3
Eminent domain and compensation process	4.8.2
Compatibility with state- and federally owned lands	4.8.4
Impacts on existing residences and structures during construction and operation	4.8.3
Impacts on recreational and special interest areas (including agricultural lands and organic farms)	4.8.4
Visual impacts of aboveground facilities	4.8.6
Impacts on landowners from removal of lands from conservation programs with potential tax or penalty implications	4.8.4, appendix O
Impacts on transportation infrastructure (roads, highways, railroads)	2.3.2, 4.9.4, appendix F
Increased impacts on landowners from trespassers and decreased privacy	4.8.3
Impacts on tourism, ecotourism, and businesses which rely on the land	4.8.4, 4.9.2

TABLE 1.3-1 (continued) Issues Identified and Comments Received During the Scoping Process for the Proposed Projects	
Issue/Specific Comment	**EIS Section Addressing Comment**
Socioeconomics	
Employment opportunities for local contractors and laborers and increased tax revenues	4.9.1, 4.9.7
Assessment of and impacts on community public safety resources	4.9.3
Traffic impacts associated with the project	4.9.4
Impacts on Environmental Justice communities	4.9.8
Impacts on homes, businesses, and land values, potential for increased taxes and lowered property values	4.9.5, 4.9.7
Impacts on mortgage rates	4.9.5
Impacts on ability to obtain and afford homeowner's insurance	4.9.6
Cultural Resources	
Tribal consultation and impacts on tribal lands and areas of cultural importance to Native American tribes	4.10.1
Impacts on culturally and historically significant properties	4.10.4
Air Quality	
Consistency with the emissions limits and standards	4.11.1
Impacts on air quality resulting from construction activities	4.11.1
Methane leaks, GHG emissions and consistency	4.11.1
Radon	4.11.1
Noise	
Potential noise impacts resulting from construction activities and proposed mitigation measures to reduce impacts	4.11.2
Reliability and Safety	
Emergency response plans, evacuation plans, and coordination with community public safety services	4.8.5, 4.12.1
Remote detection of potential issues (e.g., pipeline leaks), safety of pipeline operation	4.12.1
Safety and reliability of constructing and maintaining the pipeline	4.12.1
Pipeline damage from accidental third-party or terrorist actions	4.12.1
Cumulative Impacts	
Analysis of cumulative impacts	4.13

We also received scoping comments and comments on the draft EIS regarding the potential for overseas exportation of natural gas associated with the Constitution's project. Constitution has stated that it would deliver natural gas to the existing Iroquois and TGP systems, to ultimately serve markets in New England and New York. We are aware of a possible project being considered by Iroquois, the South-to-North (SoNo) project which has not yet been filed with the Commission. This project appears to involve reversing the flow of natural gas on parts of Iroquois' system. If Iroquois pursues the SoNo project and it is approved, then portions of gas supplied to Iroquois could be displaced to other parts of its system. However, it is nearly impossible, and not practical to track the final destination of any one given molecule of natural gas. While the gas supplied by Constitution could be displaced to the northern parts of Iroquois' system, the capacity created by the project would still be realized.

Constitution's application does not include provisions for the exportation of natural gas. Further, there are no existing or proposed natural gas exportation facilities located downstream of Constitution's project. Should exportation facilities downstream of Constitution's project be proposed in the future, then any such proposal would be subject to a new and separate approval process from the U.S. Department of Energy (DOE), the FERC, and all other applicable permitting agencies.

1.4 NON-JURISDICTIONAL FACILITIES

Under Section 7 of the NGA, the FERC is required to consider, as part of its decision to authorize interstate natural gas facilities, all factors bearing on the public convenience and necessity. Occasionally, proposed projects have associated facilities that do not come under the jurisdiction of the Commission. These "non-jurisdictional" facilities may be integral to the need for the proposed facilities (e.g., a power plant at the end of a FERC-jurisdictional pipeline), or they may be merely associated as minor, non-integral components of the jurisdictional facilities that would be constructed and operated as a result of Certification of the proposed facilities.

Two proposed non-jurisdictional facilities are associated with the proposed pipeline project and would be located in Susquehanna County, Pennsylvania. These facilities include the White Road M&R Station near milepost (MP) 3.3 and the Sutton Road M&R Station near MP 9.4. The White Road M&R Station would consist of a 2.2 acre site and it would house transfer, measurement, and regulation facilities. Williams Field Services Company would own and operate the White Road M&R Station. The Sutton Road M&R Station would receive up to 150 million standard cubic feet per day of natural gas. The approximate 2 acre site would be enclosed by a chain link fence. Southwestern Energy Services Company (Southwestern) would own and operate the Sutton Road M&R Station.

Commentors recommend that the impacts associated with producing natural gas from the Marcellus Shale be included in the environmental review of the Project. Our authority under the NGA and the NEPA review requirements relate only to natural gas facilities that are involved in interstate commerce. Thus, the facilities associated with the production of natural gas are not under FERC jurisdiction. The development of the Marcellus Shale, which is regulated by the states, continues to drive the need for takeaway interstate pipeline capacity to allow the gas to reach markets. Therefore, companies are planning and building interstate transmission facilities in response to this new source of gas supply. In addition, many production facilities have already been permitted and/or constructed in the region, creating a network through which natural gas may flow along various pathways to local users or interstate pipeline systems.

That is not to say that the environmental impact of individual production facilities is not assessed. In Pennsylvania, the permitting of oil and gas production facilities is under the jurisdiction of the PADEP, and other agencies, such as the COE or the Susquehanna and Delaware River Basin Commissions. Although we do not examine the impacts of Marcellus Shale production facilities to the same extent as the project facilities in this EIS, we have identified existing and proposed Marcellus Shale production facilities in proximity to the Constitution project (including the White Road and Sutton Road M&R Stations) and have considered them within the context of cumulative impacts in the project area (see section 4.13 - Cumulative Impacts).

1.5 PERMITS, APPROVALS, CONSULTATIONS, AND REGULATORY REVIEW

Table 1.5-1 lists the major federal, state, and local permits, approvals, and consultations identified for the construction and operation of the projects. Table 1.5-1 also provides the dates or anticipated dates when Constitution and Iroquois commenced or anticipate commencing formal permit and consultation procedures. Constitution and Iroquois would be responsible for obtaining all permits and approvals

required to implement the proposed projects prior to construction regardless of whether they appear in this table.

TABLE 1.5-1
Major Permits, Approvals, and Consultations Applicable to the Proposed Projects[a]

Agency	Permit/Approval/ Consultation	Agency Action	Constitution Status	Iroquois' Status
Federal				
FERC	Certificate of Public Convenience and Necessity	Determine whether the proposed project is in the public interest, and consider issuance of a Certificate.	Application for Certificate under review (filed June 13, 2013). Consultation ongoing.	Application for Certificate under review (filed June 13, 2013). Consultation ongoing.
COE	Section 404, CWA Permit	Issuance of a Section 404 permit for discharges of dredged or fill material into waters of the United States, including jurisdictional wetlands.	Consultation began in August 2012 Application submitted August 27, 2013	Not Applicable
EPA	Section 404, CWA	Review CWA, Section 404 wetland dredge-and-fill applications to the COE with 404(c) veto power for wetland permits issued by the COE.	Consultation through the COE process	Consultation through the COE process
	CAA	Determination of General Conformity Applicability. Review and publicly comment on the environmental impacts of major federal actions.	Not Applicable	Delegated to NYSDEC
FWS	Section 7 ESA Consultation, Biological Opinion	Finding of impacts on federally listed or proposed species. Provide Biological Opinion if the project is likely to adversely affect federally listed or proposed species or their habitats.	Consultation ongoing	Clearance from FWS received February 22, 2013
	Migratory Bird Treaty Act	Provide comments to prevent taking or loss of habitat for migratory birds.	Consultation ongoing	Consultation ongoing
	Bald & Golden Eagle Protection Act	Provide comments to prevent taking or loss of habitat for bald and golden eagles.	Consultation ongoing	Consultation ongoing
Federal Aviation Administration (FAA)	49 CFR Part 77.9	Review of communication tower specifications	Not Applicable	Not Applicable
Susquehanna River Basin Commission	Water Allocation Permit	Issuance of a Water Allocation Permit for withdrawal of surface water and groundwater.	Consultation ongoing; applications to be submitted 3rd or 4th quarter 2014	Not Applicable
Delaware River Basin Commission	Water Withdrawal Permit	Issuance of a Water Withdrawal Permit for withdrawal of surface water and groundwater.	Consultation ongoing; applications to be submitted 3rd or 4th quarter 2014	Not Applicable

TABLE 1.5-1 (continued) Major Permits, Approvals, and Consultations Applicable to the Proposed Projects[a]				
Agency	**Permit/Approval/ Consultation**	**Agency Action**	**Constitution Status**	**Iroquois' Status**
State of Pennsylvania				
PADEP Regional Bureaus of Watershed Management	Section 401 Water Quality Certification	Issuance of a Section 401 permit for discharge to waters of the United States.	Permit issued September 5, 2014	Not Applicable
PADEP Regional Bureaus of Watershed Management	Chapter 105	Issuance of a Chapter 105 permit for wetlands and water obstructions.	Consultation ongoing; applications submitted June 2014	Not Applicable
PADEP Bureau of Land and Water Conservation Division of Stormwater Management and Sediment Control	Chapter 102	Issuance of a Chapter 102 permit	Consultation ongoing; applications submitted June 2014	Not Applicable
PADEP Bureau of Water Quality Protection	CWA Section 402 National Pollutant Discharge Elimination System & General Permit for Hydrostatic Test Water Discharges	Issuance of a Section 402 & hydrostatic test water discharge permit.	Consultation ongoing; applications to be submitted 3rd or 4th 2014	Not Applicable
Pennsylvania Department of Transportation	Highway Occupancy Permit	Issuance of a Highway Occupancy Permit for installation of utilities which serve the public.	Consultation ongoing; applications to be submitted 4th quarter 2014	Not Applicable
Pennsylvania Department of Conservation and Natural Resources	Rare Species Consultation	Provide comments to prevent impacts on rare species.	Consultation ongoing	Not Applicable
Pennsylvania Fish and Boat Commission (PFBC)	Rare Species Consultation	Provide comments to prevent impacts on rare species.	Consultation ongoing	Not Applicable
PFBC	Permit for Use of Explosives in Commonwealth Waters	Permit for blasting in waterbodies.	Estimated 1st quarter 2015	Not Applicable
PFBC	Chapter 93 Water Quality Determinations	Review and comment on water quality designations.	Complete	Not Applicable
Pennsylvania Game Commission	Rare Species Consultation	Provide comments to prevent impacts on rare species.	Consultation ongoing	Not Applicable
Pennsylvania Historical and Museum Commission Bureau of Historic Preservation	Section 106, NHPA Consultation	Review and comment on the project and its effects on historic properties.	Consultation ongoing	Not Applicable

TABLE 1.5-1 (continued) Major Permits, Approvals, and Consultations Applicable to the Proposed Projects[a]				
Agency	**Permit/Approval/ Consultation**	**Agency Action**	**Constitution Status**	**Iroquois' Status**
Local and County				
Susquehanna County/Municipalities	County/Municipal Road Opening Permits	Permits for impacts on roads.	Consultation ongoing; Applications to be submitted 4th quarter 2014	Not Applicable
Susquehanna County Planning Commission	Plan Certification Under Article VII (Commercial and Industrial Land Development) Section 707.4 (Noise)	Permit for noise impacts	Estimated 1st quarter 2015	Not Applicable
State of New York				
NYSDEC	Joint Permit including: Article 15, Article 24, and CWA Section 401	Issuance of Water Quality Certificate	Consultation ongoing; applications submitted August 2013	Not Applicable
NYSDEC	Article 15 Title 33	Permit hydrostatic test water withdrawal	Applications submitted August 2013	Not Applicable
NYSDEC	State Pollution Discharge Elimination System Program General Permit for Stormwater Discharges from Construction Activities (GP-02-01)	Issuance of permit for hydrostatic test Water discharge and trench dewatering.	Notice of Intent submitted April 2014	Application will be submitted prior to construction
NYSDEC	Air State Facility Permit	Permit for construction and operation of source air pollutant emissions	Not Applicable	Application submitted July 31, 2013
NYSDEC	Major Title V Greenhouse Gas Operating Permit	Permit for major potential source of greenhouse gases.	Not Applicable	Application submitted after start of operations
NYSDEC Bureau of Forest Lands Management	Temporary Revocable Permit	Issuance of Temporary Revocable Permit for use of state lands.	Application to be submitted 3rd or 4th quarter 2014	Not Applicable
NYSDEC Division of Fish, Wildlife and Marine Resources Bureau of Wildlife's Endangered Species Program	New York State Rare Species Program	Consultation on state-listed rare species.	Consultation ongoing	Not Applicable
New York State Office of Parks, Recreation and Historic Preservation, State Historic Preservation Office	Section 106, NHPA	Review and comment on the project and its effects on historic properties.	Consultation ongoing	Clearance received July 31, 2013
NYSDAM	Agricultural lands consultation	Consultation on crossing of agricultural lands.	Consultation ongoing	Not Applicable

TABLE 1.5-1 (continued)
Major Permits, Approvals, and Consultations Applicable to the Proposed Projects[a]

Agency	Permit/Approval/ Consultation	Agency Action	Constitution Status	Iroquois' Status
New York State Department of Transportation	Highway Occupancy Permit	Issuance of a Highway Occupancy Permit for installation of utilities which serve the public. Coordination on crossing design of Route 17, which will become Interstate 86.	Consultation ongoing; applications to be submitted 4th quarter 2014	Not Applicable
Local				
County/ Municipalities	County/Municipal Road Opening Permits	Permits for impacts on roads.	Consultation ongoing; applications to be submitted 4th quarter 2014	Not Applicable
Town of Wright, NY	Local Approvals for Compressor Buildings	Site Plan review, building permit, and State Environmental Quality Review Act review	Not Applicable	Application submitted November 22, 2013

[a] Consultations with Native American tribes are discussed in section 4.10.1.

TBD = To Be Determined.

2.0 PROJECT DESCRIPTION

2.1 PROPOSED FACILITIES

Constitution proposes to construct and operate a new natural gas transmission pipeline in Pennsylvania and New York. Constitution's project would involve construction and operation of a new pipeline, two new M&R stations, and associated pipeline support facilities such as MLVs, blow down valves, two side taps, communication towers, cathodic protection units, and pig launcher and receiver facilities. M&R stations measure the transfer of one gas from one pipeline system to another. MLVs are used to close the pipeline and stop the flow of gas for maintenance or safety purposes. Communication towers, which were proposed by Constitution following the issuance of the draft EIS, would facilitate reliable employee communications and remote data acquisition under all conditions, including adverse weather. Cathodic protection units minimize potential corrosion of the pipeline. An overview map of the pipeline project's location and facilities is provided on figure 2.1-1. Additional maps showing the location of pipeline route, aboveground facilities, and contractor yards are contained in appendix B. More detailed alignment sheets depicting the proposed pipeline route can be accessed at our website[1].

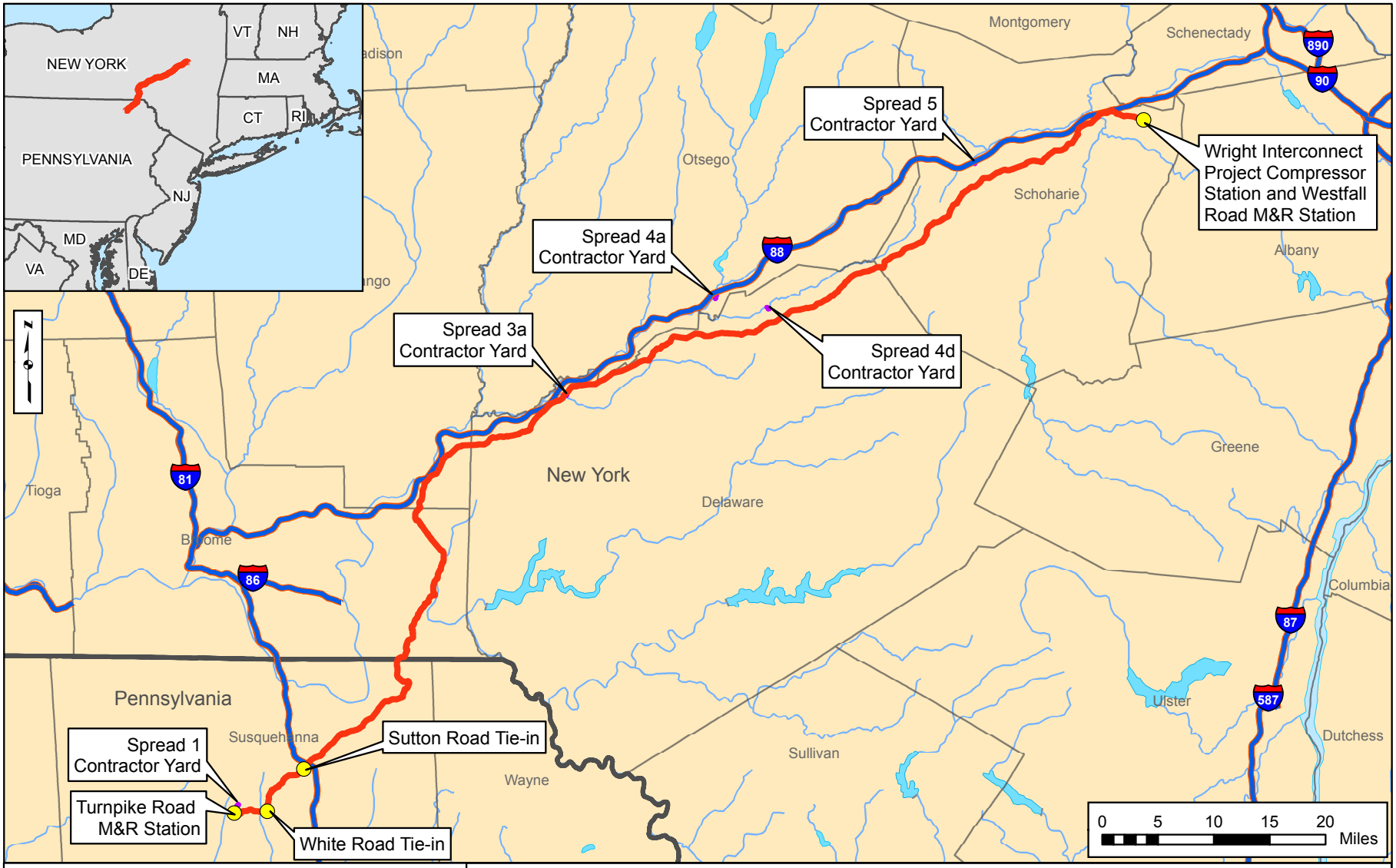
Constitution also has entered into an agreement with Iroquois to provide additional compression and related facilities at the terminus of the pipeline project. Iroquois has proposed to expand its existing compression and metering facilities in Wright, New York. An overview map of the proposed Iroquois facilities is provided on figure 2.1-2. The facilities associated with Iroquois' project are discussed throughout this document generally under "aboveground facilities." Because Iroquois' project would not involve substantial pipeline construction, sections of this document describing pipeline construction would be solely applicable to Constitution.

2.1.1 Pipeline Facilities

The proposed pipeline consists of 124.4 miles of 30-inch-diameter pipe located in the counties in table 2.1.1-1 and described in detail below.

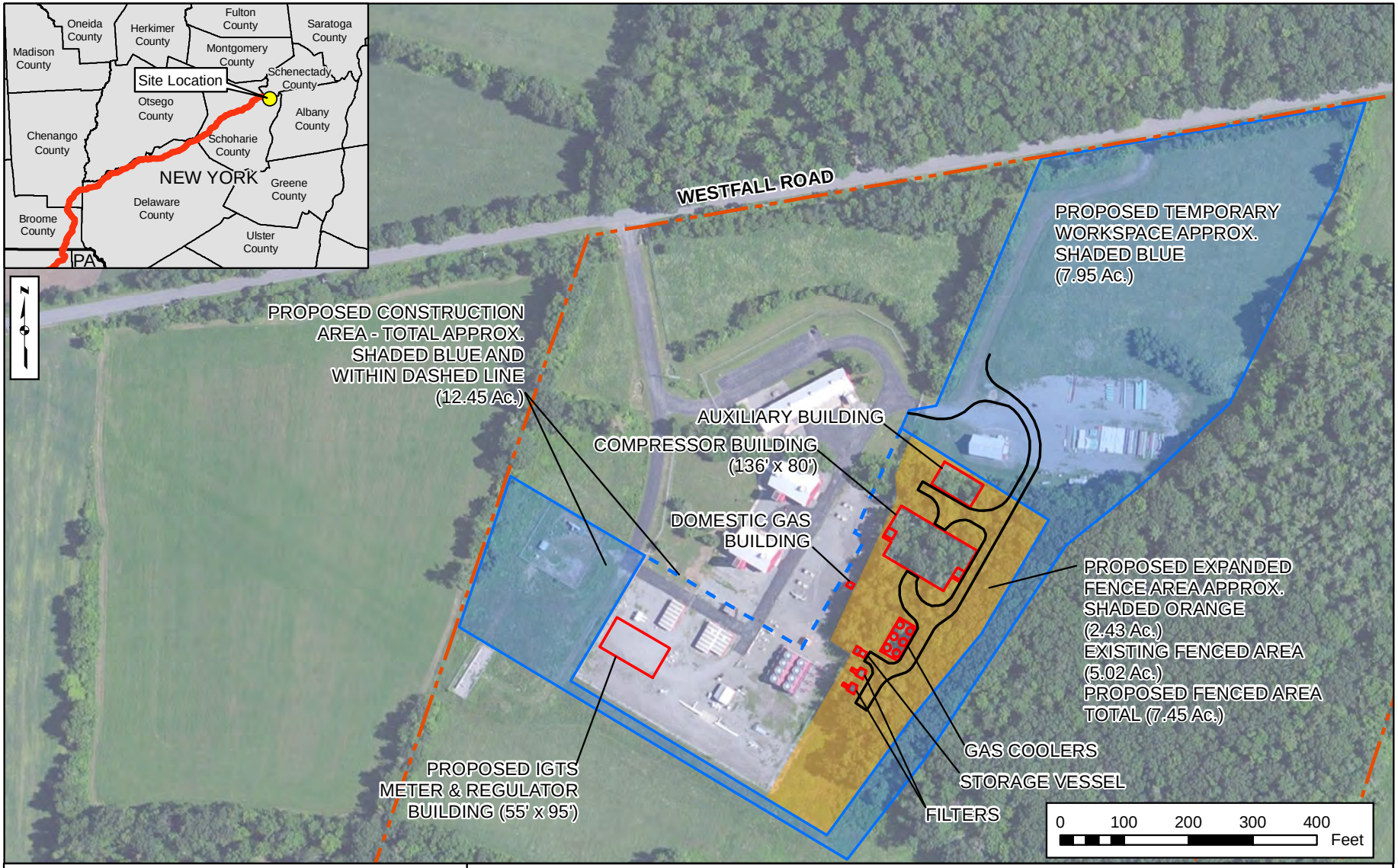
The pipeline's source of natural gas would come from two shippers, Cabot Oil and Gas Corporation (Cabot) and Southwestern who would deliver it into the pipeline in Susquehanna County, Pennsylvania. The natural gas would be transported to a proposed interconnection with the existing Wright Compressor Station operated by Iroquois in Schoharie County, New York. The pipeline route generally follows a greenfield (i.e., lands and vegetation, including adjacent areas, that are undisturbed or undeveloped) pathway from northeastern Pennsylvania to south-central New York. The maximum allowable operating pressure (MAOP) for the new pipeline would be 1,480 pounds per square inch gauge (psig).

[1] Alignment sheets for the proposed route minus re-routes since the draft EIS can be accessed at http://elibrary.ferc.gov:0/idmws/file_list.asp?document_id=14160901. Alignment sheets depicting reroutes adopted by Constitution after issuance of the draft EIS were filed on (http://elibrary.FERC.gov/idmws/file_list.asp?accession_num=20140314-5111) March 14, 2014; (http://elibrary.FERC.gov/idmws/file_list.asp?accession_num=20140603-5153) June 3, 2014; (http://elibrary.FERC.gov/idmws/file_list.asp?accession_num=20140619-5027) June 19, 2014; and (http://elibrary.ferc.gov:0/idmws/file_list.asp?document_id=14240117) August 5, 2014.



Proposed Route
Aboveground Facility
Major Highway
Contractor Yards

Figure 2.1-1
Constitution Pipeline Project
Project Overview Map



Property Boundary
Proposed Construction Area
Proposed Expanded Fence Area

Figure 2.1-2
Wright Interconnect Project
Compressor Station Map

TABLE 2.1.1-1 Pipeline Facilities Associated with the Constitution Pipeline Project		
State/County/Municipality	**Milepost Range**	**Length (miles)**
PENNSYLVANIA		
Susquehanna County		
Brooklyn	0.0 – 3.0	3.0
Harford	3.0 – 4.3	1.3
New Milford	4.3 – 13.4	9.2
Jackson	13.4 – 16.1	2.6
Oakland	16.1 – 17.0	1.0
Harmony	17.0 – 25.2	8.2
Pennsylvania (subtotal)	**0.0 – 25.2**	**25.2**
NEW YORK		
Broome County		
Sanford	25.2 – 42.2	17.0
Chenango County		
Afton	42.2 – 47.5	5.3
Bainbridge	47.5 – 50.5	3.0
Delaware County		
Masonville	50.5 – 52.2	1.7
Sidney	52.2 – 64.2	12.0
Franklin	64.2 – 73.7	9.4
Davenport	73.7 – 89.0	15.4
Harpersfield	89.0 – 93.5	4.5
Schoharie County		
Summit	93.5 – 93.9	0.3
Jefferson	93.9 – 94.1	0.2
Summit	94.1 – 96.0	1.9
Jefferson	96.0 – 96.5	0.5
Summit	96.5 – 97.0	0.5
Jefferson	97.0 – 98.9	1.9
Summit	98.9 – 105.1	6.1
Richmondville	105.1 – 109.9	4.9
Cobleskill	109.9 – 112.1	2.1
Middleburgh	112.1 – 115.6	3.5
Schoharie	115.6 – 124.0	8.4
Wright	124.0 – 124.4	0.5
New York (subtotal)	**25.2 – 124.4**	**99.2**
Constitution Pipeline Project Total		**124.4**

Note: Totals may not sum correctly due to rounding.

2.1.2 Aboveground Facilities

The proposed projects would include both construction of new aboveground facilities and the modification of existing facilities. These facilities are listed in table 2.1.2-1.

TABLE 2.1.2-1
Aboveground Facilities for the Constitution Pipeline and Wright Interconnect Projects

Facility	Milepost	Operator	Municipality	County, State
New M&R Stations (including one Communication Tower)				
Turnpike Road M&R Receipt Station (with, pig launcher, kickoff MLV No. 1, and Tower No. 1)	0.0	Constitution (input from) Cabot	Brooklyn	Susquehanna, PA
Westfall Road M&R Delivery Station (with, pig receiver, and MLV terminus – No. 11)	124.4	Constitution (delivery to Iroquois and TGP)	Wright	Schoharie, NY
Compressor Station Modifications				
Wright Interconnect Project	124.4	Iroquois	Wright	Schoharie, NY
Tap Facilities				
White Road Tie-in (side tap)	3.3	Constitution (input from Cabot)	Harford	Susquehanna, PA
Sutton Road Tie-in (side tap)	9.4	Constitution (input from Southwestern)	New Milford	Susquehanna, PA
Mainline Valves (and Communication Towers)				
MLV and Tower No. 2 – Walkers Road	15.2	Constitution	Jackson	Susquehanna, PA
MLV and Tower No. 3 – Vale Road	26.7	Constitution	Sanford	Broome, NY
MLV and Tower No. 4 – O'Brien Road	41.2	Constitution	Sanford	Broome, NY
MLV and Tower No. 5 – Access Road/Town Road	52.1	Constitution	Masonville	Delaware, NY
MLV and Tower No. 6 – Otego Road	65.9	Constitution	Franklin	Delaware, NY
MLV and Tower No. 7 – County Road 10	81.8	Constitution	Davenport	Delaware, NY
MLV and Tower No. 8 – Clapper Hollow Road	95.1	Constitution	Summit	Schoharie, NY
MLV and Tower No. 9 – Access Road/Dodge Lodge Road	108.5	Constitution	Richmondville	Schoharie, NY
MLV and Tower No. 10 – Smith Road	119.6	Constitution	Schoharie	Schoharie, NY

The Turnpike Road M&R Station would be connected to the existing, non-jurisdictional Central Compressor Station via a 700-foot-long, 30-inch-diameter tie-in pipeline. This tie-in pipeline would allow Cabot to input natural gas into the Constitution pipeline. The White Road Tie-in would also allow for Cabot to input natural gas into the Constitution pipeline via Cabot's non-jurisdictional White Road M&R Station. Cabot's contribution to the Constitution pipeline at both sources would be limited to a maximum of 500,000 Dth/d combined. The Sutton Road Tie-in would connect Southwestern's non-jurisdictional Sutton Road M&R Station to the Constitution pipeline and would deliver up to 150,000 Dth/d. The Westfall Road M&R Station would deliver gas to Iroquois' existing Wright Compressor Station for eventual delivery to the existing Iroquois and TGP natural gas pipeline systems. The Westfall Road M&R Station would be connected to Iroquois' existing Wright Compressor Station and proposed compressor transfer station by a 500-foot-long, 30-inch-diameter tie-in pipeline.

Following issuance of the draft EIS, Constitution proposed to expand the scope of its project to include the installation of 100-foot-tall, monopole, radio communication towers at 10 locations. The towers would be 2 feet in diameter at the base, tapering to 1 foot in diameter at the top. The towers would be located within the Turnpike Road M&R station and nine other MLV sites as listed in table 2.1.2-1. The towers would be used to deploy ultra-high frequency (UHF) radio equipment, antennas, and satellite dishes to support reliable backup employee communications and operational data transmission. The towers would not emit light or sound, nor would guy wires be used to support the structures.

Constitution stated that given the bedrock located at each of the proposed tower sites, it would use a surface-mounted, monopole flange attached to a pedestal base foundation, secured with stud bolts. The bedrock at the proposed sites would be rippable with construction equipment according to Constitution, and blasting would not be required. A typical drawing of Constitution's standard proposed communication tower and foundation is provided in appendix C.

Cathodic protection units, which include both aboveground and underground components, would be installed at 11 locations along the pipeline (table 2.1.2-2) and would function to prevent pipeline corrosion. Protection units typically consist of underground negative connection cables welded to the pipeline. The negative connection cables would connect to underground linear anode cable systems tied into an aboveground junction box and rectifier that operate the system. The cable systems, junction box, and rectifier would be located immediately adjacent to selected permanent access roads.

Constitution has entered into an agreement for Iroquois to provide additional compression at the terminus of Constitution's pipeline. Iroquois' proposed expansion would expand its existing compression and metering facilities in Wright, New York. Iroquois' project would provide additional compression allowing delivery of up to 650,000 Dth/d of natural gas from the terminus of the proposed Constitution pipeline into the existing Iroquois and the TGP systems.

As part of Iroquois' project, it would construct, own, and operate several new and modified facilities at its existing Wright Compressor Station property in Schoharie County, New York. These facilities would include:

- connection with Constitution's proposed 500-foot-long, 30-inch-diameter tie-in pipeline;
- construction of a new transfer compressor station including the addition of incremental compression facilities of about 21,800 horsepower, to supplement the existing compression capacity of 14,200 horsepower;
- expansion of the existing odorization facilities;
- construction of natural gas coolers, station piping, and valves;
- modification and upgrade of the existing delivery meter and associated piping to the TGP system or possible construction of a new delivery meter to support the full capacity of the Constitution pipeline; and
- modification of the existing Wright Compressor Station to allow Iroquois to use station-wide compression in the most energy efficient and integrated method.

TABLE 2.1.2-2
Cathodic Protection System Locations

Cathodic Protection System Unit	MP	Permanent Access Road	Approximate Permanent Access Road Length (feet)	Approximate Length of Linear Anode Beds (feet)	Approximate Length of Negative Connection Cables (feet)	Location	Land Use Type
R1	1.8	PAR-1	3,201	750	2,451	West of North Weston Road	Agriculture
R2	7.2	PAR-6	1,706	1,000	706	West of Tingley Lake Road	Agriculture
R4	26.8	PAR-20	87	350 (array configuration)	87	West of Vale Road	Upland Forest
R4A	35.2	PAR-28	567	250	317	East of North Sanford Road	Agriculture
R5	44.3	PAR-34	1,722	1,000	722	East of Oxbow Road	Agriculture
R6	60.2	PAR-38	1,481	1,000	481	Southeast of State Road 357	Open Land
R7	70.0	PAR-44	3,288	1,000	2,288	West of State Road 357	Agriculture
R11	76.9	PAR-48B	1,059	500	559	South of Prosser Hollow Road	Agriculture
R8	96.0	PAR-60	2,264	1,500	764	East of Dead End Road	Agriculture
R9	103.5	PAR-66	3,024	2,500	524	East of State Route 10	Agriculture
R10	118.0	PAR-73	2,110	1,500	610	North of Terrace Mountain Road	Open Land

Note:
Area affected during construction and operations for the anode beds and negative connection tables is included in the area associated with the permanent access road. An additional 5 feet by 10 feet area for the rectifier and junction box may be located adjacent to the access road.

Expansion of the existing Wright Compressor Station would eliminate the need for a new, greenfield compressor station, which was originally planned by Constitution. Iroquois' expansion would be constructed completely within the property boundaries of the existing Wright Compressor Station.

2.2 LAND REQUIREMENTS

Table 2.2-1 summarizes the land requirements for the combined Constitution and Iroquois projects. A detailed description and breakdown of land requirements and use is presented in section 4.8.1. Construction of Constitution's project would disturb 1,859.0 acres of land, including the pipeline facilities, aboveground facilities, contractor yards, and access roads. Permanent operations would encumber 757.0 acres, consisting of 711.0 acres for the new pipeline right-of-way, 5.4 acres for Constitution's aboveground facilities, and 40.6 acres for access roads. Cathodic protection facilities for the pipeline would be associated with the permanent access road easements. The remaining 1,102.0 acres of land disturbed by Constitution would be restored and allowed to revert to its former use. Iroquois' project would require 12.5 acres during construction, and would encumber 4.5 acres during operation. Collectively, Constitution and Iroquois' proposed projects would affect 1,871.5 acres during construction and 761.5 acres during operations.

TABLE 2.2-1 Summary of Land Requirements Associated with the Constitution and Iroquois Project Facilities				
Facility	**Land Affected During Construction (acres)** [a]		**Land Affected During Operation (acres)** [b]	
PIPELINE FACILITIES				
Pennsylvania				
Pipeline Right-of-Way	318.3		147.8	
Additional Temporary Workspace	19.5		0.0	
New York				
Pipeline Right-of-Way	1,240.4		563.2	
Additional Temporary Workspace	91.2		0.0	
Pipeline Facilities Total		***1,669.4***		***711.0***
ABOVEGROUND FACILITIES [b]				
Pennsylvania				
Turnpike Road M&R Station	4.9		3.1	
New York				
Westfall Road M&R Station	3.3		2.3	
Wright Interconnect Project (Iroquois)	12.5		4.5	
Aboveground Facilities Total		***20.7***		***9.9***
CONTRACTOR YARDS				
Pennsylvania	**20.0**		**0.0**	
New York	**81.5**		**0.0**	
Contractor Yards Total		***101.5***		***0.0***
ACCESS ROADS				
Pennsylvania	**36.3**		**18.1**	
New York	**43.6**		**22.5**	
Access Roads Total		***79.9***		***40.6***
SUBTOTAL – CONSTITUTION PIPELINE PROJECT		**1,859.0**		**757.0**
COMBINED PROJECTS TOTAL		**1,871.5**		**761.5**

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

[b] The Sutton Road and White Road Tie-ins, MLVs, communication towers, and pig launcher and receiver facilities would be located within the operational easement and would not result in additional land impacts beyond those already accounted for above.

2.2.1 Pipeline Facilities

Of the 1,669.4 acres of land that would be disturbed during construction of the pipeline facilities and associated workspaces, 711.0 acres would be retained as new permanent pipeline right-of-way. The remaining 958.4 acres would be used as temporary workspace.

2.2.1.1 Adjacent Existing Rights-of-Way and Utility Crossings

The proposed pipeline would be collocated within or adjacent to existing pipelines and/or electric transmission utility rights-of-way for 10.6 miles (9 percent). Additionally, the proposed route crosses multiple existing pipelines and/or electric transmission utility (i.e. powerline) rights-of-way (1.4 miles of

crossovers collectively), but these crossings are not considered collocation. A summary of the locations where the pipeline would be collocated within or adjacent to existing rights-of-way is presented in table 2.2.1-1.

TABLE 2.2.1-1
Summary of Pipeline Collocated with Existing Rights-of-Way

Adjacent Facility	Start Milepost	End Milepost	Paralleled Length (feet)	Width of Foreign Right-of-Way (feet)	Width of Foreign Right-of-Way That Would Be Used During Construction (feet)	Width of Foreign Right-of-Way That Would Be Used During Operation (feet)
Susquehanna County, Pennsylvania						
Powerline	6.2	6.6	2,112	30	0	0
Powerline	10.3	10.7	2,112	120	25	0
Powerline	11.0	11.2	1,003	120	25	0
Bluestone Pipeline	22.0	22.3	1,901	50	0	0
Subtotal Susquehanna County			***7,128***			
Broome County, New York						
Powerline	37.4	40.7	17,266	100	10	0
Powerline	40.7	40.7	475	100	25	0
Subtotal Broome County			***17,741***			
Chenango County, New York						
Powerline	47.4	47.5	581	400	50	0
Powerline	47.5	47.6	422	400	125	0
Powerline	47.9	48.0	264	400	50	0
Powerline	48.0	48.0	158	400	100	0
Powerline	48.0	48.0	106	400	0	0
Powerline	48.0	48.0	106	400	50	0
Powerline	48.0	48.0	158	400	100	0
Powerline	48.0	48.9	4,646	400	50	0
Subtotal Chenango County			***6,441***			
Delaware County, New York						
Powerline	52.8	53.1	1,637	250	10	0
Powerline	53.1	53.5	2,376	250	0	0
Powerline	53.5	53.6	370	250	10	0
Powerline	53.6	53.8	1,056	250	25	0
Powerline	53.8	54.2	2,165	250	10	0
Powerline	54.2	55.2	5,491	250	0	0
Powerline	55.2	55.3	211	250	110	0
Powerline	55.3	55.3	370	250	10	0
Subtotal Delaware County			***13,676***			

TABLE 2.2.1-1 (continued) Summary of Existing Rights-of-Way Collocated with the Proposed Constitution Pipeline						
Adjacent Facility	**Start Milepost**	**End Milepost**	**Paralleled Length (feet)**	**Width of Foreign Right-of-Way (feet)**	**Width of Foreign Right-of-Way That Would Be Used During Construction (feet)**	**Width of Foreign Right-of-Way That Would Be Used During Operation (feet)**
Schoharie County, New York						
30" TGP 200 Line	121.3	121.4	370	150	10	0
30" TGP 200 Line	121.4	121.4	158	150	60	0
30" TGP 200 Line	121.4	121.5	211	150	0	0
30" TGP 200 Line	121.5	121.5	53	150	25	0
30" TGP 200 Line	121.5	121.5	158	150	75	0
30" TGP 200 Line	121.5	121.7	1,003	150	25	0
30" TGP 200 Line	121.7	121.9	1,109	150	10	0
30" TGP 200 Line	121.9	122.3	1,901	150	25	0
30" TGP 200 Line	123.3	123.4	634	150	0	0
30" TGP 200 Line	123.4	123.5	158	150	20	0
30" TGP 200 Line	123.5	123.9	2,218	150	0	0
30" TGP 200 Line	123.9	124.4	2,851	150	25	25
30" TGP 200 Line	124.4	124.4	158	150	25	0
Subtotal Schoharie County			***10,982***			
CONSTITUTION PIPELINE PROJECT TOTAL COLLOCATION			***56,058***			

2.2.1.2 Right-of-Way Configurations

Constitution proposes to use a 100-foot-wide construction right-of-way in upland interior forested locations (excluding areas with steep side slopes[2] as quantified in section 4.1.3), a 110-foot-wide construction right-of-way in non-agricultural uplands, and a 125-foot-wide construction right-of-way in upland agricultural lands. Constitution proposes to use a 75-foot-wide construction right-of-way in most wetlands. In cases where Constitution proposes the Direct Pipe method, there would be no disturbance of the ground surface between the trenchless construction workspaces as described further below. Constitution proposed to use the horizontal directional drill (HDD) method at several locations as described in the draft EIS, but modified its plans and currently does not propose any HDDs. The descriptions of the HDD method remain in the text below given its prior planned use and the possibility that it may be used if Constitution modifies its plans again. Actual right-of-way configurations and widths would vary, in some cases beyond 125-feet-wide considering extra workspace, based on site-specific conditions including road and railroad crossings, waterbodies, wetland crossings, the need for additional spoil storage, steep topography, the presence or absence of an existing right-of-way, and proximity to adjacent utilities. Constitution has submitted drawings that depict right-of-way configurations for the proposed 30-inch-diameter pipeline. The typical right-of-way configurations

[2] Steep side slopes are defined as areas where the pipeline would run parallel to the slope contours and where the slope is 15 percent or greater.

proposed by Constitution are included in appendix C and are discussed further below. The construction procedures that would be followed are described in detail in section 2.3.

The width of the construction right-of-way for the 30-inch-diameter pipeline would vary depending on site-specific factors; the permanent right-of-way would be 50 feet wide across the entire project. While many construction right-of-way configurations are possible based on site-specific conditions, there are four main variations for uplands, agricultural lands, interior forest areas, and wetlands. The trench would be 10 feet wide in all upland configurations, and it would be 12 feet wide in wetlands. In upland areas the 110-foot-wide right-of-way would consist of 70 feet on the working side and 30 feet on the non-working (spoil) side of the 10-foot-wide pipeline trench. In upland agricultural areas requiring additional topsoil segregation, the construction right-of-way would typically be 125 feet wide, consisting of 70 feet on the working side of the pipeline and 45 feet on the non-working (spoil) side of the 10-foot-wide trench. Through upland interior forest, and where no construction safety constraints such as steep side slopes are present, the typical 100-foot-wide construction right-of-way would consist of 60 feet on the working side and 30 feet on the spoil side of the 10-foot-wide trench. Within wetlands, the typical 75-foot-wide construction right-of-way would consist of 44 feet on the working side of the 12-foot-wide trench and 19 feet on the spoil side. Where the Direct Pipe method is employed in uplands or wetlands, there would be no actual construction right-of-way between the entry and exit workspaces, and no clearing, trenching or other disturbance of the ground other than site-specific workspaces associated with placing the guide wires via foot traffic and minor hand clearing.

2.2.1.3 Extra Workspace

In addition to the various construction right-of-way configurations described above, Constitution has requested a wider construction right-of-way in several locations due to the presence of constraints mentioned above and for other, site-specific construction-related reasons. Appendix D identifies where Constitution has requested extra workspace for staging areas and resource crossings, including workspace dimensions, the acreage of impact, associated land use, and the justification for their use. A detailed discussion of Constitution's requests for extra workspace is provided below in section 2.3 and in sections 4.3.3.7 and 4.4.4.

Additional extra workspaces beyond those currently identified could be required during construction of the pipeline. Prior to construction, Constitution would be required to file a complete and updated list of all extra work areas, including any requested additional contractor yards for review and approval (see Post-Approval Variance Process in section 2.5.4).

2.2.2 Aboveground Facilities

The proposed aboveground facilities for Constitution's project include 2 new M&R stations, 2 new tie-ins, 11 MLVs, and pig launcher and receiver facilities (see table 2.1.2-1). Communication towers would be contained completely within the previously proposed sites of the Turnpike Road M&R Station and MLV sites 2 through 10. Construction of the Turnpike Road M&R Station would require 4.9 acres of land, 3.1 acres of which would be used permanently during operation. The kickoff MLV (No. 1), interconnecting piping, and a pig launcher would be located at the Turnpike Road M&R Station. The Westfall Road M&R Station would affect 3.3 acres of land during construction and 2.3 acres during operation. The MLV terminus (No. 11), interconnecting piping, and a pig receiver would be located at the Westfall Road M&R Station. Constitution's Sutton Road and White Road Tie-ins and MLVs 2 through 10 would be entirely within the permanent right-of-way and therefore would not encumber any additional acreage. Constitution proposed to move the location of MLV No.6 in Delaware County, New York from MP 66.7 to MP 65.9 after issuance of the draft EIS.

Constitution proposes to use remotely controlled MLVs along the pipeline route. Remotely controlled MLVs would be continuously monitored at Constitution's gas control center and in the event of an incident, an electronic command for valve closure can be sent. According to information provided by Constitution, remotely controlled MLVs provide more real-time data and reliability than automatically controlled valves.

Modifications and construction at Iroquois' Wright Compressor Station would occur within the existing station property boundary. Construction of Iroquois' project would require 12.5 acres of temporary workspace, including 2.1 acres within the existing fence line, 2.4 acres that would be outside the existing fence line but within the new, expanded fence line (this area also would be retained permanently for operations), and 8.0 acres of temporary workspace outside the proposed new, expanded fence line that eventually would be allowed to return to its pre-construction state. Iroquois would not need to acquire any additional property for project operation.

2.2.3 Contractor Yards

To support construction activities, Constitution proposes to use six contractor yards on a temporary basis. The contractor yards would be used for equipment, pipe sections, and construction material and supply storage, as well as temporary field offices, parking, and pipe preparation and pre-assembly staging areas. The use of these sites would temporarily affect about 101.5 acres of land. These sites are classified as having predominately open land / agricultural land use (see table 2.2.3-1). These yards are depicted on the maps in appendix B. Following issuance of the draft EIS, Constitution removed contractor yards Spread 2, 3, and 4b from the proposed pipeline project and added contractor yards Spread 3a, 4d, and 5 (overflow parking).

TABLE 2.2.3-1
Contractor Yards along the Constitution Project Route

State/Yard	Municipality	Size (acres)	Land Use
Pennsylvania			
Spread 1	Bridgewater/Susquehanna County	20.0	Open Land
Subtotal		***20.0***	
New York			
Spread 3a	Sidney/Delaware	11.1	Agriculture
Spread 4a	Oneonta/Otsego County	26.9	Sand and Gravel, Open Land
Spread 4d	Davenport/Delaware	25.2	Agriculture
Spread 5	Richmondville/Schoharie County	13.7	Agriculture and Open Land
Spread 5 (Overflow parking)	Richmondville/Schoharie County	4.6	Industrial
Subtotal		***81.5***	
	Constitution Pipeline Project Total	**101.5**	

2.2.4 Access Roads

In addition to public roads, Constitution proposes to use 78 private access roads along the pipeline route (27 in Pennsylvania and 51 in New York) to construct the pipeline (see maps in appendix B). Of these 78 roads, 49 are existing roads, nine would be a combination of existing and new roads, and 20 would be all newly constructed. Constitution proposes to maintain all but 10 of the 78 roads

permanently for operations. Four of the 10 proposed temporary access roads would be newly constructed. Constitution has proposed a standard 12-foot-wide access road in straight areas, with expansion to 24-feet-wide as required for curves and corners. Modifications to existing roads could include tree, brush, or structure removal, widening, grading, installation of culverts, and addition of gravel. The location, description, length, land use, and type of improvement required (if any) for each of the access roads are listed in appendix E.

2.3 CONSTRUCTION PROCEDURES

The projects would be designed, constructed, tested, and operated in accordance with all applicable requirements included in the DOT regulations in 49 CFR 192,[3] *Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards*; and other applicable federal and state regulations, including the U.S. Department of Labor, Occupational Safety and Health Administration requirements. These regulations are intended to ensure adequate protection for the public. Among other design standards, Part 192 specifies pipeline material and qualification, minimum design requirements, and protection from internal, external, and atmospheric corrosion.

To reduce construction impacts, Constitution would implement its state-specific Environmental Construction Plans (ECPs)[4]. The ECPs include Constitution's *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan) which are based on our *Upland Erosion Control, Revegetation, and Maintenance Plan* (our Plan[5]). The ECPs also include Constitution's *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures), which, similarly, are based upon and contain many of the measures found in our *Wetland and Waterbody Construction and Mitigation Procedures* (our Procedures[4]). The intent of Constitution's Plan and Procedures is to identify baseline mitigation measures and construction techniques that incorporate guidelines recommended by various resource agencies (such as crop productivity monitoring procedures), as well as other guidelines and plans tailored to project-specific issues. The ECPs contain numerous measures that would prevent or minimize potential impacts on resources. As indicated in appendix D, Constitution's ECPs include some alternative measures that differ from our standard Plan and Procedures, such as the use of certain extra workspaces. These alternative measures are discussed in more detail in section 4.2.4, 4.3.3, 4.4.3, and 4.4.4, which also includes our recommendations for the appropriateness of these modifications.

Constitution's Plan and Procedures propose three notable modifications from our standard Plan and Procedures. These modifications, their descriptions, and status are listed below in table 2.3-1.

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[3] Pipe design regulations for steel pipe are contained in subpart C, Part 192. Section 192.105 contains a design formula for the pipeline's design pressure. Sections 192.107 through 192.115 contain the components of the design formula, including yield strength, wall thickness, design factor, longitudinal joint factor, and temperature derating factor, which are adjusted according to the project design conditions, such as pipe manufacturing specifications, steel specifications, class location, and operating conditions. Pipeline operating regulations are contained in subpart L, Part 192.

[4] The Pennsylvania ECP (Volume II Appendix I) and the New York ECP (Volume II Appendix J) can also be found at http://elibrary.ferc.gov/idmws/file_list.asp?document_id=14160901.

[5] The FERC Plan and Procedures are a set of construction and mitigation measures that were developed in collaboration with other federal and state agencies and the natural gas pipeline industry to minimize the potential environmental impacts of the construction of pipeline projects in general. The FERC Plan and Procedures can both be viewed on the FERC Internet website at https://www.ferc.gov/industries/gas/enviro/guidelines.asp.

TABLE 2.3-1 Summary of Proposed Modifications to the FERC's Plan and Procedures				
Applicable FERC Plan/Procedures Section	**Resource Issue**	**Description**	**Status**	**Section Discussed**
Plan, at IV.A.2	Construction right-of-way width	Proposal to utilize a standard construction right-of-way width of 100 feet in upland interior forested locations, 110 feet in other upland locations, and 125 feet in all active agricultural areas.	Acceptable	2.2.1
Procedures, at Sections II.A and VI.B.1.a	Construction right-of-way width in wetlands; extra workspace positioning relative to waterbodies and wetlands	Proposal to use a construction right-of-way width greater than 75 feet in wetlands; utilize extra workspace within 50 feet of waterbodies and wetlands in specific locations as listed in appendix D.	Acceptable	4.4.4
Procedures, at VI.D.1	Vegetation clearing and maintenance associated with HDDs or Direct Pipes	Proposal to clear vegetation at a 10-foot-wide corridor within wetlands that are between HDD entry and exit points to facilitate water withdrawal for drilling operations.	Not Acceptable - the clearing of wetland (and/or upland) vegetation between HDD or Direct Pipe entry and exit points is not adequately justified.	4.4.3

Constitution's Plan and Procedures also include deviations from our standard Plan and Procedures not listed in table 2.3-1, but they are more protective than our requirements, and we have found them to be acceptable. Iroquois proposes to adopt our Plan and Procedures, but did not propose any modifications from the FERC's standard Plan and Procedures.

To avoid or minimize the potential for harmful spills and leaks during construction, Constitution has developed a Spill Plan for Oil and Hazardous Materials (Constitution's Spill Plan) and Iroquois has developed Spill Prevention, Control and Countermeasure (SPCC) Plan. Constitution's Spill Plan and Iroquois' SPCC describes spill and leak preparedness and prevention practices, procedures for emergency preparedness and incident response, and training requirements. Additional discussion of Constitution's Spill Plan is presented in section 4.3.2. Other resource-specific plans have been developed for the proposed pipeline project and are included in the ECPs. These plans are introduced below and are discussed in more detail in section 4.0.

2.3.1 General Pipeline Construction Procedures

This section describes the general procedures proposed by Constitution and Iroquois for their respective facilities. Constitution's primary pipeline construction technique in upland areas would be standard, sequential assembly line installation (described below). Constitution would have 5 of these assembly lines or "spreads" that would each be simultaneously completing construction activities at different locations along the route. Iroquois' construction at the Wright Compressor Station would entail standard site and industrial development type activities.

Other specialized construction methods, such as two-tone cut and fill methods used on steep side-slopes, HDD and Direct Pipe methods used to cross under sensitive resources, residential-specific methods, and procedures for crossing of waterbodies and wetlands would also be employed. These specialized construction methods are also described below.

Separate crews typically would be used for construction of the aboveground facilities and modifications to existing facilities. Construction procedures for aboveground facilities are described in section 2.3.3.

Survey and Staking

After Constitution completes land or easement acquisition and before the start of construction, crews would mark the limits of the approved work areas (i.e., the construction right-of-way boundaries and extra workspace, the pipeline centerline, and approved access roads). Property owners would be notified prior to surveying and staking activities. Wetland boundaries and other environmentally sensitive areas identified in easement agreements or by federal and state agencies would be clearly marked with visible signage and fenced with erosion control devices for protection. The FERC Plan assigns duties to the applicants' environmental inspectors (EI) including "Verifying the location of signs and highly visible flagging marking the boundaries of sensitive resource areas, waterbodies, wetlands, or areas with special requirements along the construction work area." Constitution would also use orange safety fencing to identify wetlands if required by COE permitting requirements.

Clearing Operations

Clearing would be required to remove trees, brush, and other existing vegetation from approved work areas. This would occur by mechanical means including feller-bunchers and hydroaxes. Hand cutting with chain saws may also be used in specific areas as needed. Timber would be removed from the right-of-way and sold for lumber or pulp if suitable, disposed of at an appropriate receiving facility, or chipped on the right-of-way. Constitution would not dispose of any cleared vegetation by burning. The transportation of any wood materials would comply with the NYSDEC's regulations intended to prevent the spread of invasive species. Constitution's state-specific Invasive Species Management Plans are described in more detail in section 4.5. Timber may also be cut and stacked at the edge of the right-of-way in accessible area, if requested by the landowner. Wood chips would not be placed in agricultural areas, wetlands, or waterbodies. Timber would not be left in piles or stacks on the right-of-way.

In uplands, tree stumps and rootstock would be removed from the entire width of the permanent right-of-way. Additional stump pulling would be conducted in upland extra workspaces if deemed necessary for safety reasons. In wetlands, the pulling of stumps would be limited to the trench line and other areas where it is deemed necessary for safety reasons (see section 2.3.2.1 for a description of stump removal in wetlands). Elsewhere in wetlands, stumps and rootstock would be left intact to promote revegetation following construction. Excavated stumps would be removed from the right-of-way for disposal at approved locations or made available to landowners upon request.

Closely following clearing and before beginning grading activities, crews would install erosion control devices at the locations outlined in the ECPs. The ECPs also include specifications for the installation and maintenance of temporary erosion controls such as silt fence, straw bales, temporary slope breakers (interceptor dikes); as well as permanent erosion controls such as permanent trench plugs, slope breakers, restoration methods, and revegetation measures. The EI would be responsible for ensuring that the erosion controls are installed correctly, inspected, and maintained in accordance with the ECPs.

Grading

Grading of the construction right-of-way would be scheduled to limit the amount of time between clearing and the installation of the pipeline. Where necessary, the entire width of the construction right-of-way, including the temporary construction workspace, would be rough graded with bulldozers to allow for safe passage of equipment and to prepare the work surface for pipeline installation activities.

Backhoes may be used in conjunction with bulldozers in areas where tree stumps, rock outcrops, and uneven topographic features need to be removed. A travel lane would be utilized to allow for the passage of daily traffic.

Topsoil stripping would occur in agricultural and residential lands, and in other areas as requested by landowners. Up to 12 inches of topsoil would be removed and kept segregated from subsoil until replacement. Constitution would strip topsoil from the full right-of-way in agricultural lands. Constitution has developed a *Soil Protection and Subsoil Decompaction Mitigation Plan*, which is discussed in more detail in section 4.2.

Trenching

The trench would be excavated with a backhoe or track-mounted excavator to provide at least the minimum cover as required by 49 CFR 192. Typically, the trench would be sufficiently deep (5.5 feet deep to 7.5 feet deep for the 30-inch-diameter pipeline) to provide for a minimum of 3 feet of cover over the pipeline. In areas with consolidated rock, the minimum amount of cover would be 24 inches. In certain areas such as at crossings of foreign pipelines and utilities, deeper burial would be required resulting in an increased trench depth. Constitution's proposed minimum specifications for depth of cover over the pipeline are listed in table 2.3.1-1. Where the Direct Pipe methods are used the pipeline would be installed deep below the ground surface.

TABLE 2.3.1-1
Constitution's Proposed Minimum Specifications for Depth of Cover

Location [a]	Normal Soil (cover depth in inches)	Consolidated Rock (cover depth in inches)
DOT PHMSA Class 1	36	24
DOT PHMSA Class 2, 3, and 4	36	24
Land in Agriculture	48	24
Drainage ditches of public roads or railroad crossings	60	24
Navigable river, stream, or harbor	60	24
Minor stream crossings	60	24

[a] As defined by the DOT Pipeline and Hazardous Materials Safety Administration (PHMSA) at 49 CFR 192.5.

Class 1: offshore areas and areas within 220 yards of a pipeline with ≤10 buildings intended for human occupancy.

Class 2: areas within 220 yards of a pipeline with >10 but <46 buildings intended for human occupancy.

Class 3: areas within 220 yards of a pipeline with >46 buildings intended for human occupancy and areas within 100 yards of either a building or a small, well defined outside area (such as a playground, recreation area, outdoor theater, or other place of public assembly) that is occupied by 20 or more persons on at least 5 days a week for 10 weeks in any 12-month period.

Class 4: areas within 220 yards of a pipeline where buildings with four or more stories are prevalent.

The Constitution project would cross underground utilities in numerous locations. Prior to construction, Constitution's contractors would contact the "Call Before You Dig" or "One Call" system, or state or local utility operators, to verify and mark all underground utilities (e.g., cables, conduits, and pipelines) along the pipeline route to minimize the potential for accidental damage during construction. In areas where the location is not apparent, utility lines would be located by field instrumentation and test pits. The proposed route has been designed to avoid existing utility lines to the extent possible. However, relocation of utilities may be necessary in some circumstances. Constitution would coordinate all required utility relocations with the appropriate owner.

Spoil material excavated from the trench would be temporarily piled to one side of the right-of-way, adjacent to the trench. Subsoil would not be allowed to mix with the previously stockpiled topsoil. Where trench dewatering is needed, water would be discharged off the right-of-way into a well-vegetated upland area and/or into an approved filter. Any contaminated soil or groundwater encountered would be managed in accordance with the Constitution's Unanticipated Discovery of Contamination Plan (Contamination Plan). Additionally, Constitution has developed an Unanticipated Cultural and Paleontological Resources and Human Remains Discovery Plan (Discovery Plan) should those features be discovered during trenching or construction. We find this plan acceptable.

Shallow Bedrock and Blasting

The proposed pipeline would cross numerous areas of shallow bedrock distributed along most of the route as discussed in detail in section 4.1. Where bedrock is encountered along the pipeline route, it would be broken up and removed using one of the following methods. Where practicable, conventional, non-explosive methods would be used, including ripping or hammering the rock with a pointed backhoe attachment before excavating it with a backhoe. Rock would be returned to a level no higher than the existing rock profile during restoration. In agricultural areas rock would not be used for backfill closer than 24 inches in mesic soil or 30 inches in frigid soils from the construction surface of the right-of-way, and any excess would be disposed of at a landfill or recycling facility or used for other approved purposes within the right-of-way as allowed by the landowner and applicable permits.

If rock cannot be removed by any of these techniques, blasting may be required to fracture the rock prior to its removal. Blasting would be performed under strictly controlled conditions designed to prevent potential damage to people and property (such as homes and wells). Constitution has proposed to offer both pre- and post-construction testing of water quality and quantity in wells and to mitigate any damages caused by construction. Minimum charges needed to perform the blasting would be used. Heavy mats may be used to prevent the scattering of debris, and blast monitoring would be conducted. Constitution has developed a Blasting Plan to address potential issues and impacts related to blasting (see section 4.1).

Constitution also developed a Karst Mitigation Plan to address potential issues associated with the presence of shallow carbonate sedimentary (i.e., limestone) rock. This plan is also discussed in section 4.1. The plan includes provisions for the use of geotechnical specialists, exploratory testing, and geophysical assessment as necessary to prevent or minimize potential impacts.

Pipe Stringing, Bending, and Welding

Once the trench is excavated, the next process in conventional pipeline construction is stringing the pipe along the trench. Stringing involves initially hauling the pipe by tractor-trailer, generally in 40-foot lengths (joints), from contractor yard onto the right-of-way. The pipe would be off-loaded from trucks and placed next to the trench using a sideboom tractor. Typically, several pipe joints are lined up end-to-end or "strung" to allow for welding into continuous lengths known as strings. Individual joints would be placed on temporary supports or wooden skids and staggered to allow room for work on the exposed ends.

The pipe would be delivered to the contractor yards and work areas in straight sections. Some bending of the pipe would be required to enable the pipeline to follow the natural grade and direction changes of the right-of-way. Selected joints would be bent by track-mounted hydraulic bending machines as necessary prior to line-up and welding. Manufacturer supplied induction bends and pre-fabricated elbow fittings may be used in certain circumstances as needed. Following stringing and bending, the individual joints of pipe would be aligned and welded together. All welding would be performed

according to applicable American National Standards Institute, American Society of Mechanical Engineers, and American Petroleum Institute standards as well as Constitution's specifications. Only welders qualified to meet the standards of these organizations would be used during construction.

Every completed weld would be examined by a welding inspector to determine its quality using radiographic or other approved methods as outlined in 49 CFR 192. Radiographic examination is a non-destructive method of inspecting the inner structure of welds and determining the presence of defects. Welds that do not meet the regulatory standards and Constitution's established specifications would be repaired or removed. After a weld is approved, the joint would be cleaned and epoxy coated. The coating on the remainder of the completed pipe section would be inspected and any damaged areas repaired.

Special tie-in crews would be used at some locations, such as at waterbody and road crossings, at changes in topography, and at other selected locations as needed. A tie-in is typically a relatively small segment of pipeline specifically used to cross certain features as needed. Once the pipeline segment is installed across the feature, the segment is then welded to the rest of the pipeline.

Lowering-in and Backfilling

Before the pipeline is lowered-in, the trench would be inspected to ensure that it is free of rocks and other debris that could damage the pipe or protective coating. Typically, any water that is present in the trench would be removed and pumped to a vegetated upland through an approved filter. Constitution would use a padding machine to ensure that rocks mixed with subsoil do not damage the pipe. The padding would consist of subsoil free from rocks and would surround the pipe along the bottom, both sides, and at the top. No topsoil would be used as padding material. Where there is not sufficient padding material on site or when the native material that was excavated from the trench is not suitable backfill material (i.e., rocky), the acquisition of backfill from other sources may be necessary.

After the pipe is lowered into the trench, final tie-in welds would be made and inspected, and then the trench would be backfilled. All suitable material excavated during trenching would be re-deposited into the trench using bladed equipment or backhoes. If rock is excavated from the trench and subsequently used as backfill, it would not be allowed to extend above the soil horizon where it naturally is found. The top of the trench may be slightly crowned to compensate for settling.

Cleaning and Hydrostatic Testing

After burial, the inside of the pipeline would be cleaned to remove any dirt, water, or debris inadvertently collected in the pipe during installation. A manifold would be installed on one end of the pipeline section and a cleaning "pig" (typically a large soft plug used to swab the inside of the pipeline) would be propelled by compressed air through the pipeline.

After cleaning, the pipe would be hydrostatically tested to ensure that the system is capable of withstanding the operating pressure for which it was designed. Hydrostatic testing involves filling the pipeline with water and pressurizing the water in the pipeline for several hours to confirm the pipeline's integrity. The testing would be done in segments according to Constitution's requirements and the DOT's specifications in 49 CFR 192. The exact sequence and timing of hydrostatic testing would depend on the final schedule for construction (section 2.4). Iroquois anticipates using a combination of nitrogen and water from municipal sources for hydrostatic testing.

Water for hydrostatic testing would potentially be obtained from five streams located along the proposed pipeline route. These streams are discussed in more detail in section 4.3. Constitution would reuse test water by transferring water from one test segment to another where practicable. Following

testing, the water would be discharged in vegetated upland areas through a dewatering structure designed to slow the flow of water. All testing activities would be conducted within the parameters of the applicable water withdrawal and discharge permits.

Cleanup and Restoration

Within 20 days of backfilling the trench, all work areas would be final graded and restored to pre-construction contours and natural drainage patterns as closely as possible, weather permitting. Permanent slope breakers or diversion berms would be constructed and maintained in accordance with the ECPs as needed. Fences, sidewalks, driveways, and other structures would be restored or repaired as necessary. If seasonal or other weather conditions prevent compliance with these timeframes, temporary erosion controls would be maintained until conditions allow completion of final cleanup.

Restoration activities would be conducted in accordance with state and municipal permit requirements. Soils that supported vegetation prior to construction would be revegetated using seed mixes, application rates, and timing windows recommended by local soil conservation authorities or other duly authorized agencies (such as the Natural Resources Conservation Service [NRCS]), landowner requests, and in accordance with the ECPs. The right-of-way would be seeded within six working days following final grading, weather and soil conditions permitting, unless otherwise directed by local soil conservation authorities. Additionally, monitoring of revegetation after construction would be conducted to evaluate and correct areas requiring remediation.

Cathodic Protection and Alternating Current Mitigation

Constitution would install cathodic protection equipment along the pipeline to prevent the corrosion of metal surfaces over time. Cathodic protection equipment could consist of underground negative connection cables, linear anode cable systems, aboveground junction boxes, and rectifiers as described above in section 2.1.2. Constitution may also develop an alternating current mitigation plan for areas where the pipeline parallels adjacent power lines. The alternating current mitigation plan would be designed to ensure safety and prevent corrosion facilitated by the presence of nearby high voltage power lines.

2.3.2 Special Construction Techniques

Construction involving wetlands, waterbodies, or construction across or within roads, highways, railroads, and streets, would require construction techniques that differ from the standard measures implemented in general areas. Constitution's special construction techniques are summarized below.

2.3.2.1 Wetland Crossings

The proposed pipeline would cross palustrine forested, palustrine scrub-shrub, and palustrine emergent wetlands. Wetland resources are discussed in detail in section 4.4. Construction within, and restoration of wetlands would be performed in accordance with the wetland construction and mitigation measures contained in the ECPs and Constitution's Procedures.

Clearing of vegetation in wetlands would be limited to trees and shrubs, which would be cut flush with the surface of the ground and removed from the wetland. Stump removal, grading, topsoil segregation, and excavation would be limited to the area immediately over the trenchline in order to avoid excessive disruption of wetland soils and the native seed and rootstock within the wetland. A limited amount of stump removal and grading may also be conducted in other areas if dictated by safety-related concerns.

During clearing, sediment barriers such as silt fence and staked straw bales would be installed and maintained adjacent to wetlands and within temporary extra workspaces as necessary to minimize the potential for sediment runoff. Sediment barriers would be installed across the full width of the construction right-of-way at the base of slopes adjacent to wetland boundaries. If trench dewatering is necessary in wetlands, the trench water would be discharged into stable, vegetated, upland areas and/or filtered through a filter bag or siltation barrier in accordance with the ECPs. No heavily silt-laden water would be allowed to flow into a wetland.

Construction equipment working in wetlands would be limited to that essential to clear the right-of-way, excavate the trench, fabricate and install the pipeline, backfill the trench, and restore the right-of-way. The specific method of construction used in wetlands would depend on the stability of the soils at the time of construction.

Standard pipeline construction, similar to construction methods described for uplands, may be conducted in non-saturated wetlands. In areas of saturated soils or standing water, low-ground-weight construction equipment and/or wooden mats would be used to reduce rutting and the mixing of topsoil and subsoil. In unsaturated wetlands and unfrozen wetlands, the top 12 inches of topsoil from the trenchline would be stripped and stored separately from the subsoil.

Where wetland soils are saturated and/or inundated, the pipeline may be installed using the push-pull technique. The push-pull technique involves stringing and welding the pipeline outside of the wetland and excavating the trench through the wetland using a backhoe supported by equipment mats. The water that seeps into the trench is used to “float” the pipeline into place together with a winch and flotation devices attached to the pipe. After the pipeline is floated into place, the floats are removed allowing the pipeline to sink into place. Pipe installed in saturated wetlands is typically coated with concrete or equipped with set-on weights to provide negative buoyancy. After the pipeline sinks to the bottom of the trench, a trackhoe working on equipment mats backfills the trench and completes cleanup. Trenchless construction techniques, such as conventional bore and Direct Pipe would also be used to cross under certain wetlands (see section 2.3.2.2).

Because little or no grading would occur in wetlands, restoration of contours would be accomplished during backfilling. Prior to backfilling, trench breakers would be installed where necessary to prevent the subsurface drainage of water from wetlands. Where topsoil has been segregated from subsoil, the subsoil would be backfilled first, followed by the topsoil. Equipment mats, terra mats, and timber riprap used for equipment support would be removed from wetlands following backfilling.

For wetlands at the base of slopes, permanent interceptor dikes and trench plugs would be installed in upland areas adjacent to the wetland boundary. Temporary sediment barriers would be installed where necessary until revegetation of adjacent upland areas is successful. Once revegetation is successful, sediment barriers would be removed from the right-of-way and properly disposed.

2.3.2.2 Waterbody Crossings

Waterbody crossings would be constructed in accordance with federal, state, and local permits and the ECPs. Surface water resources are discussed further in section 4.3.2, and aquatic resources are discussed in section 4.6.2. Discussion of potential impacts on fisheries resources, including agency consultations regarding construction timing restrictions, is also included in section 4.6.2. Constitution would cross waterbodies using methods including dry open-cut (if dry or frozen at the time of crossing), dry crossings (flume pipe, cofferdam, or a dam and pump), or trenchless crossings (conventional bore or Direct Pipe).

Where standing water is present within a channel, but flow is not discernible, a dry crossing (e.g., flume crossing, dam and pump, or cofferdam) method would be used to allow for construction under dry conditions. The specific dry crossing method to be used at waterbodies would be decided at the time of construction based on site conditions.

Wet, open-cut crossing methods are not proposed for any waterbodies, but could be considered if the dry crossing options are rendered infeasible. Wet, open-cut construction methods involve trenching within the waterbody under flowing conditions, with backfill and restoration occurring quickly (typically within 24 to 48 hours) to limit impacts on the stream. Implementation of these methods would require additional review by the COE, PADEP, NYSDEC, and the Commission.

The pipeline crossings would typically require extra workspaces on each side of the waterbody to stage construction, fabricate the pipeline, and store materials. These extra workspaces would be located a minimum of 50 feet from the waterbody edge, except where the adjacent upland consists of actively cultivated or rotated cropland or other disturbed land, or where site-specific for a reduced setback is necessary (section 4.3.3 and appendix D).

Constitution would install temporary equipment bridges over waterbodies. Bridges may include clean rock fill over culverts, equipment pads supported by flumes, railcar flatbeds, flexi-float apparatus, and other types of spans. These bridges would remain in place throughout construction until they are no longer needed. Each bridge would be designed to accommodate normal to high stream flows and would be maintained to prevent soil from entering the waterbody. All construction equipment would be required to use the bridges, except for the clearing equipment needed for installation of the equipment bridges. The number of clearing equipment crossings of each waterbody would be limited to one piece of equipment as specified in Constitution's Procedures. Sediment barriers would be installed immediately after initial disturbance of the waterbody or adjacent upland. Sediment barriers would be properly maintained throughout construction and reinstalled as necessary (such as after backfilling of the trench) until replaced by permanent erosion controls, or restoration of adjacent upland areas is complete and revegetation has stabilized the disturbed area.

Dry Crossing Construction Methods

Dry open-cut crossings of waterbodies involve conventional trenching of channels that are dry or frozen at the time of crossing (contain no discernible flow). This construction technique is similar to the standard pipeline installation process described above for uplands. However, Constitution identified it would complete construction and backfill within 24 hours for minor water bodies (less than 10 feet wide) and within 48 hours for intermediate waterbodies (10 to 100 feet wide). Constitution has committed to keep temporary diversion structures available onsite in the event that unexpected rainfall causes any waterbody being crossed by the dry open-cut method to begin flowing prior to completion of the crossing. In that case, a flume crossing, dam and pump or cofferdam method would then be employed.

The flume method is a standard dry waterbody crossing method that involves diverting the flow of water across the construction work area through one or more flume pipes placed in the waterbody. The first step involves placing a sufficient number of adequately sized flume pipes in the waterbody to accommodate the highest anticipated flow during construction. After the flume pipe(s) are placed in the waterbody, sand bags or equivalent dam diversion structures are installed in the waterbody upstream and downstream of the trench area. These devices serve to dam the stream and divert the water flow through the flume pipe(s), thereby isolating the water flow from the construction area between the dams. The flume pipe(s) and dams would remain in place during pipeline installation and until the final cleanup of the stream bed and bank is completed.

The dam and pump method is another standard dry waterbody crossing construction method that may be used as an alternative to the flume method. This method is similar to the flume crossing method except that pumps and hoses are used instead of flumes to move water across or around the construction work area. The technique involves installing a pump upstream of the crossing and running a discharge hose from the pump across the construction area to a discharge point downstream of the construction area. After the pump is installed and operational, sandbags or equivalent dam diversion structures would be installed upstream and downstream of the trench area to isolate the water flow from the construction area between the dams. An energy dissipation device would be used to prevent scouring of the stream bed at the discharge location. Water flow would be maintained throughout the dam-and-pump operation until the pipeline is installed and banks are restored and stabilized.

A cofferdam is a temporary structure that could be installed within waterbodies to isolate a portion of the work area during construction, thereby allowing pipeline installation and construction to proceed under dry conditions. Cofferdams would typically be used for waterbody crossings with larger high flow volumes that may be unsuitable for flume or dam and pump methods. A cofferdam consists of installing the pipeline across the waterbody in stages, using the cofferdam to divert the water around the workspace (i.e., a portion of the stream's width) in each stage. This process allows work to proceed under dry conditions during each stage after the work area is dewatered, and it could take two or more stages to complete the crossing. Cofferdam construction methods may include but not be limited to sand bags, sheet piling, timber lagging, and inflatable dams.

Cofferdam crossings would be designed in accordance with all applicable federal and state permits to ensure that the cofferdam could withstand elevated waterbody flows during the course of the work. Dewatering operations of the work areas isolated by the cofferdam would require silt-laden water to be pumped and discharged to an appropriate dewatering device (e.g., filter bags) in a vegetated upland area before it would be allowed to flow back towards the waterbody.

Trenchless Crossing Methods

Conventional boring consists of creating a tunnel-like shaft for a pipeline to be installed below roads, waterbodies, wetlands, or other sensitive resources without affecting the surface of the resource. Bore pits would be excavated on both sides of the resource to the depth of the adjacent trench and graded to match the proposed slope of the pipeline. A boring machine would then be used within the bore pit to tunnel under the resource or wetland by using a cutting head mounted on an auger. The auger would rotate and be advanced forward as the hole is bored. The pipeline would then be pushed through the bore hole and welded to the adjacent section of pipeline.

The HDD construction method would not be used at any locations based on construction method changes following issuance of the draft EIS, and the Direct Pipe construction method would be used at four locations. The proposed Direct Pipe locations cross under waterbodies and/or wetlands, in each case. The locations and lengths of the proposed Direct Pipe crossings and the resources they would cross under are summarized in table 2.3.2-1. Constitution has prepared conceptual site-specific construction plans for the one major waterbody crossing (Schoharie Creek). We find this conceptual plan to be acceptable.

TABLE 2.3.2-1 Proposed Horizontal Directional Drill and Direct Pipe Locations for the Constitution Pipeline						
Approximate Milepost		Length (feet)	Potential Installation Method	Proposed Alternative Crossing Method if the Trenchless Method Fails	Reason for Evaluation	Status
Start	End					
New York						
47.7	48.0	700	Direct Pipe	Open-cut crossing (Wetlands) Dry crossing (Waterbodies)	Avoidance of Bennettsville Creek, other waterbodies, wetlands	The HDD method was determined to be infeasible by Constitution after issuance of the draft EIS. Constitution proposed changing the crossing method from HDD to Direct Pipe.
85.8	86.1	530	Direct Pipe	Open-cut crossing (Wetlands)	Avoidance of wetlands	The HDD method was determined to be infeasible by Constitution after issuance of the draft EIS. Constitution proposed changing the crossing method from HDD to Direct Pipe.
87.8	88.2	400	Direct Pipe	Open-cut crossing (Wetlands) Dry crossing (Waterbodies)	Avoidance of wetlands, Middle Brook, other waterbodies, and Highway 23	The HDD method was determined to be infeasible by Constitution after issuance of the draft EIS. Constitution proposed changing the crossing method from HDD to Direct Pipe.
119.8	120.0	744	Direct Pipe	Dry crossing (Waterbodies)	Avoidance of Smith Road, Schoharie Creek, Holiday Way	Preliminary design of Direct Pipe method in progress

The HDD method, which is not currently proposed, would if utilized also avoid disturbing surface and shallow subsurface features (such as waterbodies, wetlands, vegetation, manmade structures, and public use and protected areas) between two construction areas. The HDD method typically involves establishing workspaces in upland areas on both sides of the feature(s) to be crossed and confining the work and equipment to these areas. The process commences with the drilling of a pilot hole in an arced path beneath the feature using a drill rig positioned on the entry side of the crossing. When the pilot hole is completed, reamers are attached and are used to enlarge the hole in one or more passes until its diameter is sufficient to accommodate the pipeline. As the hole is being reamed, a pipe section long enough to span the entire crossing is fabricated (staged and welded) on one side of the crossing (typically the exit side) and then hydrostatically tested to ensure the integrity of the welds. When the reaming is complete, the prefabricated pipe section is pulled through the pre-reamed drilled hole back to the entry side.

Between HDD entry and exit points foot traffic would be required to place guide wires to track the progress and guide the movement of the drilling cutterheads. These guide wires would be placed in upland and wetland areas but would not be laid on the bed of any waterbodies.

Constitution proposes to clear a 10-foot-wide corridor between the Direct Pipe entry and exit holes, including within wetlands, at Middle Brook, Bennettsville Creek, and Schoharie Creek. We consider this proposal in section 4.4, but have currently found the need to be unsupported. Pathways to the water source in support of drilling operations can typically be routed in a meandering fashion, thereby avoiding trees and any substantial clearing. In section 4.4 we recommend that Constitution not clear any trees between the Direct Pipe entry and exit sites during construction. Minor brush clearing, less than 3 feet wide, using hand tools only is typically allowed to facilitate the use of the HDD tracking system, or acquisition of water for makeup of the HDD slurry (although no HDDs are currently proposed).

Throughout the drilling process, a slurry of naturally occurring, non-toxic, bentonite clay and water would be pressurized and pumped through the drilling head to lubricate the drill bit, remove drill cuttings, and hold the hole open. This slurry, referred to as drilling mud or drilling fluid, has the potential to be inadvertently released to the surface. The pipeline route would be monitored and the circulation of drilling mud throughout the HDD operation for indications of an inadvertent drilling mud release and would immediately implement corrective actions if a release is observed or suspected. The corrective actions that Constitution would implement if it utilizes the HDD method, including the agencies it would notify and the steps it would take to clean up and dispose of a release, are outlined in its Draft HDD Contingency Plan, which is discussed in section 4.3.3.

It is possible for HDD operations to fail, primarily due to the encountering of unexpected geologic conditions during drilling or if the pipe were to become lodged in the hole during pullback operations. Potential causes for abandoning a drill hole include the loss of drill bits or pipe down the hole due to a mechanical break or failure; a prolonged release of drilling mud that cannot be controlled; failure of the HDD pullback where a section of pipe cannot be retracted and has to be abandoned; or an inability to correct a severe curvature of the pilot hole drill path. In any event, reasonable attempts would be made to overcome the obstacles preventing successful completion of the drill. Such measures could include re-drilling the pilot hole in a slightly different location or re-conditioning of the pilot hole. Constitution would be required to seek approval from the Commission and other applicable agencies prior to abandoning any proposed HDD (or Direct Pipe) crossing in favor of another construction method. If an HDD or Direct Pipe hole were to be abandoned, Constitution would seal and grout with cement at least the upper 35 feet of the bore hole(s), with the top five feet filled with soil to allow for revegetation. Constitution's preferred alternative crossing methods in the event that any proposed trenchless crossing were to fail are listed in table 2.3.2-1.

Not all geotechnical data testing pertaining to the feasibility of the proposed Direct Pipe crossings have been provided by Constitution, often due to a lack of survey permission. These geotechnical assessments would be required by the Commission prior to the start of drilling operations (see section 4.1.1.2). If any of the proposed Direct Pipe crossings are found to be infeasible, Constitution would be required to submit specific proposed alternate construction methods for review and approval by the Commission and other applicable agencies.

The Direct Pipe procedure is another trenchless construction method that is similar to HDD, but is also combined with processes related to microtunnelling. A single, continuous process allows the trenchless installation of pre-fabricated pipeline simultaneously with development of the bore hole. A Direct Pipe installation is different from an HDD because a much larger initial cutterhead is used, eliminating the reaming process. Excavation and hole boring is performed with a navigable microtunnelling machine and cutterhead. Temporary flushing pipes located inside the pipeline are used to

transport the drilling fluids to the cutterhead and earthen cuttings to the surface. The pressure used to advance the boring process and simultaneously install the pipeline is applied directly to the pipeline by a piece of equipment called a "pipe thruster." The force applied on the pipeline pushes the cutting head forward. Reliable installation and monitoring methods ensure accurate measurement of the pipe's location along the intended pathway.

Direct pipe installations may be shorter and more shallow than HDD installations because the bore hole is continuously cased, thereby limiting the risk of hole collapse and the inadvertent release of drilling fluids. The Direct Pipe technology for a 30-inch-diameter pipeline is currently limited to crossings of roughly 900 feet in length or shorter. Subsurface geology (including boulders) may affect the successful use of this method.

2.3.2.3 Drag-Section and Stove-Pipe Specialized Construction Methods

The drag-section and stove-pipe methods could be used to reduce the amount of workspace and the duration of construction activity in the immediate vicinity of residences and other areas where workspace may be limited. The drag-section method first involves excavating a trench long enough to accommodate several pipe sections. Then, a section of pipe fabricated at either end of the trench is carried along the travel lane, lowered into the ditch, and welded into place. Immediately after, the trench is backfilled. At any given time with this method, the excavation of the trench is limited to length of the prefabricated pipe segment being installed. The steps for the stove pipe method are similar except that only one pipe section would be installed at a time (typically 40 feet).

2.3.2.4 Typical Road and Railroad Construction Methods

The pipeline project would cross numerous public or private roads and railroads. Two of the railroads that would be crossed are active and two are inactive, although one inactive railroad is used as a trail. These roads and railroads are listed in appendices F-1 and F-2, respectively, along with the proposed crossing method. Roads would either be conventionally bored, open-cut, or crossed by Direct Pipe. All railroads would be conventionally bored. A description of the conventional boring, HDD, and Direct Pipe construction techniques is provided above. Open-cut road crossing methods are described below. The use of conventional boring, HDD, and Direct Pipe methods would avoid road and rail surface impacts, but the use of the open-cut crossing method would not. Road crossing permits would be obtained from applicable federal, state, and local agencies. These permits would dictate the specific requirements for the day-to-day construction activities and methods at each crossing.

Open-Cut Road Crossing Method

Where paved, road crossings are open-cut, the pavement over the trench would be cut and removed. This would be followed by the excavation of the trench and installation of the pipeline. Trenching would typically be accomplished using a backhoe or trackhoe augmented by hand-shoveling where necessary to expose and protect existing utilities. Any existing utilities that are exposed during the excavation would be supported at their existing elevations. This support would be maintained throughout the crossing operation until the backfilling is completed. If the roadway surface is paved, the pavement would be restored in accordance with the road crossing permit requirements. Gravel surfaces would also be repaired to as good or better conditions following restoration.

Constitution would use appropriate measures to ensure that road construction activities do not prevent passage by emergency and other vehicles. Measures could include the use of temporary travel lanes during construction or the installation of steel plate bridges over the work area to allow traffic flow during open trenching. Traffic flow and access to homes would be maintained, except for the temporary

periods when road blockage is unavoidable due to actual pipeline installation. In circumstances where traffic volumes are high or congested, Constitution would use a police presence to direct traffic and ensure public safety.

2.3.2.5 Residential Areas

The proposed pipeline route crosses numerous residential properties and would pass within 50 feet of at least seven identified homes and one pool house. Residential structures within 50 feet of construction work areas are discussed in more detail in section 4.8.3.1; Constitution has developed site-specific residential construction plans for these homes. Special care would be taken when residential areas are adjacent to construction activities to minimize neighborhood and traffic disruption and to control noise and dust to the extent practicable.

In general, Constitution indicated that when working near or adjacent to residential areas, it would:

- maintain at least a 25-feet-wide buffer from any residence and the construction work area, where feasible;
- notify local residents at least 7 days in advance of construction activities;
- maintain access to homes, except for short periods necessary for installing the pipeline;
- install safety fencing along the work areas for at least 100 feet on both sides of a residence and install additional fencing along the work boundary;
- preserve trees and landscaping, where possible;
- preserve and replace topsoil in lawns;
- restore affected structures such as fences, mailboxes, and gates;
- ensure pipe is welded and installed as quickly as reasonably possible consistent with prudent pipeline construction practices to minimize construction time affecting a home or neighborhood; and
- backfill the trench within 10 days and complete final cleanup within 10 additional days, weather permitting.

2.3.2.6 Winter Construction

Constitution has proposed to place its project into service in March 2015 although we acknowledge this date is no longer feasible (see section 1.0, above and section 2.4, below), and would seek approval to begin construction as soon as all necessary federal, state, and local approvals and site access can be obtained. This schedule may involve construction during the winter of 2014/2015. Therefore, Constitution developed a Winter Construction Plan to address specialized methods and procedures that would be used to protect resources during the winter season. The key elements of the Winter Construction Plan include:

- use of special snow plowing equipment that would prevent mixing of snow and underlying soil;
- storage of snow over the trenchline prior to excavation to prevent deep frost penetration of the soil;
- clearing of snow from roads without blocking driveways or other access points;

- coordination with individual landowners on a site-specific basis if snow storage adjacent to the construction right-of-way is desired;
- minimization of the amount of open trench and use of safety fencing where snow may cover an open trench;
- suspension of backfill and topsoil replacement if unfeasible due to frozen conditions;
- use of mulch and erosion control devices to stabilize topsoil and subsoil piles; and
- delaying final cleanup activities until soils have thawed.

We have reviewed the Winter Construction Plan and have found its mitigating measures acceptable.

2.3.2.7 State-owned Lands

Constitution is proposing to cross two state-owned lands in New York: the Clapper Hollow State Forest in Schoharie County, and the Melondy Hill State Forest in Chenango County. The proposed routes across these two state forests have been modified by Constitution in consultation with the NYSDEC in order to minimize potential impacts. Constitution has developed site-specific crossing plans that we find acceptable. These crossings are discussed further in section 4.8.4.1.

2.3.2.8 Agricultural Lands

The proposed pipeline crosses numerous agricultural lands including row crops, specialty crops, pastures, and organic farms. These resources are discussed in detail in section 4.8. Measures that would be used by Constitution to prevent or minimize impacts on agricultural lands would include:

- use of an Agricultural Inspector (AI);
- preservation, segregation, and replacement of topsoil across the full construction right-of-way;
- removal of rock (4 inches in size or larger) to a depth of 12 inches or to the subsoil horizon;
- repair or replacement of drain tiles or irrigation systems damaged during construction; and
- initiation of a crop-monitoring program to assess the yields of restored areas post-construction.

In addition to the other plans already discussed in this section, Constitution has developed or adopted three other specialized plans to further prevent or minimize potential impacts. These plans include: *Special Crop Productivity Monitoring Procedures* (provided by the NYSDAM and adopted by Constitution); *Seeding, Fertilizing, and Lime Recommendations for Gas Pipeline Right-of-way Restoration in Farmlands* (also provided by the NYSDAM and adopted by Constitution); and an Organic Farm Protection Plan.

2.3.2.9 Rugged Topography

Rugged topography, such as steep, vertical slopes and steep side slopes (i.e., slopes running parallel to the proposed route), is present in numerous areas along the proposed pipeline route. These areas are listed in appendix G. In the steepest areas, Constitution would employ a technique called

"winching" that involves placing heavy equipment at the top of the slope to serve as an anchor point, and then connecting one or more additional pieces of equipment together with a cable. This provides stability and safety to the equipment operators as work proceeds up and down the steep slope.

Another construction method used in areas with steep side slopes is called the "two-tone" cut and fill method. Typically, the up-slope side of the construction right-of-way is cut during grading, and the soil excavated from the cut is then be used to fill the down-slope edge of the construction right-of-way to provide a safe and level working surface for heavy equipment. Pipeline construction then occurs on the level surface as it would in typical construction. Then, during restoration, the spoil material are placed back into the cut and compacted to match the original topography and contours. Constitution would require extra workspace in these areas for storage of excavated material from the temporary cut and fill areas, as well as for temporary storage of material such as trench spoil, excess rock, and felled timber. Subsurface springs or seeps encountered during excavation activities would be directed down-slope through drainage pipes or French drains.

Right-of-way restoration in rugged areas, including restoration of pre-construction contours, would begin within 10 days of pipeline installation to minimize potential erosion issues. Permanent trench breakers would be installed in the trench surrounding the pipeline in areas of steep slopes with high erosion potential and to prevent the high velocity channeling of water along the trench line. Constitution indicated that cement sacks would not be utilized to construct trench breakers. Seeding and mulching would be performed in these areas to promote revegetation and slope stability.

2.3.3 Aboveground Facility Construction Procedures

Both Constitution and Iroquois have proposed aboveground facilities for their proposed projects (see table 2.1.2-1 above). Constitution's facilities include two new M&R stations, two side taps, communication towers, a pig launcher, a pig receiver, MLVs, and assorted ancillary facilities (including junction boxes and rectifiers for cathodic protection) at various points along the proposed route. Construction activities associated with these facilities would include installation of erosion controls, clearing, grading, installation of concrete foundations, construction of metal buildings appurtenances, fencing, communication tower assembly, pressure testing, and restoration grading and landscaping. Initial work at the M&R stations would focus on preparing the sites for equipment staging, fabrication, and construction. Foundation holes and pipe trenches would be excavated with standard construction earthmoving equipment, unless blasting is required. Following foundation work, station equipment and structures would be brought to the site and installed, using any necessary trailers or cranes for delivery and installation. Following installation of the facilities, associated equipment, piping, and electrical systems would be installed, and the sites would be graveled, as necessary, and fenced. Necessary equipment testing and start-up activities would occur on a concurrent basis.

The construction methods associated with Iroquois' expansion of the Wright Compressor Station would proceed in a manner similar to that described immediately above, but in a single location at the terminus of the pipeline project and on a larger scale. Iroquois' proposed facilities include a new compressor building, cooling facility, additional piping, and other ancillary facilities. The compressor building would be approximately 80 feet wide by 100 feet long. The roof would peak at 58 feet tall, although the exhaust stack would reach a height of 63 feet. A steel frame would be covered with siding, although the exterior design has not yet been completed. The cooling facility would be approximately 40 feet long by 25 feet wide. Telephone service would be extended over from the existing connections within the Wright Compressor Station, and expanded electrical service would be required. Prior to placement into service, Iroquois' new facilities would be tested and operated on a trial basis.

2.4 CONSTRUCTION SCHEDULE

As part of their applications, Constitution and Iroquois originally proposed an in-service date of March 2015. However, we acknowledge this date is no longer feasible. Constitution has proposed to start construction in February of 2015 and continue through the end of 2015. The applicants would request to place the facilities into service following a determination that restoration is proceeding satisfactorily. We expect an in-service request would follow shortly after the end of construction. The Applicants would seek to begin construction of their projects dependent upon:

- whether the Commission decides to authorize a Certificate;
- subsequent acquisition of additional survey access and easement agreements;
- completion of field surveys and submittal of permit applications;
- receipt of all necessary federal, state, and local authorizations;
- other project-specific requirements such as waterbody, migratory bird, and rare bat construction window restrictions (see sections 4.3.3, 4.6, and 4.7);
- satisfaction of all pre-construction conditions of any Certificate issued for the projects; and
- the FERC's separate, post-Certificate authorization that construction may begin.

Constitution originally proposed that construction would start in the third quarter of 2014, but later amended the proposed date to the second quarter of 2014 and then again to February 2015. Constitution would likely first commence clearing activities at special status streams, access roads, trenchless construction workspaces, and M&R stations and subsequently clear vegetation at remaining areas along the mainline pipeline right-of-way. It is anticipated that pipeline construction would occur over a period of approximately 9 to 12 months. Winter weather, wet conditions, and other unforeseen factors could result in construction schedule delays. Iroquois proposed that construction at the Wright Interconnect project would start in July 2014 and would continue for approximately 9 months.

2.5 ENVIRONMENTAL COMPLIANCE INSPECTION AND MITIGATION MONITORING

2.5.1 Coordination and Training

Constitution and Iroquois would incorporate the mitigation measures identified in their permit applications as well as additional requirements of federal, state, and local agencies into their construction drawings and specifications. Constitution and Iroquois would also provide copies of applicable environmental permits and construction drawings and specifications to their construction contractors.

Constitution and Iroquois would develop an environmental training program tailored to the proposed projects and their requirements. The program would be designed to ensure that:

- qualified environmental training personnel provide thorough and focused training sessions regarding the environmental requirements applicable to the trainees' activities;
- all individuals receive environmental training before they begin work on any construction workspaces;
- adequate training records are kept; and

- refresher training is provided as needed to maintain high awareness of environmental requirements.

Constitution and Iroquois would also conduct training for construction personnel regarding proper field implementation of the ECPs and other project-specific plans and mitigation measures.

2.5.2 Environmental Inspection

Constitution and Iroquois would be represented on each construction spread[6] or work area by a Resident Engineer/Chief Inspector, who would have overall authority on the construction spread for quality assurance and compliance with mitigation measures, other applicable regulatory requirements, and company specifications. One or more EIs would be employed per spread by Constitution and Iroquois during active construction and restoration. The EIs would be on-site during active construction and would have peer status with all other activity inspectors. The EI would have authority to stop construction activities that violate the measures set forth in the documents and permit authorizations for both projects, as well as authority to order corrective actions. At a minimum, the EI would be responsible for:

- ensuring compliance with the measures set forth in the ECPs (for the pipeline project) and all other environmental permits and approvals, as well as environmental requirements in landowner agreements;
- identifying, documenting, and overseeing corrective actions as necessary to bring an activity back into compliance;
- verifying that the limits of authorized construction work areas and locations of access roads are properly marked before clearing;
- verifying the location of signs and highly visible flagging marking the boundaries of sensitive resource areas, waterbodies, wetlands, or areas with special requirements along the construction work area;
- identifying erosion/sediment control and stabilization needs in all areas;
- locating dewatering structures and slope breakers to ensure they would not direct water into sensitive areas such as known cultural resource sites or sensitive species habitat;
- verifying that trench dewatering activities do not result in the deposition of sand, silt, and/or sediment near the point of discharge in a wetland or waterbody. If such deposition is occurring, the EI would stop the dewatering activity and take corrective action to prevent a reoccurrence;
- advising the Resident Engineer/Chief Inspector when conditions (such as wet weather) make it advisable to restrict construction activities to avoid excessive rutting;
- approving imported soils and verifying that the soil is certified free of noxious weeds and soil pests, unless otherwise specified by the landowner;
- determining the need for and ensuring that erosion controls are properly installed, as necessary, to prevent sediment flow into wetlands, waterbodies, sensitive areas, and onto roads;

[6] A spread is an individual segment of the overall project staffed by its own labor and equipment. The project would consist of 5 spreads.

- inspecting and ensuring the maintenance of temporary erosion control measures at least daily in areas of active construction or equipment operation, on a weekly basis in areas with no construction or equipment operation; and within 24 hours of each 0.5 inch or greater of rainfall in Pennsylvania, with slightly more stringent inspection requirements in New York[7];
- ensuring restoration of contours and topsoil;
- ensuring the repair of all ineffective temporary erosion control measures as soon as possible but not longer than 24 hours after identification;
- ensuring that the Applicants' contractors implement and comply with their spill prevention and mitigation plans;
- keeping records of compliance with conditions of all environmental permits and approvals during active construction and restoration; and
- identifying areas that should be given special attention to ensure stabilization and restoration after the construction phase. Constitution would also employ an AI, who would ensure that construction within agricultural areas or areas that could impact agricultural resources meet permit requirements.

2.5.3 FERC Third-Party Compliance Monitoring

Constitution has committed to funding a FERC third-party compliance monitoring program during the construction phase of the pipeline project. Under this program, a contractor, is selected by, managed by, and reports solely to the FERC staff to provide environmental compliance monitoring services. The FERC Third-party Compliance Monitor would provide daily reports to the FERC on compliance issues and make recommendations to the FERC Project Manager on how to deal with compliance issues and construction changes, should they arise. In addition to this program, FERC staff would also conduct periodic compliance inspections during all phases of construction.

2.5.4 Post-Approval Variance Process

The pipeline alignment and work areas identified in this draft EIS should be sufficient for construction and operation (including maintenance) of the projects. However, minor route realignments and other workspace refinements sometimes continue past the project planning phase and into the construction phase. These changes could involve minor route realignments, shifting or adding new extra workspaces or staging areas, adding additional access roads, or modifications to construction methods. We have developed a procedure for assessing impacts on those areas that have not been evaluated in this draft EIS and for approving or denying their use following any Certificate issuance. In general, biological and cultural resources surveys were conducted using a survey corridor larger than that necessary to construct the facilities. Where survey approvals were denied, Constitution would complete the required surveys following a Certificate issuance. If Constitution or Iroquois request to shift an existing workspace or require a new extra workspace subsequent to issuance of a Certificate, these areas would typically be within the previously surveyed area. Such requests would be reviewed using a variance request process.

[7] Twice per week inspections in areas with no active construction and greater than 5 acres in size and the initiation of inspections once rain events reach the 0.5-inch threshold, whether or not the rain event is continuing (as per NYSDEC requirements).

A variance request for route realignments or extra workspace locations along with a copy of the survey results would be documented and forwarded to the FERC in the form of a "variance request" in compliance with recommended condition number 5 in section 5.2 of this EIS. The FERC would take the lead on reviewing the request. Typically, no further resource agency consultation would be required if the requested change is within previously surveyed areas and no sensitive environmental resources are affected. The procedures used for assessing impacts on work areas outside the survey corridor and for approving their use are similar to those described above, except that additional surveys, analyses, and resource agency consultations would be performed to assess the extent of any impacts on biological, cultural, and other sensitive resources and identify any avoidance or minimization measures necessary. All variance requests for Constitution's project and their approval status would be documented according to the FERC's compliance monitoring program as described above. Any variance activity by either Applicant (whether submitted through the third party compliance monitoring program or directly to FERC) and subsequent FERC action would be available on the FERC's e-library webpage under the docket number for the respective project (CP13-499 or CP13-502).

After Constitution and Iroquois complete any additional surveys, landowner consultation, analyses, and/or resource agency consultations, the new work area and supporting documentation (including a statement of landowner approval) would be forwarded to the FERC in the form of a variance request, which would be evaluated in the manner described above for approval or denial.

2.5.5 Post-Construction Monitoring

After construction, Constitution and Iroquois would conduct follow-up inspections of all disturbed upland areas after the first and second growing seasons to determine the success of restoration. Restoration of upland areas would be considered successful if the right-of-way vegetation is visually successful in density and cover, surface conditions are similar to adjacent undisturbed lands, construction debris is removed, and proper drainage has been restored. For at least 2 years following construction, Constitution and Iroquois would submit quarterly reports to the FERC that document any problems identified by Constitution, Iroquois, or landowners and describe the corrective actions taken to remedy those problems. Constitution proposed to perform monitoring for invasive plant species on at least an annual basis for 3 years following construction. However, we are recommending in section 4.5 that Constitution extend the monitoring of invasive species for a period of 3 years following successful revegetation as determined by the Commission's post-construction inspections. The monitoring period for invasive species would be extended as needed or as required by permits or regulatory agencies.

In accordance with its ECPs, Constitution would monitor the success of wetland revegetation annually for the first 3 years (or as required by permit) after construction or until wetland revegetation is successful. Wetland revegetation would be considered successful when the cover of herbaceous and/or woody species is at least 80 percent of the type, density, and distribution of the vegetation in adjacent undisturbed wetland areas or as compared to documented, pre-project conditions. In accordance with its Procedures, if revegetation is not successful at the end of 3 years, Constitution would develop and implement (in consultation with a professional wetland ecologist) a plan to actively revegetate the wetland with native wetland herbaceous and woody plant species.

After construction, the FERC, cooperating agencies, and/or other agencies would continue to conduct oversight inspection and monitoring to assess the success of restoration. If it is determined that the success of any of the restoration activities are not adequate at the end of the respective timeframes, Constitution and Iroquois would be required to extend their post-construction monitoring programs.

2.6 OPERATION, MAINTENANCE, AND SAFETY CONTROLS

Constitution and Iroquois would operate and maintain the proposed pipeline and/or aboveground facilities in compliance with the DOT's regulations provided in 49 CFR 192, the Commission's guidance at 18 CFR 380.15, and the maintenance provisions of their Plan and Procedures. Constitution and Iroquois would operate and maintain the newly constructed pipeline facilities in the same manner as they currently operate and maintain their existing systems. The pipeline right-of-way would be patrolled by either aerial flyovers or ground surveys on a schedule as described in table 2.6-1, although additional ground surveys would be conducted as necessary.

TABLE 2.6-1
Maximum Scheduled Intervals Between Patrols for the Proposed Constitution Pipeline Project

Class Location of Line[a]	At All Highway and Railroad Crossings (inspection interval)	At All Other Locations (inspection interval)
1 and 2	No longer than every 7.5 months, and at least twice each calendar year.	No longer than every 15 months, and at least once each calendar year.
3	No longer than every 4.5 months, and at least four times each calendar year.	No longer than every 7.5 months, and at least twice each calendar year.
4	No longer than every 4.5 months, and at least four times each calendar year.	No longer than every 4.5 months, and at least four times each calendar year.

[a] As defined by DOT's Pipeline and Hazardous Materials Safety Administration at 49 CFR 192.5:

Class 1: offshore areas and areas within 220 yards of a pipeline with ≤10 buildings intended for human occupancy.

Class 2: areas within 220 yards of a pipeline with >10 but <46 buildings intended for human occupancy.

Class 3: areas within 220 yards of a pipeline with >46 buildings intended for human occupancy; and areas within 100 yards of either a building or a small, well defined outside area (such as a playground, recreation area, outdoor theater, or other place of public assembly) that is occupied by 20 or more persons on at least five days a week for 10 weeks in any 12-month period.

Class 4: areas within 220 yards of a pipeline where buildings with four or more stories are prevalent.

The new pipeline would be patrolled to identify:

- erosion concerns occurring along the right-of-way;
- the performance status of water control devices and stormwater structures;
- the condition of the banks at waterbody and wetland crossings;
- third-party activity along the pipeline right-of-way;
- the condition/success of vegetation and plantings;
- the presence of invasive plant species; and
- any other conditions that could threaten the pipeline.

Constitution's management staff would be notified by its inspectors of any conditions that need attention. Corrective measures would be performed as needed. Aboveground facilities such as M&R stations and MLVs would also be inspected to ensure proper working conditions. The pipeline cathodic protection system would also be monitored and inspected periodically to ensure proper and adequate corrosion protection.

Maintenance of the proposed pipeline permanent right-of-way in uplands generally would consist of mowing once every 3 years. However, Constitution may mow a 10-foot-wide strip centered over the

pipeline in both upland and wetland areas (with the exception of Direct Pipe segments), along with selective cutting and removal of trees greater than 15 feet high located within 15 feet of the pipeline within wetlands, to facilitate inspections. All workspaces affected temporarily during construction would be stabilized and seeded, and then allowed to eventually revert back to pre-project conditions.

The pipeline facilities would be clearly marked at line-of-sight intervals and at crossings of roads, railroads, and other key points. The markers would indicate the presence of the pipeline and provide a telephone number and address where a company representative could be reached in the event of an emergency or before any third party excavation in the area of the pipeline. Constitution and Iroquois participate in the "Call Before You Dig" and "One Call" programs and other related pre-excavation notification organizations.

Iroquois would also inspect and maintain the proposed compressor station facilities, including calibrating equipment; checking; the odorization system; assessing cathodic protection systems; checking safety systems; and monitoring pressures, temperature, and vibration data. Iroquois would also mow and maintain the landscaping around the compressor station.

2.7 FUTURE PLANS AND ABANDONMENT

Constitution and Iroquois have not identified or proposed any plans for future expansion of their systems or abandonment of any of the projects' facilities. If at some point in the future, the project facilities were proposed to be abandoned, then the applicant would have to seek specific authorization from the FERC for that action. The public would have the opportunity to comment on the applicant's abandonment proposal. We have received comments from the public concerning the possible future expansion of Constitution's project to transport additional and newly developed supplies of natural gas. Such an expansion, if proposed, would require a new, separate NEPA review by the FERC and additional permitting by other local, state, and federal agencies.

In response to an information request from the FERC, Constitution indicated if its pipeline inlet pressures were to be increased to Constitution's maximum operating pressure of 1,440 psig, then the maximum volume that the pipeline would be able to transport would be 850,000 Dth/d, assuming there were no other constraints at the delivery point. This scenario would possibly allow Constitution to deliver an additional 200,000 Dth/d of natural gas beyond the level currently proposed. However, Constitution would need additional FERC authorization to increase any volumes above the proposed 650,000 Dth/d.

3.0 ALTERNATIVES

In accordance with NEPA and our policy, we evaluated alternatives to the projects to determine whether an alternative would be technically and economically feasible, and environmentally preferable to the proposed action. The purpose of this evaluation was to determine whether there are reasonable alternatives that would result in less environmental impact than the projects as proposed while still meeting the projects' objectives. As described in section 1.1, Constitution indicated that the project objectives were to:

- deliver up to 650,000 Dth/d of natural gas supply from Susquehanna County, Pennsylvania to the interconnect with the Iroquois and TGP systems at the existing Wright Compressor Station;
- provide new natural gas service for areas currently without access to natural gas;
- expand access to multiple sources of natural gas supply, thereby increasing supply diversity and improving operational performance, system flexibility, and reliability in the New York and New England market areas;
- optimize the existing systems for the benefit of both existing and new customers by creating a more competitive market, resulting in enhanced market competition, reduced price volatility, and lower prices; and
- provide opportunities to improve regional air quality by utilizing cleaner-burning natural gas in lieu of fuel oil in existing and future residential, commercial, and industrial facilities, thereby reducing GHG emissions and other pollutants.

Iroquois stated that the purpose of its project is to provide 650,000 Dth/d of leased firm capacity of natural gas from the terminus of the Constitution's project in Wright, New York to downstream customers in Iroquois' existing system through the addition of system compression, interconnections with TGP, and other necessary infrastructure. According to Iroquois, the interconnection with Constitution's project and the proposed compressor transfer station would provide Iroquois' existing customers with new supply, increased reliability, and lower fuel prices.

After issuance of the draft EIS, we became aware of another possible project being considered by Iroquois, the South-to-North (SoNo) Project which has not yet been filed with the Commission and would involve reversing the flow of natural gas on parts of its system. If Iroquois pursues the SoNo project and it is approved, then portions of gas supplied to Iroquois could be displaced to other parts of its system. While the gas supplied by Constitution could be displaced to the northern parts of Iroquois' system, the capacity created by the Constitution project would still be realized.

The alternatives to the proposed actions that we address in this section include the no-action alternative, system alternatives, route alternatives, minor route variations, and aboveground facility site alternatives.

We established several key criteria to evaluate the potential alternatives identified. Each alternative was evaluated in consideration of whether or not it would:

- be technically and economically feasible and practical;
- offer a significant environmental advantage over the proposed action; and
- meet the projects' objectives, as described above.

With respect to the first criterion, it is important to recognize that not all conceivable alternatives are technically feasible and practical. For example, some alternatives may not be possible to implement due to technological difficulties or logistics. We do not design natural gas pipeline projects. Rather, pipeline companies propose and design pipeline projects in response to market conditions. In turn, we analyze these proposals and a reasonable range of alternatives. In conducting this analysis, it is important to recognize the environmental advantages and disadvantages of the proposed actions in order to focus the analysis on reasonable alternatives that may reduce impacts and offer a significant environmental advantage. A detailed discussion of the environmental consequences of the projects (both positive and negative) is included in section 4.0.

Using the evaluation criteria discussed above and subsequent environmental comparisons, each alternative was considered to the point where it was clear that the alternative was either not reasonable, would result in substantially greater environmental impacts that could not be readily mitigated, offered no potential environmental advantages over the proposed projects, or could not meet the projects' objectives. Alternatives that appeared to result in less than or similar levels of environmental impact were reviewed in greater detail. The following sections discuss and analyze each of the alternatives evaluated in sufficient detail to explain why they were eliminated from further consideration or are recommended for adoption into the respective project.

Where environmental data are presented within this alternatives analysis, it is data collected from desktop (e.g., maps, literature, aerial photography, and agency databases) sources. Constitution collected field survey data for its proposed route and some (but not all) alternatives. Therefore, to present the most consistent comparisons of potential impacts on environmental resources this section presents data obtained from desktop sources for both the proposed route and alternative routes, even when field data may exist.

We evaluated both quantitative and qualitative data in our analyses of alternatives and we also used subjective assessments. Subjective assessments are used in evaluating numerous, disparate parameters that are difficult or impossible to unify into a simple decision-making method for an alternatives analysis. These parameters do not always have equal weight in the assessment with factors such as overall disturbance (segment length, amount of acreage to be disturbed), longer-term impacts (forest impacts), impacts on state or federally regulated resources (streams, wetlands-particularly PFO wetlands), or affecting safety or constructability, for example, side slope construction may have more weight than factors with short-term impacts (agricultural row crops or hayfields), non-regulated resources (trails crossed), or other factors (number of roads and railroads crossed). Side slopes are typically more problematic for construction feasibility (and require more workspace) than steep slopes.

During the preliminary design stage for the projects, Constitution participated in our pre-filing process (see section 1.3). This process emphasizes identification of potential stakeholder issues early in the development of a project, as well as identification and evaluation of alternatives that may avoid or minimize these issues. During this process, Constitution made multiple modifications to its proposed pipeline route to address stakeholder concerns. The majority of route changes were made to avoid conflicts with existing or planned land uses or to increase the distance of the pipeline route from residences and commercial businesses, recreation areas, or other infrastructure. These changes were subsequently made part of the Constitution's proposed route when it filed its FERC application and supplements (including after issuance of the draft EIS as described below), and are presented in this final EIS. Iroquois did not participate in our pre-filing process, but its proposal is the result of the adoption of an alternative to Constitution's original proposal (i.e., a new, greenfield compressor station) in an effort to reduce overall environmental impact.

3.1 NO-ACTION ALTERNATIVE

The Commission has two courses of action in processing applications under Section 7 of the NGA: 1) deny the requested action (the no-action alternative), or 2) grant the Certificate, with or without conditions. If the no-action alternative is selected by the Commission, the proposed facilities would not be constructed, and the short- and long-term environmental impacts from the projects would not occur. In addition, if the no-action alternative is selected, the stated objectives of Constitution and Iroquois' proposals would not be met. The no-action alternative would eliminate this new natural gas supply for New York and New England markets, causing existing and potential users of natural gas to either pursue other means of natural gas supply, to rely on other fuels (such as heating oil), or to seek other means to meet or curtail their energy needs.

The New York State Energy Planning Board (2009) assessment of natural gas markets in New York and in the northeast concluded that most of the interstate transmission pipelines in the region are at or near capacity on peak days, and that by 2018 unmet peak day natural gas demand for New York and New England could range between an estimated 300,000 to 900,000 Dth/d. Demand for natural gas is expected to grow by five percent between 2009 and 2020 for New York alone (New York State Energy Planning Board 2009), and production of natural gas is increasing in the northeast region. Other reports have also documented increased demand for natural gas in New York and New England and the lack of adequate pipeline capacity to deliver required volumes of natural gas (ISO-New England 2012, ICF International 2012).

The lack of a new pipeline with access to supply sources into the region could prolong the existing supply constraints in the proposed delivery areas, which could create winter-premium pricing and exacerbate price volatility for all natural gas users in the areas, and could increase the difficulty for others, such as the operators of gas-fired electric generating plants, in finding economical gas supplies. This in turn could lead to higher gas and electric rates in the region and could lead to energy shortages during times of winter peak demand.

The burning of natural gas at power plants to produce electricity also results in reduced air emissions compared to other fossil fuels, such as coal and fuel oil. According to the EPA (2013a), natural gas produces at least 50 percent less carbon dioxide (CO_2), almost 70 percent less nitrogen oxides (NO_x), and about 99 percent less sulfur oxides compared to a coal-fired power plant. Since the 1990s, the transition to natural gas fueled power plants in New England has substantially decreased dependence upon the formerly pre-dominant energy sources of fuel oil, coal, and nuclear energy (ISO-New England 2012). If the no action alternative were adopted, then air emissions could be increased if other sources of energy were used. Other energy alternatives are discussed below in section 3.1.2.

The no-action alternative would not provide the potential economic benefits associated with the proposed projects, including increased jobs, secondary spending, and tax revenues during construction, as well as increased property tax revenues to local governments during operations as discussed in section 4.9. Further, the no-action alternative would not provide natural gas service to municipalities in Pennsylvania and New York near the project that do not currently have access to natural gas. The above-mentioned transition in energy sources in New England over time has been hastened by the relative lower cost of natural gas, which has economic and cost savings benefits that are then passed along to consumers of electricity.

In summary, the no-action alternative would avoid the environmental impacts of the proposed projects, but it would result in the need for alternate means to satisfy the demand for natural gas, or other sources of energy in New York and New England. The no-action alternative would not meet the objectives of the proposed projects. It would likely, however, lead end users to seek energy from other

sources including other fossil fuels and renewable energy. It could also lead to increased energy conservation. Each of these potential options, with respect to the no-action alternative, is discussed below.

3.1.1 Energy Conservation and Energy Efficiency

Energy conservation measures have and will continue to play an important role in reducing energy demand in the United States. The Energy Policy Act of 2005 includes guidelines to diversify America's energy supply and reduce dependence on foreign sources of energy, increase residential and businesses' energy efficiency and conservation (e.g., EPA Energy Star Program), improve vehicular energy efficiency, and modernize domestic energy infrastructure (U.S. Congress 2005).

New York has strongly promoted energy conservation and has a number of programs in place to minimize energy use. One result of these programs is that New York is now the second most energy efficient state in the nation on a per capita basis, with about one-third lower energy usage than the national average. One of New York's energy goals is to reduce electricity use to 15 percent below 2015 projected levels, which would provide additional impetus for the state's electricity efficiency initiatives. Data from the New York Independent System Operator (NYISO) demonstrate that although statewide energy use dropped a total of 5.1 percent in 2008 and 2009 (primarily due to the downturn in the economy), energy use grew by 3 percent in 2010, and remained near 2010 levels in 2011. Energy use in the New York City area in 2010 also exceeded 2008 levels (NYISO 2012). Moreover, projected electrical demand in New York is forecast to increase by about 900 gigawatt hours per year between 2011 and 2021 (NYISO 2012). This projected growth in electrical demand takes into account New York's 15 percent energy efficiency target described above. Con Edison is a major supplier of electricity and natural gas in the New York area and operates programs that promote energy efficiency for homes, businesses, and industry, including a "Green Team" initiative with opportunities for energy audits, incentives, and rebates (Con Edison 2013).

New England states such as Massachusetts also strongly promote energy efficiency (Massachusetts Executive Office of Energy and Environmental Affairs 2013). The State of Massachusetts calls energy efficiency its "first fuel" and sponsors programs to promote energy efficiency for homes, businesses, cities, new construction projects, and state government operations. Massachusetts was ranked as the top state in the American Council for an Energy Efficient Economy's (ACEEE 2013) rankings for 2012 and other New England states such as Connecticut, Rhode Island, and Vermont all also ranked in the top ten. Massachusetts has some of the most ambitious energy savings targets in the United States with targets of 2.6 percent annual electric savings for 2013-2015 along with state-funding and support (ACEEE 2013). Additionally, National Grid is a major supplier of electricity and natural gas in the New England area and operates a program called Mass Save which promotes energy efficiency for homes, businesses, and industry (National Grid 2013).

Combined Heat and Power

Combined heat and power (CHP), also known as cogeneration, accounts for almost 12 percent of electrical power generation in the U.S. (United States Clean Heat and Power Association 2013). CHP is the simultaneous production of electricity and heat from a single fuel source, such as natural gas, biomass, biogas, coal, or oil. CHP is not a single technology, but an energy system that can be modified depending on the needs of the energy end user. CHP systems consist of a number of individual components configured into an integrated whole to recover and use waste heat from production of electricity. These components include the prime mover, generator, heat recovery equipment, and electrical interconnection. The prime mover drives the overall system and typically includes reciprocating engines, combustion turbines, steam turbines, microturbines, and fuel cells (EPA 2011a). In the U.S., CHP decreases energy

use by about 1.3 trillion British thermal units (Btus) per year and contributes to overall reductions in NO_x and SO_2 emissions (United States Clean Heat and Power Association 2013). New York currently has 517 CHP installations with a generating capacity of about 5,552 megawatts (MW) (ICF International 2013). The vast majority (85 percent) of these CHP installations operate using natural gas.

The State of Massachusetts promotes the use of CHP (Mass.gov 2013). The state offers incentives for the use of alternative energy systems such as CHP and stated that CHP was especially appropriate for larger commercial, industrial, and institutional facilities.

Recently, the EPA evaluated the opportunity for the use of CHP at wastewater treatment facilities and found that, as of June 2011, wastewater treatment CHP systems were in place at 133 sites in 30 states, representing 437 MW of capacity (EPA 2011a). Although 78 percent of the facilities identified rely solely on biogas from on-site anaerobic digesters, some facilities employ other fuel sources (e.g., natural gas or fuel oil) either because the facility does not use anaerobic digesters or because biogas is not a practicable option due to site-specific technical or economic conditions. New York currently has six wastewater treatment CHP facilities representing about 3 MW of capacity (EPA 2011a). Wastewater CHP systems typically work best when employed at facilities with influent flow rates of 5 million gallons per day (mgd) or more (EPA 2011a). This is because waste stream volumes this large are typically required to produce sufficient quantities of biogas to make CHP usage economically feasible. The EPA's 2011 study examined the potential for increasing CHP use at wastewater treatment facilities with influent rates of at least 1 mgd. Smaller wastewater facilities that employ anaerobic digesters can produce sufficient biogas through conventional means (given high enough biosolids loadings) or augment their digester process to raise the biogas generation rate (e.g., addition of collected fats, oils, and greases; use of microbial stimulants). About 37 percent of the wastewater treatment facilities with influent flows of 1 to 5 mgd and employing anaerobic digestion processes are candidates for deployment of CHP (EPA 2011a). If all of these facilities instituted CHP an additional 54 MW per day of electrical generation and 4,997 million Btu per day of thermal energy could be produced nationally.

While the Energy Policy Act and these other state and municipal programs promote increased energy efficiency and conservation by supporting new energy efficient technologies (such as CHP) and increasing funds for energy efficiency research, and would no doubt minimize energy use, they are not expected to eliminate the increasing demand for energy or natural gas. Additionally, the implementation and success of energy conservation in curtailing energy use is a long-term goal, extending well beyond the timeframe of the proposed projects.

Projections by the DOE's Energy Information Administration (EIA) support this conclusion. According to the *Annual Energy Outlook 2013 with Projections to 2040* (DOE/EIA 2013a) reference case, despite increased efficiency, natural gas consumption (subtotal) in the Mid-Atlantic states, which include Pennsylvania and New York, is expected to grow from 2.78 quadrillion Btu per year in 2010 to 3.45 quadrillion Btu per year in 2040. Natural gas consumption in the New England states is expected to grow from 0.90 quadrillion Btu per year in 2010 to 1.12 quadrillion Btu per year in 2040. These natural gas estimates comprise about a 24 percent increase in consumption for both regions. Therefore, while energy conservation and energy efficiency would undoubtedly reduce the demand for fossil fuels in the New York and New England regions to some degree, it would not eliminate the need for additional natural gas supply altogether or in the short term.

While energy conservation reduces demand for energy sources such as natural gas, and may be a long-term alternative or partial alternative for the projects, implementation of sufficient energy conservation measures to eliminate the need for the proposed projects is not feasible in the short-term. As such, we do not consider energy conservation or energy efficiency a practicable alternative to the proposed projects and they were eliminated from further analysis.

3.1.2 Non-Gas Energy Alternatives

3.1.2.1 Nuclear Energy

Energy from nuclear power is important nationally and accounted for approximately 9 percent of annual energy consumption nationwide in 2011 (DOE/EIA 2013a). In New York, nuclear power currently accounts for about 14 percent of statewide generating capacity (NYISO 2012). In New England (Massachusetts, Maine, New Hampshire, Vermont, Rhode Island, and Connecticut), nuclear energy accounted for approximately 12 percent of total energy consumption in 2012. The projected trends for nuclear energy production are relatively flat, with total consumption rising from 0.377 quadrillion Btu in 2012 to 0.405 quadrillion Btu in 2021 and then decreasing to 0.384 quadrillion Btu by 2033 (DOE/EIA 2013a).

Entergy's Vermont Yankee nuclear plant, which has provided about 4 percent of New England's total electricity supply since 2007, is scheduled to close in 2014 (DOE/EIA 2013b). The reasons cited by Entergy for the plant's closure included low wholesale electricity prices resulting partially from low natural gas prices, as well as capital costs associated with maintaining the plant (DOE/EIA 2013b). The same report showed that the portion of total electricity sales in New England attributable to natural gas grew from less than 30 percent overall in 2001 to greater than 50 percent in 2012.

Moreover, increased use of nuclear power is seen by some as a means of reducing GHG emissions associated with the burning of fossil fuels. However, environmental and regulatory challenges concerning safety and security, the disposal of toxic materials (i.e., spent fuel), and alterations to hydrological/biological systems would need to be addressed before any new nuclear power generation facilities could be constructed. Nuclear power remains controversial, given these factors.

Plans for a new nuclear power plant in New York were announced by UniStar Nuclear. UniStar Nuclear applied for a Combined License in September 2008 for a new nuclear plant at the Nine Mile Point nuclear plant site on Lake Ontario in the town of Scriba, which is approximately 6 miles northeast of Oswego, New York. The proposed plant would generate about 1,710 MW of electricity. However, the future of the project is unclear. According to the DOE/EIA, UniStar requested that the U.S. Nuclear Regulatory Commission suspend its review of the application for the project on May 31, 2010. No other proposed new nuclear power reactors have been submitted to the U.S. Nuclear Regulatory Commission in New York or New England (NRC 2013). The most recent new nuclear reactor to enter service in the United States was the Tennessee Valley Authority's Watts Bar Unit 1 in 1996 (EIA 2013a).

Because the subject of nuclear power remains controversial, these proposals and any subsequent plans that arise to construct new or expand existing plants in the northeast would likely involve prolonged review periods that would not meet the objectives of the projects. For these reasons, nuclear power is not currently a practicable alternative to the projects and was eliminated from further review.

3.1.2.2 Fossil Fuels

According to the DOE/EIA's *Annual Energy Outlook 2013 with Projections to 2040* reference case (DOE/EIA 2013a), fossil fuel consumption as a percentage of total energy consumption is projected to drop from 82 percent of total U.S. energy demand in 2011 to 78 percent in 2040. The same DOE/EIA source also projected that energy production attributable to the consumption of coal would fall from 19.6 quadrillion Btu in 2011 to an estimated 18.8 quadrillion Btu in 2040. The projected decline in fossil fuel consumption as a percentage of total consumption is due largely to corporate average fuel economy standards and state and federal standards for renewable energy sources.

If the proposed projects were not constructed, fossil fuels including coal and fuel oil could be used as alternative sources of electricity generation. We are not aware of any plans for major energy supply projects that would supply or use petroleum to create electricity in the projects' area. Coal is used for energy generation and would function as an alternative to natural gas. However, relative to natural gas, the burning of coal results in greater emissions of pollutants such as NO_x, sulfur dioxide (SO_2), GHG, and mercury (EPA 2005). In 2010, coal comprised 46 percent of total U.S. electric power generation (DOE/EIA 2011). Due to the greater environmental impacts associated with emissions from coal-burning power generation, it is unlikely that coal would displace the need for natural gas in the target market areas in the foreseeable future.

Use of fuel oil may result in increased reliance on foreign oil, which could require development of additional import, storage, and refining facilities. Fuel oil is commonly transported by pipeline which could then require construction of other pipeline systems to transport it which would likely have similar impacts as the proposed projects, but in a different location. Reliance on fuel oil as an alternative to natural gas would increase the potential for environmental impacts such as oil spills; land development to construct or modify import, storage, and refining facilities; and pollution from air emissions. Because natural gas burns cleaner than other fossil fuels, is relatively inexpensive compared to other fossil fuels, and is domestically produced, we conclude that it is unlikely that other fossil fuels would displace the need for natural gas in the target market areas in the foreseeable future. Therefore, consideration of the use of other fossil fuels was eliminated from further review.

3.1.2.3 Renewable Energy

The DOE/EIA (2013a) projects rapid growth in renewable fuel consumption due primarily to the implementation of the federal Renewable Fuels Standard for transportation fuels and state renewable portfolio standard (RPS) programs for electric generation. Nationally, the consumption of renewable energy is projected to increase between 2011 and 2040 from about 9 percent in 2011 to approximately 13 percent in 2040 as a result of state standards, federal tax credits for renewable electricity generation and the federal renewable fuels standard (DOE/EIA 2013a). A summary of potential renewable energy use in the projects' area is included below.

Wind

Wind power technology that has experienced advancements over the last 20 years including reductions in installation costs, improved turbine performance, and reduced maintenance costs. Although wind projects have no operational emissions, such developments can negatively affect wildlife (particularly birds and bats), visual resources, and other environmental resources. In the projects' general area, the sites with the highest wind velocities tend to be located along ridgelines in areas of steep slopes (National Renewable Energy Laboratory [NREL] 2010) which are challenging to access and generally highly visible.

To date, most of the large-scale renewable projects participating in the New York RPS program are wind projects in northern and western New York where wind resources are greatest. As of March 2012, currently operating wind generation capacity in New York is about 1,414 MW, or approximately 3 percent of statewide generating capacity (NYISO 2012). Interconnect requests into NYISO's queue as of March 2012, representing proposed power projects, would add another 4,000 MW of wind capacity (NYISO 2012). Since the wind farm areas are typically located far from major downstate load areas, major infrastructure improvements would be necessary for these projects to serve the New York City area.

To address this concern, proposals are being evaluated to develop wind resources closer to or in the vicinity of major load areas. The New York Power Authority (NYPA), Long Island Power Authority, and Con Edison, in collaboration with other public agencies, are currently conducting technical and environmental studies to determine the feasibility of siting a wind farm about 13 to 15 miles offshore of the western end of the Rockaway Peninsula to generate 350 MW of electricity by 2015 (with the potential to expand to 700 MW in later phases) to serve the New York City and Long Island market. According to the Joint Con Edison - Long Island Power Authority Offshore Wind Power Integration Project Feasibility Assessment (March 20, 2009), a 350-MW wind facility operating at a 30 percent capacity factor would generate about 920,000 MW hours per year, half of which would serve New York City. In June 2010, the NYPA Board of Trustees authorized the NYPA to apply for a lease for approximately 64,500 acres of underwater land from the Federal Bureau of Ocean Energy Management, Regulation and Enforcement, formerly known as the Minerals Management Service. In September 2011, the NYPA submitted a request to that agency to lease approximately 81,500 acres offshore of the Rockaway Peninsula for construction of up to 700 MW of wind power. The New York State Energy Research and Development Authority completed an initial environmental feasibility study (NYSERDA 2010). These actions indicate a continuing interest in the project; however, the development of the offshore wind project is still in its early phase and its future is still uncertain. However, additional site-specific engineering and environmental studies need to be completed, the agencies need to release a request for proposal to select a private project developer to build and operate the wind farm, the filing of permit applications would need to be made, and environmental reviews would need to be conducted. The Cape Wind Project, another proposed wind power project with 130 turbines producing up to 454 MW, would be located in Nantucket Sound off shore of Massachusetts (Cape Wind 2013). Cape Wind has received applicable permit approvals and is pending as its project financing phase is completed and legal challenges are resolved.

Total consumption of renewable energy sources such as wind (and combined with other renewable energy sources such as conventional hydroelectric, geothermal, and solar) is projected to rise from 0.219 quadrillion Btu in 2010 to an estimated 0.270 quadrillion Btu in 2020 and ultimately to 0.378 quadrillion Btu by 2040 in the New England region (DOE/EIA 2013a). It appears likely that wind projects will continue to be pursued depending on tax credits and/or other financial incentives, state programs, technology improvements, transmission availability, and the public interest. In June 2010, the governor of New York, along with the governors of nine other east coast states, signed a memorandum of understanding with the U.S. Department of the Interior to establish the Atlantic Offshore Wind Energy Consortium to promote the development of wind resources on the Outer Continental Shelf. In February 2011, the DOE and U.S. Department of the Interior published A National Offshore Wind Strategy, a guidance document for developing an offshore wind energy industry in the United States. This document calls for development of 10 gigawatts (GW) of deployed wind generation capacity by 2020, at a cost of $0.10 per kilowatt hour; and a longer term goal of 54 GW of generating capacity by 2030, at a cost of $0.07 per kilowatt hour. However, the authors note that, to achieve the called-for generation goals, two critical objectives must be met: reducing the cost of offshore wind energy and reducing the timeline for deploying offshore wind energy (i.e., streamlining regulatory review and permitting). It is also speculative at this point to say which individual project(s) may be approved and economically supported to provide power to the New York markets, or what effect these projects might have on the local natural gas market.

In the near-term, sufficient wind energy is not available in the projects' vicinity that would provide the 650,000 Dth/d (190,496.4 megawatt hours or 15,874.7 MW per 12-hour day) of energy that would be provided by the proposed projects. Constitution estimated that 5,292 new wind turbines would be required to provide the same energy generation capacity as the natural gas to be transported by the proposed projects. The amount of land that would be directly impacted by operation of that number of wind turbines was estimated to be approximately 1,323 acres including access roads and support structures, but excluding the turbine spacing buffer that would be necessary between turbines (NREL

2012). Assuming an average of 2.5 acres per MW of wind power, the total land requirements for a theoretical wind project with the power generation capacity of the proposed projects could be greater than 39,000 acres (NREL 2009). This estimated amount of land is far greater than the permanent impact on lands of the proposed projects, which would be approximately 744 acres for the proposed pipeline and 2.4 acres for the Iroquois compression transfer station.

The largest wind farm currently operating in New York has a 320-MW capacity; approximately 50 wind farms of the same size would be required to replace the proposed projects. No wind projects are operational in the counties crossed by the proposed pipeline (NYSDEC 2012a). The Moresville Wind Farm project is proposed and under review in Delaware County; however, that project would produce 66 MW of energy, a mere 0.4 percent of the energy capacity that would be provided by the proposed projects, which is clearly insufficient in meeting their objectives (NYSDEC 2012b). Additionally, the Bureau of Ocean Energy Management (BOEM) issued a request in January 2013 to determine if there was competitive interest in leasing areas offshore of New York for wind energy (BOEM 2014). The project had been originally proposed by the New York Power Authority, Long island Power Authority, and Consolidated Edison. The wind energy area would be approximately 13 miles south of Long Island, New York and has the potential to produce 700 MW of energy. BOEM issued a notice of intent to prepare an environmental assessment in May 2014.

Onshore wind power generation requires large, permanent turbines and supporting facilities, as well as construction of electric transmission lines to connect wind facilities to transport the wind energy to consumers. These facilities would have an impact on visual resources, since onshore wind turbines are constructed to capture wind high above the natural topography and could be constructed along highly visible ridge lines. Additionally, wind turbines may have direct impacts on resident and migratory birds, bats, and other wildlife from collision mortality or indirect impacts from habitat disturbance. Construction of offshore wind power generation facilities may result in impacts on marine species. In contrast, the permanent right-of-way of the proposed pipeline area would be restored to pre-construction contours and maintained as herbaceous cover. Potential impacts on wildlife from the proposed projects are expected to be largely short-term and temporary, with the exception of habitat conversion in forested areas and the establishment of some aboveground facilities. Therefore, theoretical onshore wind generation facilities would result in greater impacts upon visual, vegetation, and wildlife resources than the proposed projects.

Because of the greater potential for negative environmental impacts on lands, visual resources, and wildlife from a wind energy project, as well as limitations including the short-term unavailability of sufficient wind energy to meet the projects' objectives, we have determined that wind energy is not a suitable alternative for the proposed projects and it was eliminated from further consideration.

Geothermal Power

Geothermal energy is dependent upon proximity to hotspots of volcanic activity or tectonic plate boundaries. The project area is not conducive to development of geothermal power generation projects. Therefore, geothermal energy was eliminated from further consideration.

Fuel Cells

Fuel cells use hydrogen or fossil fuels to generate electricity more cleanly than traditional electrical generation methods; however, fuel cell technology is in the early phases of development. Because fuel cell technology is not sufficiently developed to provide a cost-effective, substantial source of energy, fuel cells were eliminated from further consideration.

Hydroelectric Generation

Hydroelectric generation is fully commercialized, including both run-of-river and large impoundment-type projects ranging in capacity from less than one MW to hundreds of MW. The DOE/EIA (2013a) has projected that little new hydroelectric capacity will be developed through 2040. Although hydroelectric power does not result in emissions of air pollutants, it can alter flow conditions within streams, thereby affecting habitats for fish and other aquatic organisms. Additionally, new hydroelectric facilities may require the construction of electric power transmission lines and their associated environmental impacts.

One new project that has applied for a license from the FERC is the Thompson Hydroelectric Project (P-12741) on the Hudson River in Saratoga and Washington Counties, New York (FERC 2013). This proposed project would consist of a dam, a generating unit with a capacity of approximately 24 MW, a transmission line, and other facilities that, if licensed and constructed, would have an estimated annual generation of approximately 69 gigawatt hours. The applicant for the Thompson Hydroelectric Project filed an application for a successive preliminary permit on August 20, 2013 proposing to study the feasibility of the hydropower project.

Currently, there are two proposed transmission projects to import hydroelectric and wind power into New York and New England: the Champlain Hudson Power Express Project and the Northern Pass Project. The DOE (2013) issued a notice of availability for a draft EIS for the Champlain Hudson Power Express Project on October 21, 2013. Both proposed projects require a Presidential Permit since the transmission line would involve a border crossing. The Champlain Hudson Power Express Project involves construction of a 1,000-MW high voltage direct current transmission system from a converter station southeast of Montreal in Quebec, Canada to the New York City area. The proposed transmission cables would be buried in Lake Champlain, the Hudson River, and under adjacent existing railroad rights-of-way. According to the project sponsors, the transmission line is expected to be used primarily by hydroelectric and wind generators in Canada. A projected energy market and emissions impact analysis, prepared by Champlain Hudson Power Express, Inc., states that the project would facilitate the import of more than 7,647 gigawatt hours of renewable energy per year, which would expand the renewable energy base within New York by 13 percent. The project is ongoing, and the public comment period for the draft EIS ended in December 2013.

The proposed Northern Pass Project would bring 1,200 MW of hydroelectric energy from Quebec to New Hampshire and New England (Northern Pass 2013). The Northern Pass Project transmission line would be largely collocated with existing rights-of-way and would extend approximately 187 miles. Northern Pass submitted an application to the DOE in October 2010, and filed an amended application in June 2013. Regulatory review of the project is ongoing.

The proposed projects' area is generally not conducive to development of major new hydroelectric power generation projects. The importation of hydroelectric power from Canada via the proposed construction of new electric transmission lines appears to be an emerging option for some of the energy needs in both New York and New England. However, these potential sources of hydroelectric power are not sufficient to displace the need for increased natural gas supplies in the region. Therefore, hydroelectric energy generation was eliminated from further consideration.

Biomass

Combustion of biomass is a proven technology using biomass feedstock, which, if properly grown, represents a renewable resource (EPA 2013b). Biomass can be derived from organic materials such as crops, wood, and municipal wastes. These products can then be turned in to heat and electricity.

In New York, biomass (e.g., wood) has been the leading in-state renewable resource consumed in the residential, commercial, and industrial sectors as measured by primary energy input. According to the New York State Energy Plan, New York uses 99 trillion Btu of wood and 13 trillion Btu of biogenic waste annually and has the technical and practical potential to develop 350 trillion and 14 trillion Btu annually by 2018, respectively (New York State Energy Planning Board 2009). Current biomass generating capacity participating in New York's RPS was 26.0 MW as of December 31, 2012 (NYSERDA 2013). An additional 43.3 MW of biomass generation capacity is in development or under construction. The mix of feedstock for these facilities includes wood, tire-derived fuel, coal, and landfill-derived methane. Information from the NYISO indicates that biomass accounts for less than 2 percent of current generation capacity in the New York Control Area (NYISO 2013).

The State of Massachusetts limited incentives associated with some biomass facilities in 2012 (Mass.gov 2012). The limitations involved the status of certain wood-burning (and similar organic material burning) power plants as renewable energy sources due to concerns based on carbon emissions and GHG concerns. New air quality efficiency standards would be required at biomass facilities to maintain state-mandated incentives.

Biomass is not considered a viable alternative to the increased natural gas supplies that would be provided by the proposed projects based on its limited capacity, and it was eliminated from further consideration.

Photovoltaic (Solar Power)

Photovoltaic power systems convert sunlight directly into electricity. These systems generally are not well-suited for use as large-scale generation in the proposed projects' area due to relatively low direct insolation, higher capital costs, potential reliability issues, and lower efficiencies.

To promote photovoltaic power systems in New York State, including providing clean energy jobs and promoting the diversity of the state's energy sources, on January 27, 2010, the NYPA released a request for proposals seeking a public-private partnership for the installation of up to 100 MW of photovoltaic systems across the state (NYPA 2010). The NYPA is reviewing numerous proposals received and, once proposals are selected, the NYPA expects the installations to occur through 2014. A recent assessment of solar domestic hot water systems within New York indicated that solar thermal energy could potentially provide over half of the energy required for water heating in a typical home that has adequate access to sunlight. Solar energy systems can be more easily deployed in densely populated areas than other renewables and where their output closely matches with peak demand; however, solar systems are among the highest cost renewable technologies (New York State Energy Planning Board 2009).

Solar energy also is used and promoted in New England. For example, the City of Boston has a program called Renew Boston Solar with a goal of increasing solar energy system capacity in Boston to 25 MW by 2015 (CityofBoston.gov 2013). This program encourages installation of solar technology in homes and businesses, as well as within City government.

Solar power generation on an industrial scale requires large, permanent facilities with impervious cover and no shading to allow for photovoltaic panels to gather energy. In contrast, the permanent right-of-way of the proposed project area would be restored to pre-construction contours and maintained as herbaceous cover. Therefore, a large, industrial scale, solar power generation facility would result in greater visual, vegetation, and habitat impacts than the proposed projects. Impacts of new electric transmission lines associated with solar power generation facilities would be similar to impacts from the proposed projects. Additionally, the operational land requirements for solar power generation would far

exceed those required for the proposed projects as at least an estimated 1,176 acres of permanent aboveground solar facilities would be required to produce the equivalent 15,875 MW of power. In addition to the construction of a solar power generation facility, construction of access roads and electric transmission lines also would be required to transport the generated solar energy to consumers, resulting in additional environmental impacts.

We received comments on the draft EIS stating that it was not appropriate to compare produced energy to transported energy without considering the full range of impacts from production to delivery. The EIS text was intended to serve as a generalized discussion of how an alternative energy source such as solar power might compare to the proposed projects. Constitution is proposing the transportation of natural gas that is currently being produced and developed in northern Pennsylvania. There are no known plans to build such solar energy facilities that could produce the amount of energy on a scale that would be transported by the Constitution pipeline or that would satisfy the demand of the projects' customers. This EIS evaluates the potential impacts of newly produced energy for sources such as large scale solar power, but those sources are not existing, would be theoretical, and would have to be built while the natural gas supply in Susquehanna County, Pennsylvania is existing and available. Additionally, as noted by the commentor, new electric transmission lines (potentially hundreds of miles long) would be required to transport electricity from any new wind or solar production areas to the end users resulting in its own set of environmental impacts.

Similarly, we also received comments on the draft EIS stating that small scale solar units, either large numbers of widely distributed solar units possibly located near existing electrical substations or even smaller solar units used in individual homes and businesses, could be used in place of the proposed projects. The FERC staff reviews applications for interstate natural gas pipeline projects in accordance with an applicant's stated objective(s) in order to disclose the environmental impacts of a proposal to inform the decisionmakers and, in accordance with NEPA, evaluate reasonable alternatives to a project. However, the FERC as a matter of policy and in accordance with the Natural Gas Act and other governing regulations, does not direct the development of the natural gas (or other energy types such as solar power) industry's infrastructure regionally or on a project-by-project basis, nor does it have the authority to permit or approval solar energy projects. As such, the FERC staff's evaluation of reasonable alternatives does not include setting project objectives, determining what an applicant's objective "should" be, nor does it include redefining the objectives of a project.

Because of the far greater land use required for a solar power generation project, as well as limitations including potential reliability issues, higher costs, and the unsuitability of the proposed project area (due to low direct insolation), solar power generation as an alternative to the increased natural gas supplies that would be delivered by the proposed projects was eliminated from further consideration.

Tidal and Wave Power

New York is committed to continued research and marketing of the development of tidal, current, and other hydrokinetic resources in the projects' area (New York State Energy Planning Board 2009). Wave and tidal energy technologies are still in the early stages of development. The limiting factors in the development of these new technologies include the high cost of construction and environmental monitoring, as well as the management of potential impacts on competing uses. From the Commission's experience in reviewing projects that involve requests for preliminary permits,[1] the interest in developing

[1] The Commission's preliminary permits carry a term of 3 years and do not authorize project construction or operation. The purpose of a preliminary permit is to maintain priority of a potential future license application for a site while a developer gathers the information necessary for developing a license application.

wave energy projects has been limited to the west coast of the United States, due to the resource availability and its proximity to shore. While the Commission has issued a number of preliminary permits, and currently has several active licensing proceedings for the development of tidal energy projects in New York, these proposals are for small-scale demonstration projects that are seeking, or plan to seek, short-term pilot licenses that would allow them to gather the field data necessary for a full-scale commercial deployment. For instance, in January 2012, the Commission issued a pilot project license for the Roosevelt Island Tidal Energy Project, a 1,050-kilowatt pilot-scale hydrokinetic generation facility that would be located in the East River in New York City (FERC 2012a). The project would be constructed in three phases and operate for 10 years. When fully built, the facility would generate about 2.4 gigawatt hours annually.

Tidal energy is also being explored in New England. The Town of Edgartown has partnered with governmental agencies and academic institutions to evaluate using tidal power to produce electricity for the Muskeget Tidal Energy Project (New England Marine Renewable Energy Center 2013). This tidal project would produce 5 MW of energy. Demonstration tests were conducted in August 2011. The Muskeget Tidal Energy Project would be subject to multiple agency regulatory reviews, including by the Commission.

Given its preliminary nature of tidal and wave energy in the United States and relatively small scale, tidal and wave energy is not a viable alternative to the increased natural gas supplies that would be delivered by the proposed projects, and it was eliminated from further consideration

Summary of Renewable Energies

The renewable energy projects planned or proposed in both New York and New England would help to diversify the electricity market in the both regions, thus helping to protect consumers from volatile fossil fuel prices and assisting both regions with achieving their respective RPS goals. Accordingly, while these renewable energy projects would benefit the energy market by diversifying the array of fuels used to generate electricity, they are not expected to meet consumers' overall electricity needs. Moreover, renewable energy is not completely interchangeable with natural gas. Most renewable energy sources are used to generate electricity. While natural gas is used for this purpose, it is also used for space heating and cooking. Although these uses could be served by electricity instead of natural gas, existing natural gas-based heating and cooking systems would have to be converted to electric-based systems, which may be prohibitively expensive for many consumers. Finally, moving electricity from the point of generation to consumers may require major investment in electric transmission lines as well as other additional infrastructure costs. Additionally, the development of the transmission lines associated with renewable projects would have potentially adverse effects on air, water, ecological values, and other resources. Therefore, renewable energy alternatives were eliminated from further consideration.

3.2 SYSTEM ALTERNATIVES

3.2.1 Existing Transportation System Alternatives

System alternatives would make use of other existing, modified, or proposed pipeline systems (or other transportation systems) to meet the stated objectives of the projects. A system alternative would make it unnecessary to construct all or part of the proposed projects, although some modifications or additions to another existing pipeline system may be required to increase its capacity, or another entirely new system may need to be constructed to meet the projects' purpose and need. Such modifications or additions would result in environmental impact that could be less than, similar to, or greater than those associated with construction of the proposed projects. The purpose of identifying and evaluating system alternatives is to determine whether potential environmental impacts associated with the construction and

operation of the proposed facilities could be avoided or reduced while still meeting the basic objectives of the projects.

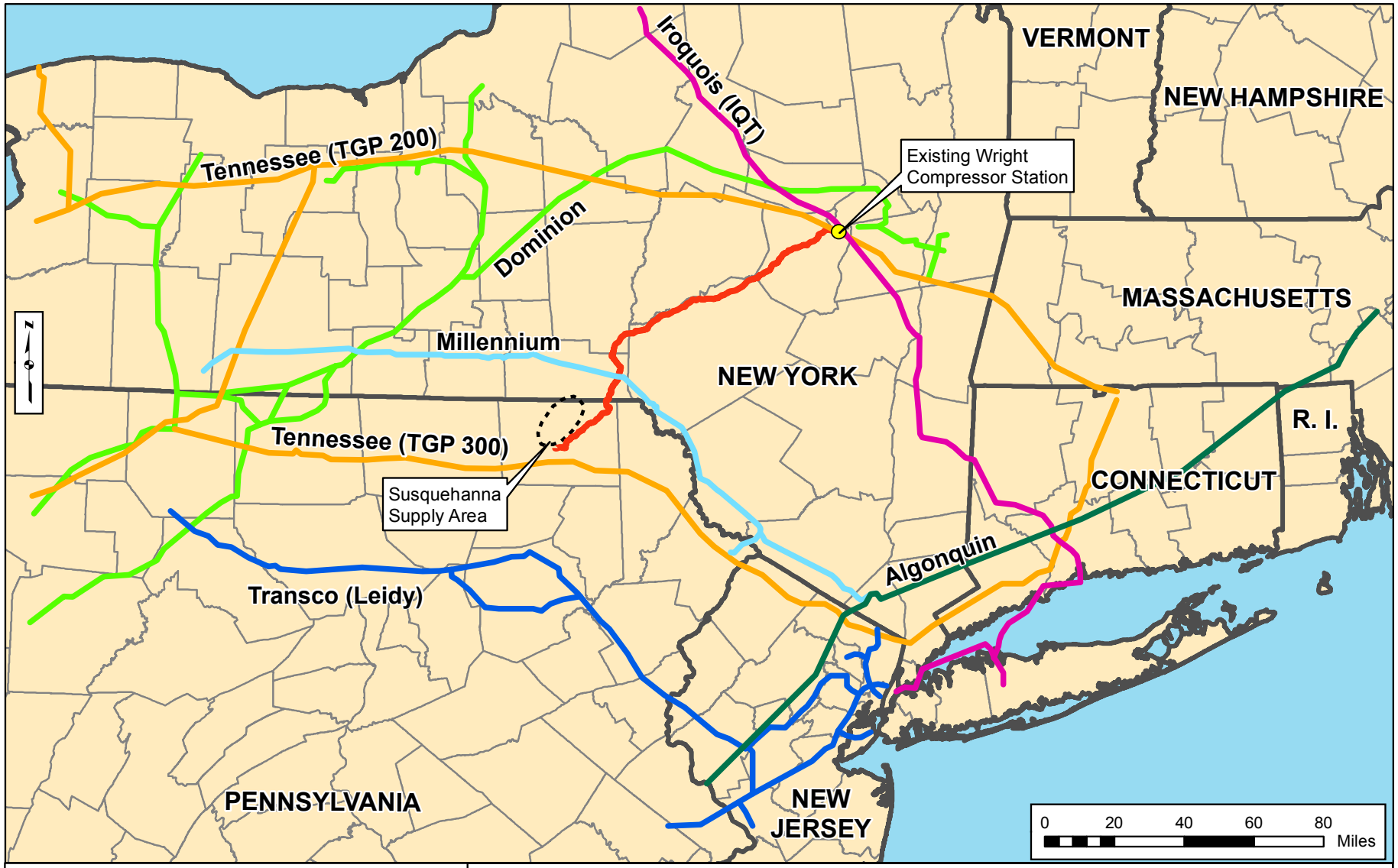
To be practicable system alternatives to the proposed projects, other systems, or modified systems would need to meet the Applicants' stated objectives (sections 1.1 and 3.0) and be both technically feasible and practicable. Two of the Applicants' objectives that are crucial to the evaluation of system alternatives would be their ability to:

- deliver up to 650,000 Dth/d of natural gas supply from Susquehanna County, Pennsylvania to the interconnects with the Iroquois and TGP systems at the existing Wright Compressor Station (or otherwise delivery of the same amount of natural gas to the destination markets through other means); and
- expand access to new sources of natural gas supply, thereby increasing supply diversity and improving operational performance, system flexibility, and reliability in the New York and New England market areas.

Another important consideration is whether a system alternative is economically practical. Two shippers (Cabot and Southwestern) have signed precedent agreements with Constitution for the proposed natural gas volumes. The shippers would deliver gas from existing sources in Pennsylvania to the New York and New England markets. To be economically practicable, a system alternative must be capable of meeting these two shippers' requirements.

Figure 3.2.1-1 provides a geographic overview of the proposed project area, as well as the relative location of other existing interstate natural gas pipelines in the area that were evaluated as system alternatives. The status of existing systems is described below in section 3.2.2.

Another potential system alternative could involve the transportation of the required volume of liquefied natural gas (LNG) to the delivery point by truck via existing roadways. We asked Constitution to evaluate a natural gas shipping alternative involving the potential use of LNG transport trucks to deliver the same amount of natural gas from the supply area in Susquehanna County, Pennsylvania to the delivery area near the existing Wright Compressor Station, along with any other infrastructure that may be required. This alternative would require the construction of a new liquefaction facility near the supply area, a vaporization plant at the delivery point, and an estimated 302,345 LNG tanker truck one-way trips per year, or approximately 828 trips per day each day of the year. Given the requirement for the new liquefaction and vaporization facilities that would have to be constructed as well as the number of truck trips that would be required on a continuous basis, we conclude that the use of LNG trucks to deliver the required amounts of natural gas is not preferable to the proposed projects.



Proposed Pipeline

Susquehanna Supply Area

Figure 3.2.1-1

Constitution Pipeline Project

Relative Location to Other Projects Overview Map

3.2.2 Status of Existing Pipeline Systems

Constitution's joint owners, Williams Partners Operating, LLC, Cabot Pipeline Holdings, LLC, and Piedmont Constitution Pipeline Company, LLC do not own or operate existing pipeline systems capable of meeting the natural gas delivery capacity that the proposed pipeline project would provide to service downstream markets in New York and New England. However, there are four other existing pipeline systems operating in the vicinity of the proposed pipeline project area in addition to the Iroquois and TGP 200 pipeline systems operating in the New York and New England market areas. These other pipelines include:

- Transco Leidy;
- TGP 300 Line;
- Millennium Pipeline Company, LLC (Millennium); and
- Dominion Transmission, Inc. (Dominion).

Constitution obtained data for each pipeline system and determined that all of these systems are currently operating at or near full capacity. We have reviewed this information and conclude that these pipelines do not have the available capacity to transport the required volumes of natural gas to the delivery point in Wright, New York in their current configuration. Moreover, none of the existing pipeline systems are connected to the proposed pipeline project's gas supply area in Susquehanna County, Pennsylvania except for TGP's 300 Line. However, TGP's 300 Line proceeds in an east-west direction, not northeast towards the existing Wright Compressor Station and proposed delivery area. TGP's 200 Line is the only pipeline that connects to the existing Wright Compressor Station and proposed natural gas delivery area, (Transco Leidy, Millennium, and Dominion do not). Even if additional pipeline was constructed for the purposes of connecting any of these system alternatives to the supply area and the delivery area, there still is not sufficient available capacity on any of these existing pipeline systems to meet the proposed pipeline projects' required delivery of natural gas. Therefore, we do not consider use of existing pipeline systems as feasible alternatives for the proposed projects.

3.2.3 Modification of Existing Pipeline Systems

Because none of the existing pipeline systems in the project area have the capacity to meet the projects' objectives in their current state, they would require substantial modifications to meet the projects' objectives. These modifications could include greenfield pipeline construction to connect to the supply area, delivery area, or both; the use of existing pipeline where possible along with looped pipeline (i.e., new pipeline construction generally adjacent to an existing pipeline); additional compression; or some combination of these options.

We dismissed major system alternatives from further consideration if it were considered to have environmental impacts greater than the proposed pipeline project. These cases at a minimum involved routes that were partially looped with an existing pipeline and had a new greenfield segment that exceeded the length of the proposed project (124 miles). This eliminated system alternatives involving greenfield and looping options of the Millennium and Transco Leidy from further analysis. The Millennium and Transco Leidy systems are discussed further below in relation to other possible system alternatives in configurations that would not require a greenfield pipeline exceeding the length of the pipeline proposed by Constitution.

Two other system alternatives, for TGP and Dominion, would have greenfield pipeline lengths less than the proposed pipeline, but would have to be combined with looped pipeline segments to provide

the same service delivery capacity as the proposed pipeline. An evaluation of the potential for these two interstate pipelines to provide the same service as the proposed projects is also presented below.

3.2.3.1 Tennessee Gas Pipeline

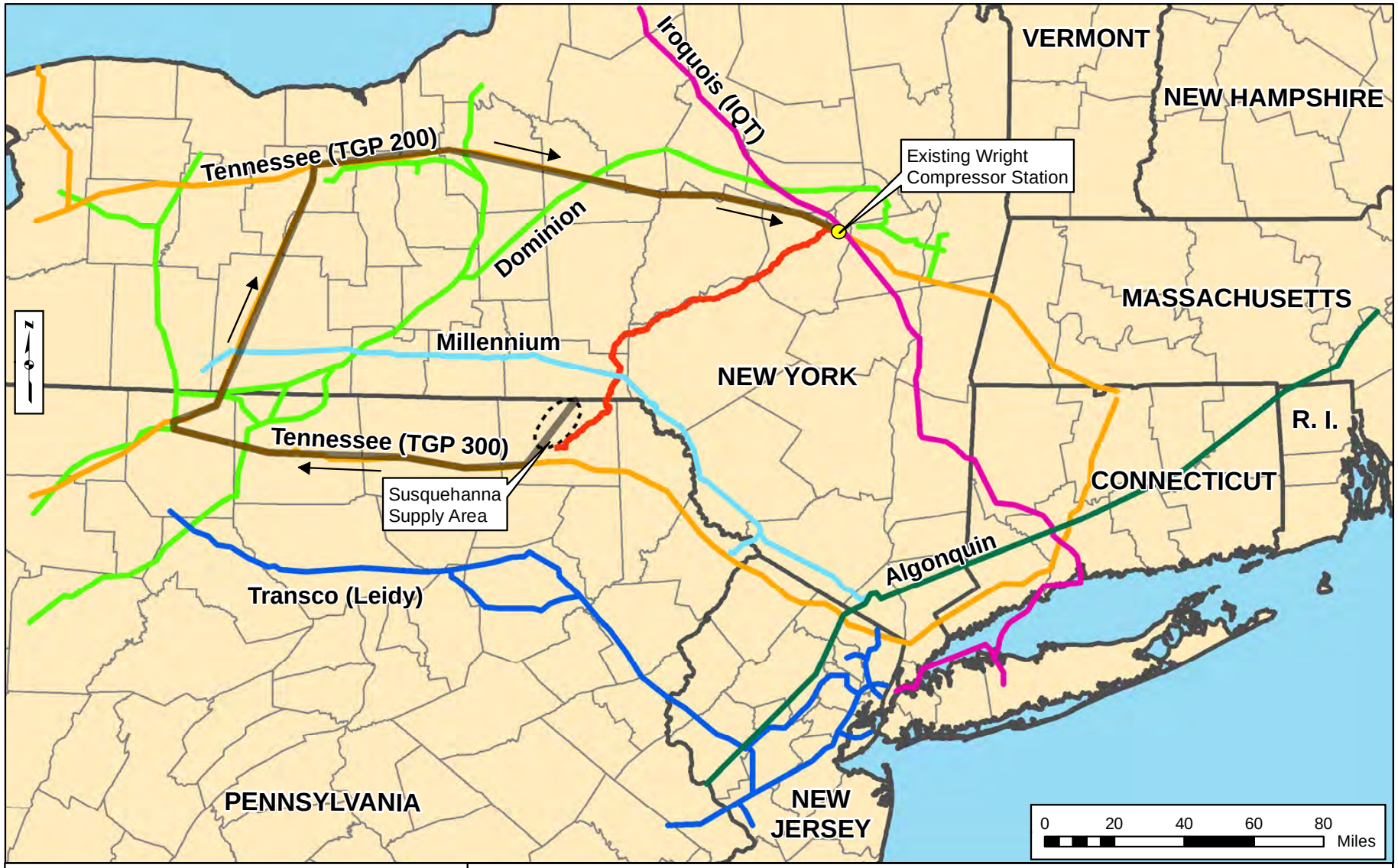
The TGP pipeline system carries natural gas from the Gulf of Mexico, Louisiana, and Texas to the northeastern United States. As shown in figure 3.2.1-1, the TGP system in the projects' area includes both the TGP 200 Line and 300 Line. The TGP 200 Line extends from western New York State through the Wright Compressor Station and into New England. The TGP 300 Line transverses across northern Pennsylvania, south of the proposed pipeline project area, and transports gas through New Jersey to New York City and New England markets.

The existing TGP system does not have available capacity in the relevant locations and could not meet the proposed projects' delivery capacity of up to 650,000 Dth/d of natural gas. To meet the required capacity, looping along portions of approximately 354 miles of the existing TGP system and additional compression (between 160,000 and 256,000 horsepower) would be required. Additionally, to connect to the supply area in Susquehanna County, Pennsylvania, expansion of the TGP system would require construction of approximately 25 miles of greenfield pipeline. The TGP system alternative would proceed south from the supply area via the 25-mile-long greenfield pipeline, proceed west along TGP's 300 Line to TGP's Compressor Station 319 in Bradford County, Pennsylvania, head north to TGP's Compressor Station 237 in Ontario County, New York, and then, finally, east along TGP's 200 Line ending at the Wright Compressor Station (figure 3.2.3-1).

Constitution estimated that installation of between 142 and 260 miles of mostly looped 30-inch-diameter pipeline and substantial new compression would be required for the TGP system alternative. We have reviewed this information and conclude that the required new facilities would likely result in land disturbance and environmental impacts greater than the impacts of the proposed projects due to the greater total length of new pipeline facilities and the need for additional new or modified compressor station facilities with at least 8 times the amount of compression required for the proposed project. Therefore, we do not consider use of the TGP system alternative as preferable to the proposed projects.

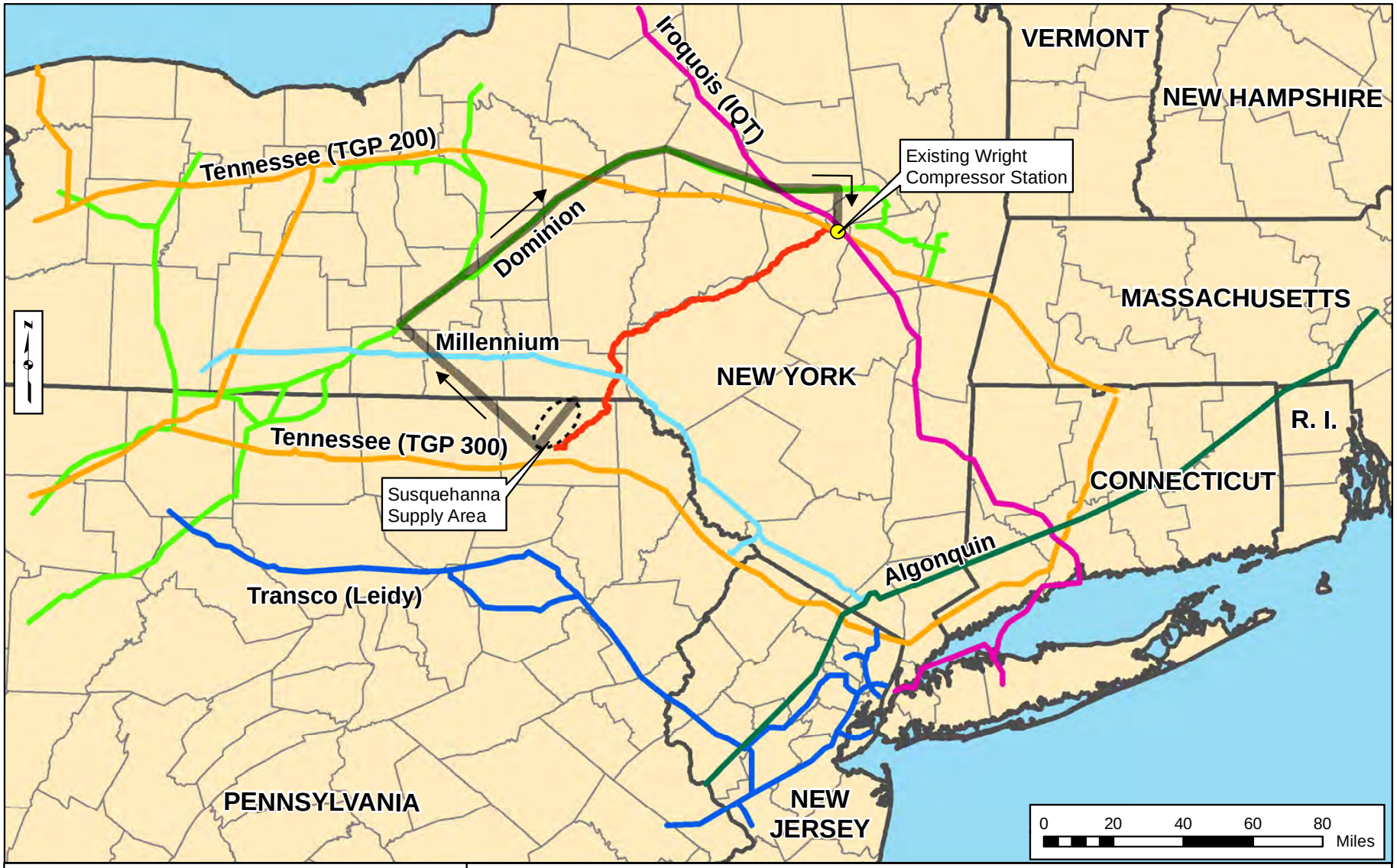
3.2.3.2 Dominion

The Dominion pipeline system transports gas to markets in the Northeast, Mid-Atlantic, and Midwest via its pipeline system in Virginia, Maryland, Pennsylvania, New York, West Virginia, and Ohio. Dominion does not have available capacity in the proposed project area and therefore could not meet the required projects' capacity of up to 650,000 Dth/d of natural gas. Looping would be required to accommodate the proposed pipeline capacity along approximately 135 miles of Dominion's existing pipeline system. Additionally, construction of approximately 92 miles of greenfield pipeline would be required to connect the existing Dominion pipeline facility to Constitution's receipt area in Susquehanna County, Pennsylvania and to the delivery area at the Wright Compressor Station (figure 3.2.3-2). Additional compression between 96,000 and 128,000 horsepower would also be required. The required new facilities would result in environmental impacts that likely would be greater than the impacts of the proposed projects due to the greater total length of new pipeline facilities (about 100 more miles) and the need for new or modified compressor station facilities (an increase of over 400 percent). Therefore, we do not consider modification of the Dominion pipeline system to be preferable to the proposed projects.



TGP 300 - TGP 200 Alternative
Proposed Route
Susquehanna Supply Area

Figure 3.2.3-1
Constitution Pipeline Project
Tennessee (TGP 300) - Tennessee (TGP 200)



Dominion Alternative
Proposed Route
Susquehanna Supply Area

Figure 3.2.3-2
Constitution Pipeline Project
Dominion Alternative

3.2.3.3 Other System Alternative Configurations

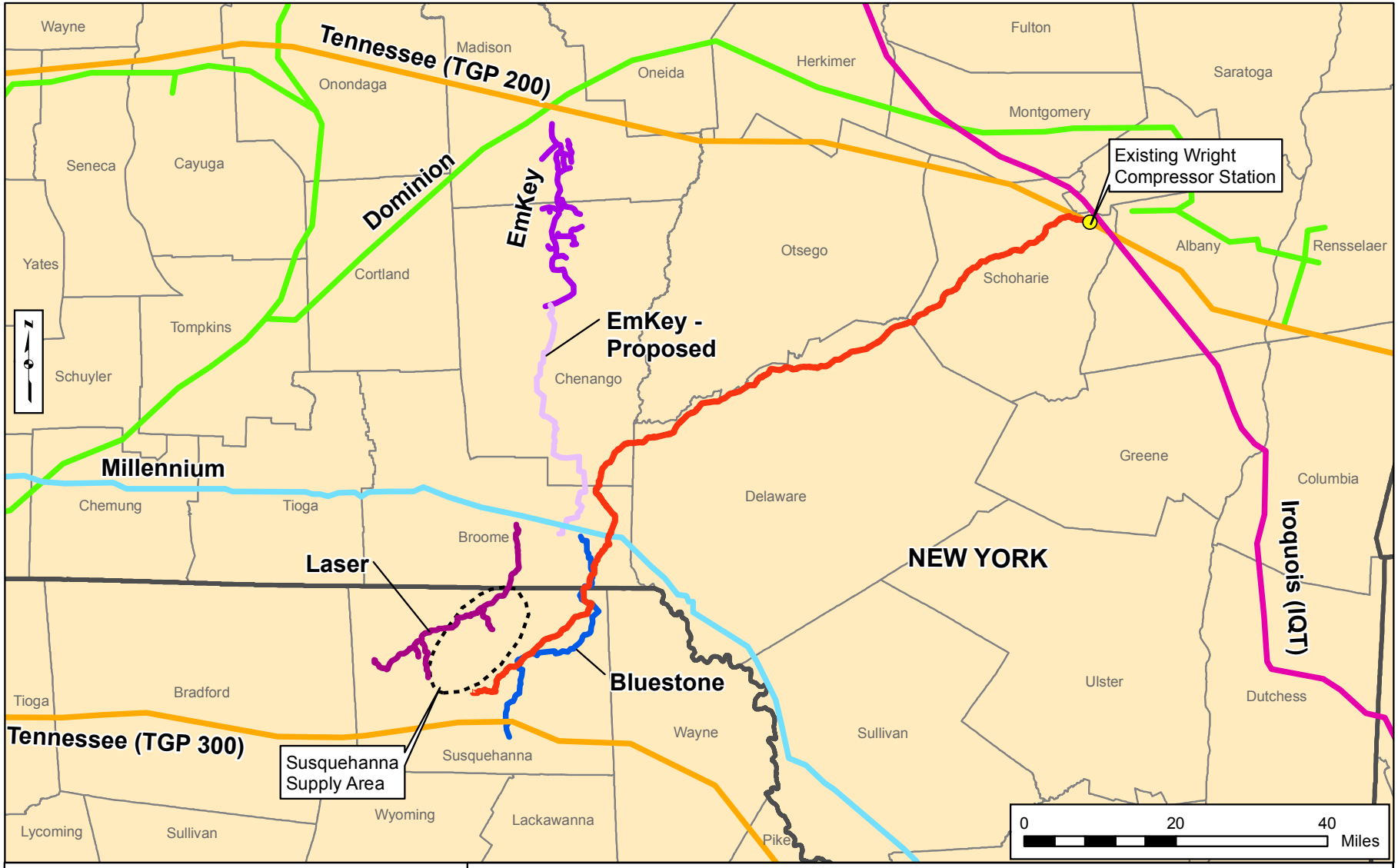
In addition to the TGP and Dominion system alternatives discussed above that were originally envisioned by Constitution in its application and which would generally proceed west initially, then north, and then east; we also considered system alternatives that would first proceed east along either the TGP 300 Line, Transco Leidy, or Millennium pipelines more directly towards New York City. In theory, natural gas delivered in a more direct pathway to the vicinity of New York City could supply that market demand assuming that the appropriate interconnections for transportation and distribution could be maintained. Furthermore, depending upon the amount of natural gas destined for delivery in New England and existing infrastructure servicing the New England area, other options may exist to deliver the required amount of natural gas to that market area as well.

As noted above, there is not sufficient available capacity to transport natural gas along the existing the TGP 300 Line, Transco Leidy, or Millennium pipelines in the direction of New York City to supply natural gas needs in that area. Further, the connection of a new pipeline proceeding east towards New York City to another existing or new pipeline extending northeast from New York City towards New England would be constrained by the high level of development within New York City and the surrounding area. Given these considerations, we conclude that system (or collocated) alternatives along the existing TGP 300 Line, Transco Leidy, or Millennium pipelines proceeding east directly toward New York City and then connecting with existing or new pipelines and proceeding towards New England, are not feasible and would not be preferable to the proposed projects.

3.3 COLLOCATION WITH EXISTING OR PROPOSED PIPELINE SYSTEMS

We reviewed the potential for collocation of the proposed pipeline project almost completely along the route of existing pipeline systems either alone or in tandem with other existing systems, or a combination of existing and proposed pipeline systems. In addition, we evaluated the potential for partial collocation with an existing pipeline system. Two existing pipeline systems or combinations of existing systems were evaluated: TGP and a Millennium-Dominion-TGP system combination. We also assessed collocation using a combination of a proposed EmKey pipeline, an existing EmKey pipeline, the Dominion Pipeline, and TGP 200 Line. Finally, we reviewed the potential for an alternative with partial collocation along the existing Bluestone pipeline. These existing and proposed pipeline systems are depicted in figures 3.2.1-1 and 3.3-1.

We received comments about potential collocation of the proposed pipeline with the Laser Northeast Gathering System (Laser System). The Laser System consists of a 16-inch-diameter pipeline and gas gathering system located in Susquehanna County, Pennsylvania (approximately 33 miles) and Broome County, New York (approximately 10 miles). Laser is owned by Williams Partners LP, a company affiliated with the Constitution Pipeline. The Laser System is located approximately 10 miles to the northwest of Constitution's proposed route, is designed for proximity to gas wells as a meandering gathering pipeline, and is not located near Constitution's proposed natural gas receipt points. For these reasons, we do not consider collocation of the pipeline project with the Laser System to be viable and it was not evaluated further. The Laser System is also depicted in figure 3.3-1.



Proposed Route

Susquehanna Supply Area

Emkey and Bluestone Alignment Sources:
http://emkeycompanies.com/emkey-resources/
http://www.dtepipeline.com/pdfs/bluestoneGatheringMap.pdf

Figure 3.3-1
Constitution Pipeline Project
EmKey, Bluestone, and Laser Pipeline Systems

3.3.1 TGP Collocated Alternative

As generally described above for the TGP system alternative (figure 3.2.3-1), the TGP collocated alternative would proceed south from the Susquehanna County, Pennsylvania supply area via a 25-mile-long greenfield pipeline, proceed west along TGP 300 to TGP Compressor Station 319 in Bradford County, Pennsylvania, head north to TGP Compressor Station 237 in Ontario County, New York, then east along TGP 200 ending at the Wright Compressor Station. Collocation with the TGP system could allow for transportation of natural gas from the vicinity of the supply area in Susquehanna County to the Wright Compressor Station.

This largely collocated TGP route would require installation of approximately 362 miles of new, collocated pipeline, approximately 25 miles of greenfield pipeline, and construction of two new compressor stations (one in Tioga County, Pennsylvania and one in Schoharie County, New York). The total length of this pipeline, approximately 387 miles, is more than three times the length of the proposed pipeline, and although it would be collocated with existing rights-of-way for approximately 94 percent of its length, it would also result in much greater total land disturbance, impacts on more landowners, and greater total environmental impacts relative to the proposed projects. Therefore, we do not consider collocation with the TGP pipeline system to be preferable to the proposed projects.

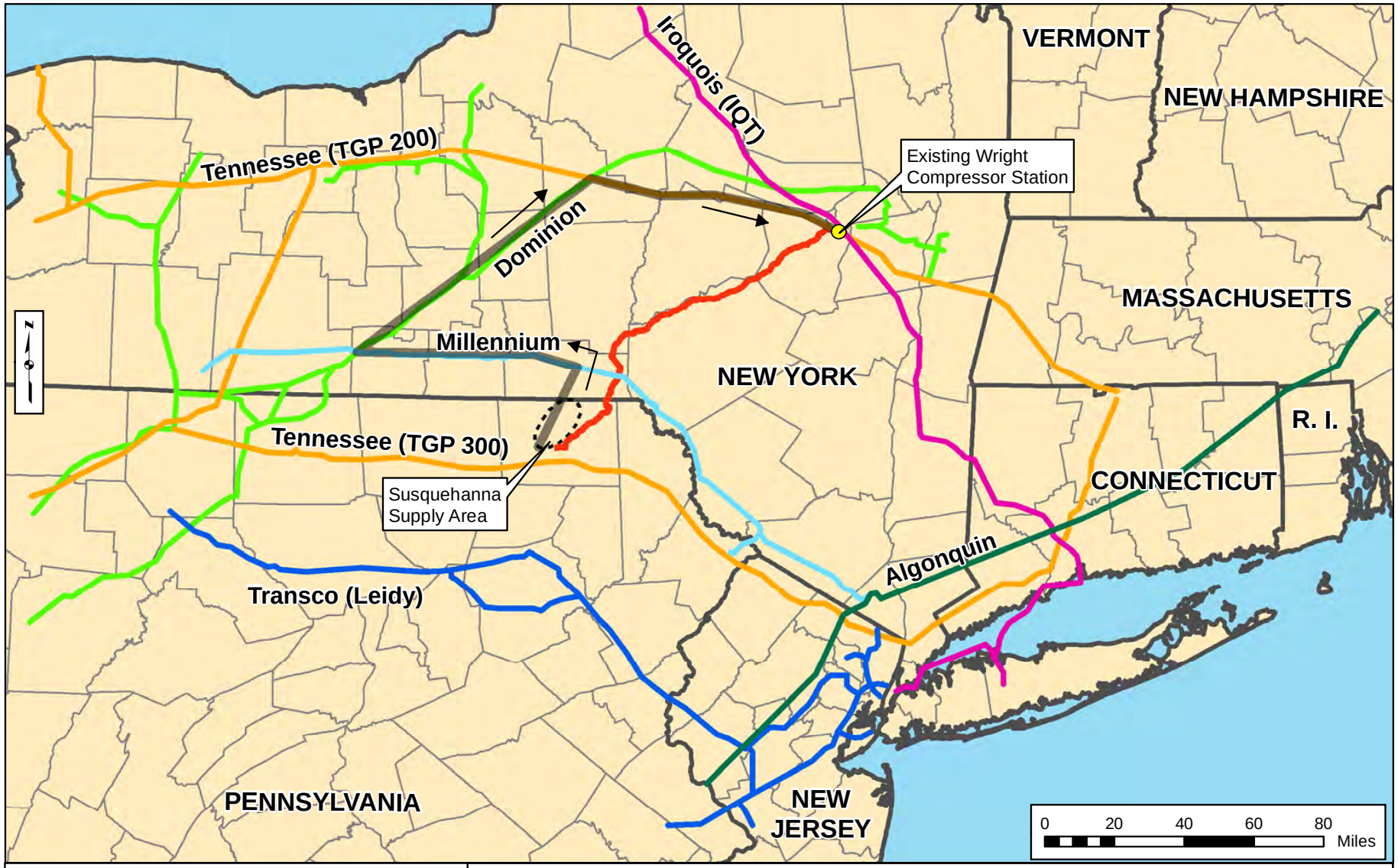
3.3.2 Millennium-Dominion-TGP Collocated Alternative

We also considered collocation with a combination of three different pipeline systems: Millennium to Dominion to TGP 200. This collocated alternative would involve an approximately 10-mile-long greenfield pipeline connecting the supply area in Susquehanna County, Pennsylvania to the north to the Millennium Pipeline, then west to the Dominion Pipeline, then northeast to the TGP 200 Pipeline proceeding east to the Wright Compressor Station (figure 3.3.2-1). Collocation with the Millennium-Dominion-TGP systems could allow for transportation of natural gas from the vicinity of the supply area in Susquehanna County to the Wright Compressor Station.

This largely collocated Millennium-Dominion-TGP route would require installation of approximately 222 miles of new, collocated pipeline, approximately 10 miles of greenfield pipeline, and construction of at least one new compressor station. The total length of this pipeline, approximately 232 miles, is almost twice the length of the proposed pipeline, and although it would be collocated with existing rights-of-way for approximately 96 percent of its length, it would also result in greater total land disturbance, impacts on more landowners, and greater total environmental impacts relative to the proposed pipeline. Therefore, we do not consider collocation with the Millennium-Dominion-TGP pipeline system to be preferable to the proposed projects.

3.3.3 EmKey-Dominion-TGP 200 Collocated Alternative

The existing EmKey pipeline is comprised of approximately 35 miles of 16- to 24-inch-diameter mainline pipeline and smaller laterals in Chenango and Madison Counties, New York. The EmKey pipeline is essentially a gathering line designed to collect and transport natural gas from wells in those two counties. EmKey has also proposed to expand its gathering line system with approximately 40 miles of new pipeline in Broome, Chenango, and Madison Counties, New York (EmKey 2013).



Millennium - Dominion - TGP 200 Alternative
Proposed Route
Susquehanna Supply Area

Figure 3.3.2-1
Constitution Pipeline Project
Millennium - Dominion - Tennessee (TGP 200)

The collocated EmKey-Dominion-TGP 200 alternative would proceed north from the Susquehanna County, Pennsylvania supply area via new, greenfield pipeline; begin collocation with the proposed EmKey pipeline route in Broome County, New York; proceed north to the existing EmKey pipeline in Chenango County, New York; then north to the Dominion Pipeline; northeast for a short distance along the Dominion Pipeline; then east via TGP 200 to the Wright Compressor Station (figure 3.3.3-1). In addition, construction of at least one new compressor station would also be required. The total length of this EmKey-Dominion-TGP 200 collocated alternative, approximately 147 miles, is almost 23 miles longer than the proposed pipeline.

The existing and proposed EmKey pipelines would include meandering pathways and laterals designed for collecting gas from wells, not for the direct transportation of natural gas northeast to the Wright Compressor Station. Gathering lines typically have smaller diameters (due to lower volumes) and have more frequent bends and turns, which generally cannot be achieved with 30-inch-diameter pipe. Therefore, collocation is unlikely for the entirety of its length and would require many pipeline crossovers that would require substantially more and larger workspaces for construction.

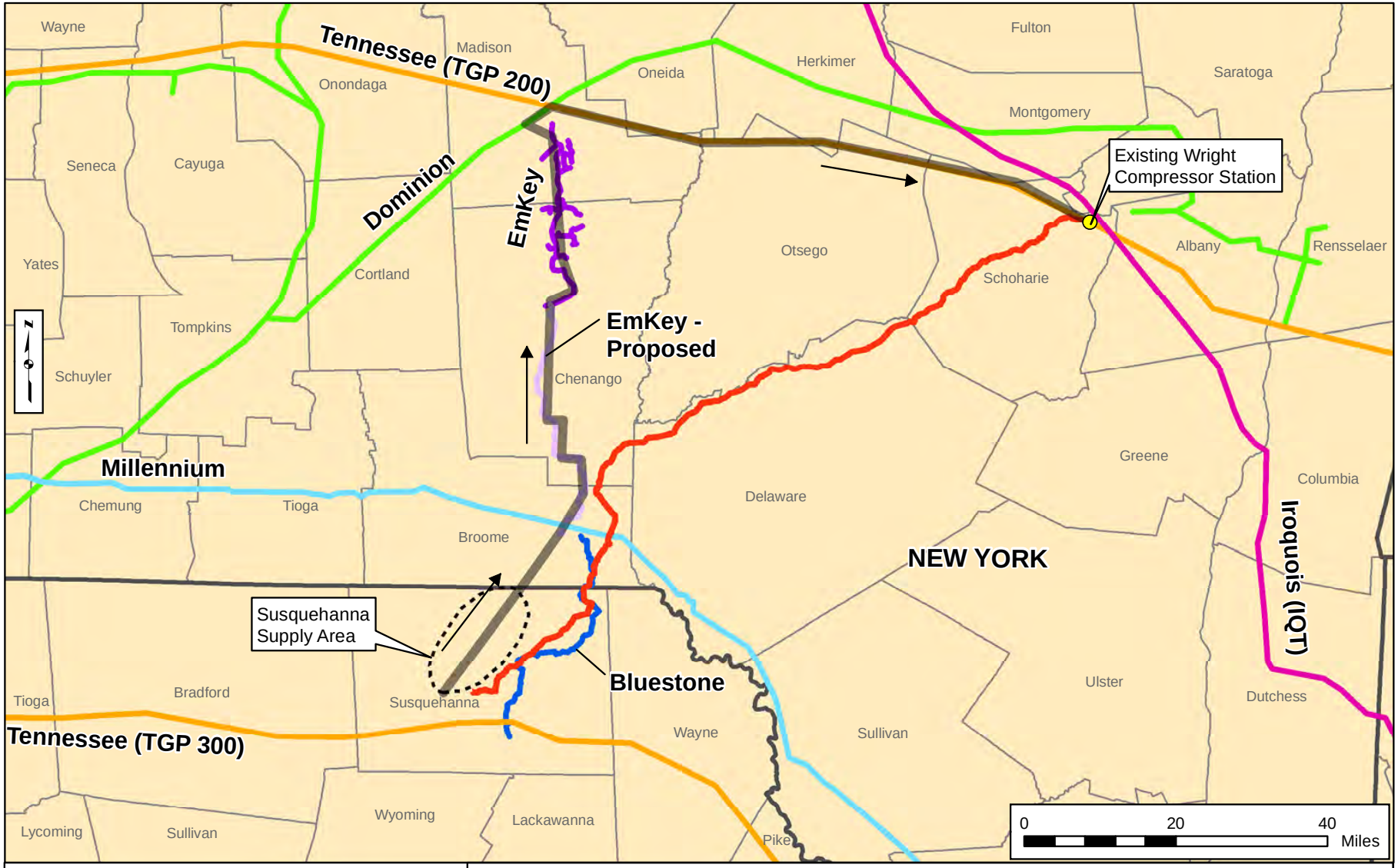
Further, Constitution's proposed receipt points would be located approximately 20 to 25 miles away from the start of the EmKey pipeline. Although it would be collocated with existing rights-of-way for approximately 95 percent of its length, it would also result in greater total land disturbance, impacts on more landowners, greater total environmental impacts relative to the proposed pipeline project (including a crossing of the Susquehanna River), and reliance upon collocation with a proposed pipeline route for which ultimate approval and construction is uncertain. Because EmKey's project status and its likelihood of construction is unknown, if it were not built, the maximum extent of collocation would be decreased to about 67 percent. While the use of some overlapping workspaces may be possible, it is likely that implementation of this alternative would require extensive use of abutting or adjacent rights-of-way, resulting in new impacts on previously undisturbed areas. Therefore, we do not consider collocation with the EmKey-Dominion-TGP 200 pipeline systems to be preferable to the proposed projects.

3.3.4 Bluestone Pipeline Partially Collocated Alternative

The existing Bluestone pipeline is comprised of approximately 40 miles of trunk line located in Susquehanna County, Pennsylvania and Broome County, New York (figure 3.3-1). The Bluestone pipeline is essentially a gathering line designed to collect and transport natural gas from wells in those two counties; it connects to the TGP 300 Line in the south and the Millennium system to the north. It does not follow a direct path typical of natural gas transmission pipelines, as its route is dependent upon linkage and proximity to existing natural gas wells. Constitution's proposed pipeline would be collocated with the Bluestone pipeline at MP 22.0 to 22.3 for a distance of approximately 1,901 feet, would cross over the Bluestone pipeline in multiple locations, and would make use of at least four access roads operated by Bluestone. Given the meandering nature of the Bluestone pipeline, its overall short length compared to the entire proposed pipeline route, and since Constitution has already proposed partial collocation and to make use of at least some other areas already disturbed by Bluestone, we conclude that additional collocation with the Bluestone pipeline is not preferable to the proposed project.

3.3.5 Northeast Energy Direct Single Pipeline Alternative

After issuance of the draft EIS, we became aware of a project being considered by TGP, called the Northeast Energy Direct (NED) Project (TGP 2014). TGP has conducted an open season for this project, but has not yet filed an application with the FERC. However, TGP entered into the pre-filing process for this project in October 2014 (http://elibrary.ferc.gov:0/idmws/doc_info.asp?document_id=14257013).



EmKey - Dominion - TGP 200 Alternative

Proposed Route

Susquehanna Supply Area

Emkey and Bluestone Alignment Sources:
http://emkeycompanies.com/emkey-resources/
http://www.dtepipeline.com/pdfs/bluestoneGatheringMap.pdf

Figure 3.3.3-1
Constitution Pipeline Project
EmKey - Dominion - Tennessee (TGP 200)

The NED project, if pursued to completion by TGP and approved by the Commission, may generally parallel the Constitution pipeline (at least in some segments) from Susquehanna County, Pennsylvania to Wright, New York before continuing east to Dracut, Massachusetts with laterals in New Hampshire and Connecticut. The project would include approximately 417 miles of pipeline, eight new compressor stations, and one modified compressor station. TGP is preliminarily requesting an in-service date of November 2018, and stated the project would deliver up to 2,200,000 dth/day of natural gas to the Northeast / New England area. Although TGP has begun the pre-filing process for the NED project it may proceed, be delayed, or could be cancelled. This project, including a discussion of its cumulative impacts, is discussed further in section 4.13.3.

We considered the possibility of requiring Constitution and TGP to build one larger diameter pipeline to accommodate the objectives of both projects. Depending on the proposed capacity of TGP's project (currently up to 2,200,000 dth/day via either a 30-inch- or 36-inch-diameter pipeline) this would require construction of an approximately 42-inch-diameter pipeline to meet the transportation objectives of both of the project sponsors.

Construction of one 42-inch-diameter pipeline instead of two 30-inch-diameter pipelines would generally reduce long term impacts on environmental resources, provided that both individual routes cross similar resources. However, we note that construction of a larger pipeline would require a wider construction right-of-way and additional or larger extra workspaces at resource crossings. Other constraints could arise such as differing limitations in bend angles that may be possible with a 30-inch-, but not 42-inch-diameter pipe. Also, longer trenchless crossings (either HDD or Direct Pipe) feasible with a 30-inch-diameter pipe may not be feasible if the diameter is increased. If Constitution were to revise its proposal (or the Commission were to require it to do so), Constitution would have to reassess the technical feasibility of many resource crossings, engineering design, and turbines at the Wright Compressor Station. Further reassessment of the project would take at least several months, if not longer, to complete.

If a larger pipeline were constructed and built, the extra capacity would not be able to be immediately utilized, as sufficient takeaway infrastructure from Wright, New York does not exist that TGP is currently contemplating (the Wright to Dracut portion of TGP's project). The capacity could only be used if TGP subsequently files an application with the Commission, undergoes NEPA review, is approved, and receives all necessary federal approvals and is constructed. Therefore, if the remaining portion of TGP's project is not built, the capacity created by Constitution installing a larger diameter pipeline would not be utilized, and the additional unwarranted impacts (extra workspace, possible compression, etc.,) may not be in the public interest.

The Commission applies a balancing test in reviewing proposals (Certificate Policy Statement) that weighs the environmental impacts against the purported benefits. In short, a project providing greater benefits could be approved with larger adverse or significant impacts on the environment. However, in order for the Commission to come to an informed decision, our environmental review must be completed prior to the decision. Therefore, because the environmental impacts of the remainder of TGP's project (the Wright to Dracut portion) are unknown, the Commission cannot make a determination of whether the benefits of that project are warranted. The Commission has issued a statement of policy that sets the framework preventing applicants from constructing larger projects based on speculation of future demand (and not on precedent agreements) and passing the higher project costs onto its ratepayers (i.e., overbuilding). In particular, the Commission discusses this standard in its Certificate Policy Statement and clarifications (September 15, 1999; July 28, 2000; February 9, 2000). If we were to recommend that Constitution construct a larger diameter pipe, this would directly conflict with the Commission's established policy on overbuilding. Additionally, according to available information, TGP and Constitution have different project objectives, customers, and market-driven obligations that may not be

met by a combined project. In turn, if TGP's project is ultimately denied, abandoned, or held in regulatory abeyance, disproportionate or unwarranted impacts may occur on Constitution's ratepayers and the environment. However, as we have noted above and in section 4.13.3, construction of two projects could result in additional adverse impacts that could be eliminated or reduced by the construction of a single project.

The Commission's policy is to ensure that all proposed projects are environmentally sound and consistent with public safety and then leaves it to the market to determine which projects are constructed. We therefore review applications for gas projects as they are filed, based on individual merits. The Energy Policy Act of 2005 directs the Commission to establish a schedule for the regulatory review by the Commission and relevant federal and state agencies that ensures "expeditious completion" of proceedings. Based on the timeframe for TGP's planned project, recommending the single pipeline alternative would delay Commission review of the Constitution project significantly and would be inconsistent with the Energy Policy Act of 2005.

3.4 ROUTE ALTERNATIVES AND MINOR ROUTE VARIATIONS

Major route alternatives include those that deviate from the proposed route for a significant distance, often a majority or more of the proposed route's length, and which provide a substantially different pathway from the source area to the delivery area. Minor route alternatives deviate from the proposed route less substantially than major route alternatives, are often designed to avoid large environmental resources or engineering constraints, and typically remain within the same general area as the proposed route. Minor route variations are typically site-specific and may allow for avoidance of certain localized features such as a home, wetland, or orchard.

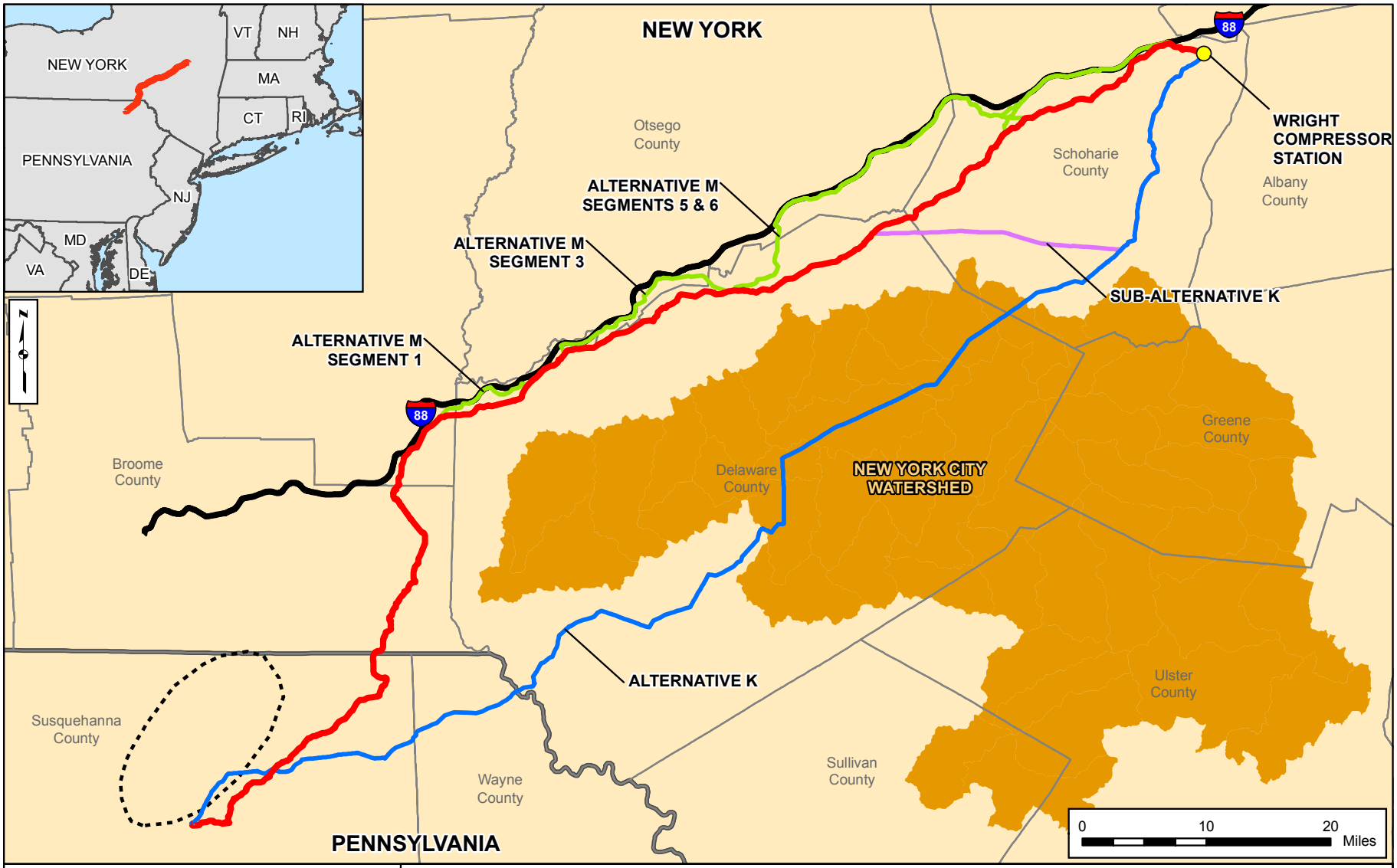
This assessment includes route alternatives and variations identified by Constitution, FERC staff, landowners, municipalities, and other stakeholders. Many of the alternatives identified below are the result of Constitution adopting changes to reduce impacts on specific resources; therefore, some of the alternatives presented are those that were originally identified by Constitution as part of its planned route in May 2012. Subsequently, our assessment of the environmental consequences of the alternatives and variations already incorporated by Constitution into its proposed route is included as part of our environmental analysis of the proposed projects in section 4.0.

3.4.1 Major Route Alternatives

We evaluated two major route alternatives, alternatives K and M. These two alternatives, along with a comparison of potential environmental impacts and other relevant factors, are described below and depicted in figure 3.4.1-1. Where applicable in the text and tables below, "Environmental Hazards" refers to government-regulated cleanup facilities, such as hazardous waste sites or potentially contaminated sites.

3.4.1.1 Alternative K

Alternative K was developed by Constitution to maximize collocation with existing rights-of-way. As with the proposed route, alternative K begins at the Williams Central Compressor Station in Susquehanna County, Pennsylvania, and ends at the existing Wright Compressor Station in Schoharie County, New York. This alternative is approximately 118 miles long, which is about 6 miles shorter than the proposed route. Alternative K is collocated with existing rights-of-way, primarily electric transmission lines, for approximately 90 miles or about 76 percent of its total length. A comparative analysis of environmental impacts of the proposed route and alternative K is presented in table 3.4.1-1.



Proposed Constitution Pipeline Route
Alternative K
Sub-Alternative K
Alternative M
Susquehanna Source Area
New York City Watershed

Figure 3.4.1-1
Constitution Pipeline Project
Major Route Alternatives

TABLE 3.4.1-1 Comparison of Proposed Route to Alternative K			
Factor	**Proposed Route**	**Alternative Route**	**Difference (if Applicable)[a]**
Length of Corresponding Segments (miles)	124.4	118.0	-6.5
Type of Right-of-Way			
Length Adjacent to Existing Utility Right-of-Way (electric/pipeline) (miles)	11.2	82.1	70.9
Length Adjacent to Existing Roadways Paralleling and within an Existing Right-of-Way or Easement (miles)	0.0	0.0	0.0
Length Adjacent to Existing Roadway Paralleling and Abutting an Existing Right-of-Way or Easement (miles)	0.5	0.5	0.0
Length Adjacent to Existing Roadways Paralleling an Existing Right-of-Way or Easement within 300 feet (miles)	7.5	7.7	0.2
Right-of-Way Requirements			
Pipeline Construction Requirements (acres)	1,659.2	1,572.7	-86.5
Pipeline Operation Requirements (acres)	754.2	714.9	-39.3
Wetlands			
Total Wetland Complexes Crossed (number)	33	36	3
Total Wetland Crossed (linear feet)	8,148	8,470	322
Total Wetland Impacts (construction/operation) (acres)	14.0/9.4	14.6/9.7	0.6/0.4
Palustrine Forest Wetland Complexes Crossed (construction/operation) (acres)	2.0/1.3	2.2/1.5	0.2/0.2
Palustrine Scrub-Shrub Wetland Complexes Crossed (construction/operation) (acres)	5.5/3.7	3.4/2.3	-2.2/-1.4
Palustrine Emergent Wetland Impacts (construction/operation) (acres)	6.6/4.4	9.0/6.0	2.5/1.6
Waterbodies			
Waterbodies Crossed (number)	98	134	36
Major River Crossings (number greater than 100 feet)	2	3	1
Streams with Drinking Water Use Designation (number)	1	5	4
Cultural Resources			
National Historic Landmarks (number)	0	0	0
National Register of Historic Places Eligible or Potentially Eligible Cultural Resources Sites Crossed (number)	0	1	1
Land Use			
Forested Land Crossed (miles)	79.0	80.4	1.4
Forested Land Impacts (construction/operation) (acres)	1,053.9/479.0	1,072.5/487.5	18.7/8.5
Forest Edge Crossed (miles)	43.1	69.9	26.9
Forested Edge Impacts (construction/operation) (acres)	574.3/261.0	932.4/423.8	358.1/162.8
Forest Interior Crossed (miles)	36.0	10.5	-25.5
Forested Interior Impacts (construction/operation) (acres)	436.0/218.7	127.4/63.7	-308.6/-154.3
Important Bird Area Crossed (miles)	2.4	19.1	16.7
Audubon Forest Blocks of Importance (miles)	6.1	47.8	41.7

TABLE 3.4.1-1 (continued) Comparison of Proposed Route to Alternative K			
Factor	**Proposed Route**	**Alternative Route**	**Difference (if Applicable)[a]**
Agricultural Land Crossed (miles)	36.0	22.2	-13.8
Agricultural Land Impacts (construction/operation) (acres)	545.6/218.2	336.5/134.6	-209.1/-83.6
Landfills, Quarries, Material Storage and Processing (number)	6	0	-6
Property Owners			
Property Owners Affected (number of parcels crossed)	655	623	-32
Residences Located within 50 feet of the Pipe Centerline (number)	7	1	-6
Residences Located within 125 feet (number)	7	14	7
Residences Located within 250 feet (number)	79	72	-7
Federal and State Land			
Federal Lands Crossed (number/miles)	0	0	0
State Forest/Parks (number/miles)	2/0.1	1/0.6	-1/0.5
Trails			
Trails (number)	2	1	-1
Other Physical Features			
Road Crossings (number)	129	134	5
Railroads Crossed (number)	4	5	1
Other Environmental Features			
Shallow Depth to Bedrock Crossed (miles)	43.7	34.9	-8.8
Steep Slopes Crossed (30 degrees or greater) (miles)	8.1	14.7	6.6
Side Slope Construction greater than 30 Percent Slope (miles)	2.3	0	-2.3
Environmental Hazards and/or Concerns (within 0.5 mile) (number)	8	9	1
Landslides / Unstable Lands Crossed (miles)	0.0	0.0	0.0

[a] Totals may not sum correctly due to rounding

Alternative K crosses the New York City Water Supply Watershed (NYCWSW) in Delaware and Schoharie Counties, New York for approximately 33 miles. The NYCWSW provides unfiltered drinking water supply to approximately eight million consumers, almost one-half the population of New York State (New York City Department of Environmental Protection [NYCDEP] 2012). The proposed pipeline route also crosses public water supply watersheds (i.e., Cobleskill Reservoir watershed, Pine Hill Reservoir watershed, and the Barton Hill Natural Resource Protection Overlay watershed), but these three watersheds would be crossed for a combined length of approximately 4 miles. Additionally, potential impacts on the Pine Hill Reservoir watershed would be minimized through the use of a reroute adopted for much of the proposed crossing length in that area. Constitution originally proposed an HDD at the Pine Hill reservoir watershed area as reported in the draft EIS, but adopted a reroute due to concerns about an inadvertent loss of drilling fluids. As discussed in section 4.3 an inadvertent loss of drilling fluids can happen with an HDD and in this case a release could affect the Village of Sidney's water supply. In addition, Constitution's proposed pipeline route is at least 1 mile away from springs supplying the Barton Hill Natural Resource Protection Overlay watershed.

Alternative K also crosses and collocates with the West Delaware Tunnel of the New York City Water Supply Aqueduct System for approximately 4 miles (NYCDEP 2012). This aqueduct carries water

supplies from the NYCWSW to New York City. If alternative K was pursued, drilling and blasting would be prohibited in the vicinity of the aqueduct, and other special permitting requirements would apply. Other energy infrastructure crossed and/or collocated with alternative K include electric utility lines operated by Penelec, New York State Electric and Gas, the NYPA, and National Grid, as well as pipelines operated by Enterprise and Millennium.

The NYCDEP administers several programs designed to protect the NYCWSW. These programs include stormwater permitting and regulation, land acquisition, agricultural partnerships, forestry initiatives, stream management and restoration plans, riparian buffer protection regulations, and wetland protection. Land use permits are required for certain activities occurring within the watershed as described in NYCDEP's Watershed Rules and Regulations (NYCDEP 2006).

The NYCDEP, in its scoping comments, noted the sensitivity of the water supply watershed, its importance to millions of water consumers in New York, and potential impacts on the watershed and ultimately the water supply resulting from stormwater discharges and polluted runoff that could occur during construction of the pipeline. It is likely that major additional permitting efforts and impact avoidance, minimization, and mitigation measures would be required by the NYCDEP if alternative K was adopted. The NYCDEP supported Constitution's decision to deem alternative K as non-viable and requested that Constitution's project not be sited within the NYCWSW. The NYCDEP further noted that if Constitution's project were subsequently routed through the NYCWSW, then the route would be subject to their permitting requirements and regulations and that the NYCDEP would have additional scoping and environmental review comments.

Both the proposed route and alternative K have certain advantages environmentally. Alternative K is shorter in length, thereby affecting less land (i.e., smaller overall footprint). It is also collocated with more existing rights-of-way than the proposed route resulting in less greenfield construction. Consequently, it would have fewer impacts on forest interiors, property owners, nearby residences, and shallow bedrock.

However, the proposed route crosses much fewer waterbodies, streams designated as drinking water supplies, areas within public water supply watersheds (as discussed above), and important bird areas and forest blocks of importance for birds as designated by the National Audubon Society. In particular, alternative K crosses 19 miles of Audubon Society-designated Important Bird Areas, and 48 miles of Audubon Forest Blocks of Importance. Important Bird Areas vary in size, but are typically discrete habitats that provide essential habitat for bird species including sites for breeding, migrating, and overwintering (Audubon New York 2013). These areas also typically focus on habitats for birds that are under regulatory protection, those birds that are considered at risk or especially vulnerable to habitat loss, or at places where large numbers of birds may congregate. Forest Blocks of Importance are contiguous blocks of forested areas providing habitat for many wildlife species, including birds. In addition to the total miles of blocks crossed, the blocks crossed by alternative K are larger, more contiguous blocks than those crossed by the proposed route.

The utility lines that alternative K would collocate with have variable right-of-way widths (depending on its operator) of between 150 and 200 feet wide. Factoring in areas of extra workspace that would be needed for crossovers of existing subsurface utilities, roads, staging areas for wetland and waterbody crossings, and avoidance of transmission towers and guide wires, the long-term impacts of construction could result in a corridor ranging between 200 and 325 feet.

Although there can be environmental benefits to collocation of linear projects and expansion of existing rights-of-way, impacts on certain wildlife species also may occur. Forest interior species, such as some migratory birds, mammals, and other fauna, may be isolated or have movements restricted by the

occurrence of extensive cleared gaps or corridors through otherwise forested areas (FERC 2008, USDA and U.S. Forest Service 2002, Bourque and Desrochers 2003). Certain species may be more sensitive to wider gaps than others. In some cases, forest gaps of approximately 250 feet may inhibit bird movement or affect behavior (U.S. Department of Agriculture 2002). Increased nest predation and parasitism may also occur along expanded corridors. Generalist, forest edge, or disturbance-tolerant avian and other wildlife species could benefit from the expansion of open corridors, but the forest interior and disturbance-intolerant species may not.

The proposed route avoids the NYCWSW, which supplies unfiltered drinking water to approximately one-half of the State of New York. Potential impacts on rare or protected species such as the bald eagle, Indiana bat, bog turtles, timber rattlesnake, and dwarf wedgemussel also would have to be fully evaluated if alternative K was selected over the proposed route. The proposed pipeline route's impacts on rare and protected species are discussed in section 4.7. According to Constitution, the full assessment and possible adoption of alternative K would add extensive time for study, stakeholder input, agency review and permitting, and construction, potentially adding over 2 years to the project schedule. Constitution also stated that such a delay would likely render the project non-viable from a market perspective. Given all of these factors, we do not consider that alternative K offers a significant environmental advantage over the proposed pipeline project.

We also considered a sub-alternative K (figure 3.4.1-1) which diverges from the proposed pipeline route north of the NYCWSW thereby avoiding it, connects to alternative K, and then proceeds north to the existing Wright Compressor Station. The addition of sub-alternative K adds approximately 6 miles to the proposed pipeline's overall length and would require the construction of a greenfield compressor station in order to meet the expanded compression requirements necessitated by the increased length. For these two reasons, we do not consider adoption of sub-alternative K to be preferable to the proposed projects and it is not further evaluated.

3.4.1.2 Alternative M

Alternative M was developed to evaluate the possibility of collocating the proposed pipeline with Interstate 88 (I-88). Numerous commenters requested that an alternative route be evaluated which would place a portion of the pipeline route within or adjacent to the I-88 corridor, thereby reducing the need for disturbance in greenfield areas. I-88 originates near Binghamton, New York, which is just north of the Susquehanna County, Pennsylvania supply area, and proceeds approximately 118 miles to the northeast to the vicinity of Schenectady, New York. The proposed pipeline route and I-88 occur in the same general vicinity as each other, both trending northeast-southwest. Near the northeast end of the proposed pipeline route at MP 121, I-88 and the proposed pipeline route would be located about 300 feet apart, before the route proceeds approximately 3 miles east ending at the Wright Compressor Station, the pipeline project's delivery point.

The I-88 corridor is managed by the New York State Department of Transportation (NYSDOT), with funding and oversight provided by the FHWA. Constitution consulted with the NYSDOT and the FHWA regarding the possibility of locating alternative M within or along the right-of-way for I-88. We also have coordinated with the NYSDOT and the FHWA regarding alternative M.

As a result of this coordination several potential construction or engineering issues have been identified regarding alternative M:

- blasting near the roadway;
- use of two-tone construction techniques on side slopes;

- disruption of interstate traffic flow during blasting;
- delays caused by slow moving, heavy construction equipment operating near the roadway; and
- limited areas where the pipeline could be safely installed relative to the roadway.

For the safety of both motorists and construction workers, Constitution would not be allowed to access the construction workspace directly from I-88; rather, access would have to be obtained from adjacent private properties. Constitution also would not be allowed to access the permanent right-of-way from I-88 during operations. Placement of the pipeline within the controlled access area[2] managed by the NYSDOT would obstruct pipeline construction as well as inspections and maintenance during pipeline operations. The NYSDOT stated that the proposed pipeline would be required to comply with its policy, (NYSDOT's Accommodation of Non-communication Utilities on New York State Freeway or Control of Access Right-of-way) which states that Constitution would be required to show that no feasible alternative routes exist or cannot otherwise be successfully implemented to obtain approval of the alternative M route from the NYSDOT and the FHWA (NYSDOT 2012). As demonstrated in this analysis, multiple alternative routes do exist including the route proposed by Constitution. Further, because the easements are federally managed, Constitution would be required to successfully negotiate an easement for any portion of its project located within or crossing these access areas. If the NYSDOT refused the granting of an easement or if a mutually agreeable easement could not otherwise be negotiated in these areas, and the Commission were to grant an approving Certificate, it would essentially be approving a non-buildable project, as federally managed lands cannot be acquired through the power of eminent domain. In some cases, projects are built on federally managed lands; however, the appropriate land managing agency was receptive to the granting of an easement.

Constitution used a tiered approach in developing a technically feasible and constructible route for alternative M. First, placement of the pipeline within the median of I-88 was evaluated. Given that the median width ranges from 60 to 100 feet, and Constitution's project would generally require at least a 100 foot construction right-of-way, there is not sufficient width for construction workspace within the median. The limited space within the median would also not be sufficient for specialized construction techniques such as the HDD method. Additionally, side slopes occurring within the median would require even more workspace, and existing stormwater management structures would present obstacles to construction. Additionally, ingress and egress to project workspaces would only be accessible directly from the left-hand lanes of I-88. This would likely require shifts of traffic to accommodate ingress and egress resulting in safety concerns, potential damage to motorists and vehicles, and delays in traffic for the duration of construction associated with reduced lane width and shifts. Given these factors, we concur that placement of the pipeline within the I-88 median is not technically feasible.

Second, placement of the pipeline adjacent to I-88 within or along the controlled access under jurisdiction of the NYSDOT was evaluated. When I-88 was constructed, the highway was placed along steep side slopes in many locations, and was often installed along rocky cliffs or bluffs via use of blasting. This roadway configuration leaves little or in some cases no room for construction workspaces adjacent to the roadway, which is further exacerbated by the lack of safe construction or operational access from I-88. Additionally, blasting would likely be required in many locations in close proximity to the highway, thereby potentially affecting highway use during construction. As noted above, construction within side slopes would also require expanded workspaces. Given these factors, we concur that placement of the pipeline immediately adjacent to I-88 within the NYSDOT's controlled access area is not feasible.

[2] A controlled access area is a highway with limited ingress and egress to facilitate traffic flow, and which the owners of abutting lands are typically denied access to or from the highway.

Finally, we evaluated placement of the pipeline adjacent to I-88 where feasible (outside of the NYSDOT's controlled access area) with deviations away from the I-88 corridor as necessary to avoid constraints such as side slopes, cliffs, stormwater management structures, known cultural resources, environmentally sensitive areas; as well as population centers, homes, and businesses. The result of these evaluations is the route discussed here as alternative M.

If alternative M were subsequently proposed as the preferred route, the FHWA, along with the NYSDOT, stated that they would need to complete additional review of the plan sheets (with I-88 access control lines) of the segments where the pipeline could approach and ultimately impact the I-88 control of access area.

For purposes of our comparative analysis, alternative M was divided into six segments. This allows us to evaluate incorporating potentially one or more segments of alternative M into the proposed route. However, due to the proximity of I-88 to the Susquehanna supply area and delivery point in Wright, New York, three segments of alternative M are identical to the proposed pipeline route; therefore, they are not assessed as part of the analysis. The remaining three segments are evaluated where alternative M and the proposed route do not follow an identical path. This process allows for a comparison not just for alternative M relative to the proposed route, but also for a more detailed assessment of various segments of alternative M compared to corresponding segments of the proposed route. The alternative M route segments are depicted in figure 3.4.1-2 and are evaluated below.

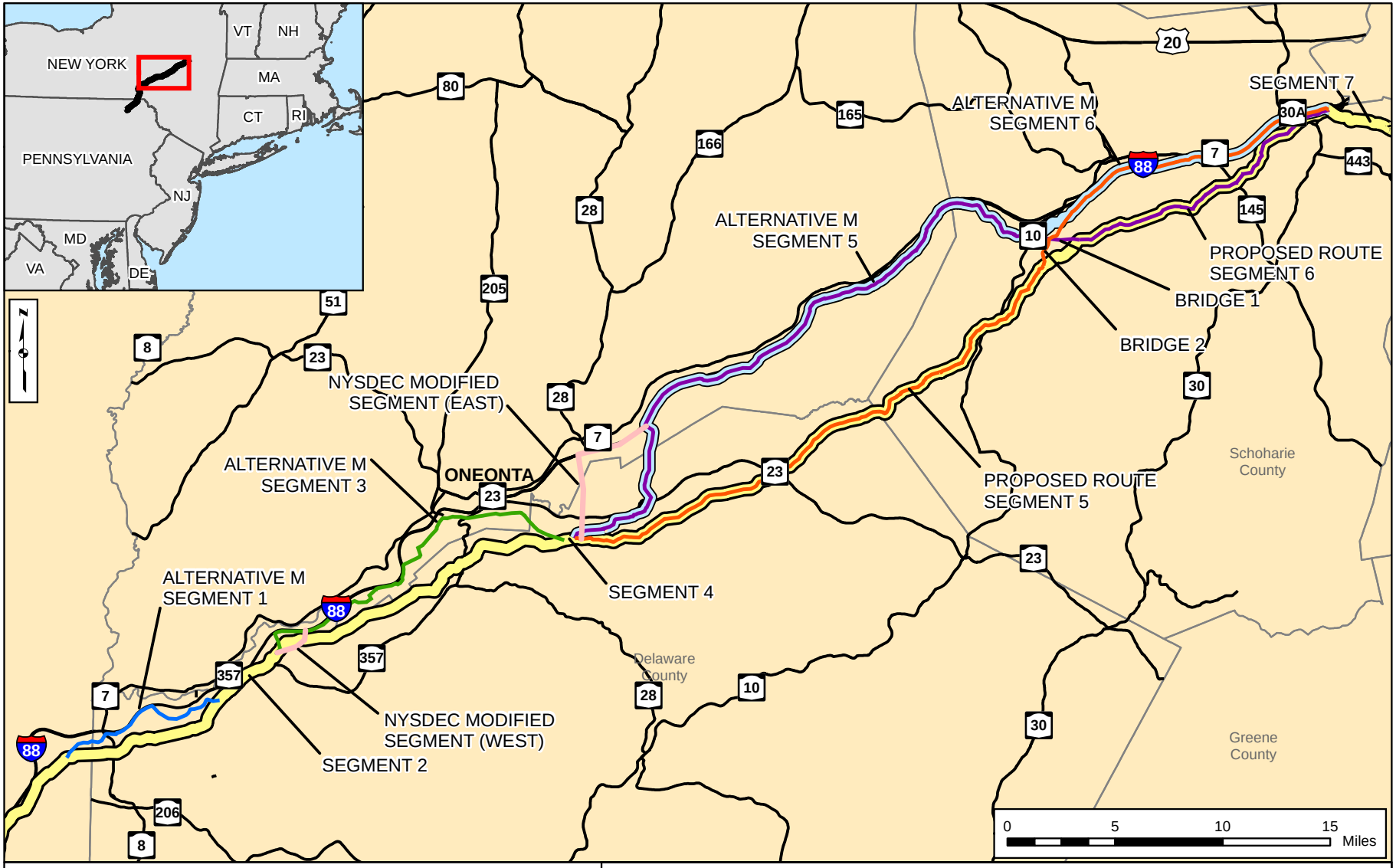
Three paired comparison segments are straightforward comparisons of the proposed route to corresponding alternative M segments. These comparison segments include (noting that segments 2, 4, and 7 are identical to the proposed route and are not compared):

- proposed route segment 1 compared to alternative M segment 1;
- proposed route segment 3 compared to alternative M segment 3; and
- proposed route segment 5/6 compared to alternative M segment 5/6.

In addition to these three straightforward segment comparisons, two other possible combinations of proposed route segments 5/6 with alternative M segments 5/6 were evaluated. We discuss these additional route combinations in order to obtain the maximum number of possible comparisons. In order to facilitate this process, and because alternative M segment 5/6 was relatively lengthy at approximately 46 miles long, Constitution developed a "bridge" connecting the proposed route segment 5 to alternative M segment 6 and also a "bridge" connecting alternative M segment 5 to the proposed route segment 6. These bridges were located near Richmondville, in Schoharie County, New York and they are depicted in figure 3.4.1-2. These alternative M combination alternatives included:

- proposed route segment 5/6 compared to alternative M segment 5 to bridge 1 to the proposed route segment 6; and
- proposed route segment 5/6 compared to proposed route segment 5 to bridge 2 to alternative M segment 5/6.

Each of these five comparisons for various alternative M scenarios are evaluated and discussed below.



NYSDEC Recommended Modifications

Proposed Route

Alternative M Seg1

Alternative M Seg 3

Alternative M Seg 5+6

Alternative M Seg 5 to Bridge 1 to Proposed Route Seg 6

Proposed Route Seg 5 to Bridge 2 to Alternative M Seg 6

Figure 3.4.1-2
Constitution Pipeline Project
Alternative M Segments

Proposed Route Segment 1 Compared to Alternative M Segment 1

Alternative M segment 1 diverges from the proposed route at MP 49.1 in Chenango County, New York and rejoins the proposed route at MP 57.6 in Delaware County, New York. This segment is 0.5 mile longer than the proposed pipeline route. Alternative M segment 1 parallels the I-88 corridor for 28 percent of its length in the southwestern portion of the project area and diverges from the I-88 corridor to avoid features such as a rock quarry, steep rocky bluffs, a residential area, and a waterbody. The locations of the Towns of Sidney and Unadilla, large wetland complexes, and the Susquehanna River precluded the feasibility of crossing under I-88 and proceeding along the northern side of the corridor. A comparison of the environmental and other routing considerations associated with proposed route segment 1 compared to alternative M segment 1 is presented in table 3.4.1-2.

TABLE 3.4.1-2
Comparison of Proposed Route Segment 1 to Alternative M Segment 1

Factor	Proposed Route	Alternative Route	Difference (if Applicable)[a]
Length of Corresponding Segments (miles)	8.3	8.8	0.5
Type of Right-of-Way			
Length Adjacent to Existing Utility Right-of-Way (electric/pipeline) (miles)	2.5	0.0	-2.5
Length Adjacent to Existing Roadways Paralleling and within an Existing Right-of-Way or Easement (miles)	0.0	0.0	0.0
Length Adjacent to Existing Roadway Paralleling and Abutting an Existing Right-of-Way or Easement (miles)	0.0	0.0	0.0
Length Adjacent to Existing Roadways Paralleling an Existing Right-of-Way or Easement within 300 feet (miles)	0.2	2.5	2.3
Right-of-Way Requirements			
Pipeline Construction Requirements (acres)	111.1	117.1	6.0
Pipeline Operation Requirements (acres)	50.5	53.2	2.7
Wetlands			
Total Wetland Complexes Crossed (number)	2	0	-2
Total Wetland Crossed (linear feet)	81	0	-81
Total Wetland Impacts (construction/operation) (acres)	0.1/0.1	0.0/0.0	-0.1-/0.1
Palustrine Forest Wetland Complexes Crossed (construction/operation) (acres)	0.0/0.0	0.0/0.0	0.0/0.0
Palustrine Scrub-Shrub Wetland Complexes Crossed (construction/operation) (acres)	0.1/0.1	0.0/0.0	-0.1/-0.1
Palustrine Emergent Wetland Impacts (construction/operation) (acres)	0.0/0.0	0.0/0.0	0.0/0.0
Waterbodies			
Waterbodies Crossed (number)	6	6	0
Major River Crossings (number greater than 100 feet)	0	0	0
Streams with Drinking Water Use Designation (number)	1	0	-1
Cultural Resources			
National Historic Landmarks (number)	0	0	0
National Register of Historic Places Eligible or Potentially Eligible Cultural Resources Sites Crossed (number)	0	0	0

TABLE 3.4.1-2 (continued) Comparison of Proposed Route Segment 1 to Alternative M Segment 1			
Factor	**Proposed Route**	**Alternative Route**	**Difference (if Applicable)[a]**
Land Use			
Forested Land Crossed (miles)	5.1	6.8	1.7
Forested Land Impacts (construction/operation) (acres)	67.9/30.8	90.0/41.9	22.1/10.1
Forest Edge Crossed (miles)	4.1	3.1	-1.0
Forested Edge Impacts (construction/operation) (acres)	54.8/24.9	41.1/18.7	-13.7/-6.2
Forest Interior Crossed (miles)	1.0	3.7	2.7
Forested Interior Impacts (construction/operation) (acres)	11.9/5.9	44.5/22.2	32.6/16.3
Important Bird Area Crossed (miles)	0.0	0.0	0.0
Audubon Forest Blocks of Importance (miles)	0.0	0.0	0.0
Agricultural Land Crossed (miles)	2.0	1.0	-1.0
Agricultural Land Impacts (construction/operation) (acres)	30.6/12.2	15.4/6.2	-15.2-/6.1
Landfills, Quarries, Material Storage and Processing (number)	0	0	0
Property Owners			
Property Owners Affected (number of parcels crossed)	36	41	5
Residences Located within 50 feet of the Pipe Centerline (number)	0	0	0
Residences Located within 125 feet (number)	0	0	0
Residences Located within 250 feet (number)	6	10	4
Federal and State Land			
Federal Lands Crossed (number/miles)	0/0.0	0/0.0	0/0.0
State Forest/Parks (number/miles)	0/0.0	0/0.0	0/0.0
Trails			
Trails (number)	1	1	0
Other Physical Features			
Road Crossings (number)	8	8	0
Railroads Crossed (number)	0	0	0
Other Environmental Features			
Shallow Depth to Bedrock Crossed (miles)	3.9	3.6	-0.3
Steep Slopes Crossed (30 degrees or greater) (miles)	0.1	1.0	0.9
Side Slope Construction (miles)	0.2	0.8	0.6
Environmental Hazards and/or Concerns (within 0.5 mile) (number)	0	3	3
Landslides / Unstable Lands Crossed (miles)	0.0	0.0	0.0

[a] Totals may not sum correctly due to rounding

Many of the routing factors considered above are similar between the two alternatives. Although alternative M segment 1 is collocated with the I-88 corridor or other existing corridors for 2.5 miles, the corresponding proposed route segment is collocated with existing corridors for 2.7 miles. Notably, the proposed route would affect fewer forested lands, interior forested lands, landowners, residences within

250 feet, and side slopes. Therefore, we do not consider adoption of alternative M segment 1 to be preferable to the proposed project.

Proposed Route Segment 3 Compared to Alternative M Segment 3

Alternate M segment 3 diverges from the proposed route at MP 61.2 in Delaware County, New York, crosses a short portion of Otsego County, New York, and then re-enters Delaware County before rejoining the proposed route at MP 76.9. Alternate M segment 3 is collocated with the southern side of I-88 for a portion of its length and deviates to avoid a cemetery, residential areas, and a commercial area adjacent to the Susquehanna River. The possibility of crossing under I-88 and proceeding along the northern side of the roadway corridor was not considered practical for this segment due to the locations of the Towns of Otego and Oneonta, New York. A comparison of the environmental and other routing considerations associated with proposed route segment 3 compared to alternative M segment 3 is presented in table 3.4.1-3.

TABLE 3.4.1-3
Comparison of Proposed Route Segment 3 to Alternative M Segment 3

Factor	Proposed Route	Alternative Route	Difference (if Applicable)[a]
Length of Corresponding Segments (miles)	15.7	18.0	2.3
Type of Right-of-Way			
Length Adjacent to Existing Utility Right-of-Way (electric/pipeline) (miles)	0.0	0.0	0.0
Length Adjacent to Existing Roadways Paralleling and within an Existing Right-of-Way or Easement (miles)	0.0	0.0	0.0
Length Adjacent to Existing Roadway Paralleling and Abutting an Existing Right-of-Way or Easement (miles)	0.0	0.1	0.0
Length Adjacent to Existing Roadways Paralleling an Existing Right-of-Way or Easement within 300 feet (miles)	0.5	6.3	5.9
Right-of-Way Requirements			
Pipeline Construction Requirements (acres)	208.9	239.6	30.7
Pipeline Operation Requirements (acres)	95.0	108.9	13.9
Wetlands			
Total Wetland Complexes Crossed (number)	5	1	-4
Total Wetland Crossed (linear feet)	1,074	350	-724
Total Wetland Impacts (construction/operation) (acres)	1.8/1.2	0.6/0.4	-0.2/-0.8
Palustrine Forest Wetland Complexes Crossed (construction/operation) (acres)	0.3/0.2	0.6/0.4	0.3/0.2
Palustrine Scrub-Shrub Wetland Complexes Crossed (construction/operation) (acres)	0.2/0.1	0.0/0.0	-0.2/-0.1
Palustrine Emergent Wetland Impacts (construction/operation) (acres)	1.4/1.0	0.0/0.0	-1.4/-1.0
Waterbodies			
Waterbodies Crossed (number)	11	17	6
Major River Crossings (number greater than 100 feet)	0	0	0
Streams with Drinking Water Use Designation (number)	0	0	0

TABLE 3.4.1-3 (continued)
Comparison of Proposed Route Segment 3 to Alternative M Segment 3

Factor	Proposed Route	Alternative Route	Difference (if Applicable)[a]
Cultural Resources			
National Historic Landmarks (number)	0	0	0
National Register of Historic Places Eligible or Potentially Eligible Cultural Resources Sites Crossed (number)	0	0	0
Land Use			
Forested Land Crossed (miles)	11.6	14.5	2.9
Forested Land Impacts (construction/operation) (acres)	154.9/70.4	193.6/88.0	38.7/17.6
Forest Edge Crossed (miles)	5.0	11.0	6.1
Forested Edge Impacts (construction/operation) (acres)	66.5/30.2	147.2/66.9	80.7/36.7
Forest Interior Crossed (miles)	6.6	3.5	-3.2
Forested Interior Impacts (construction/operation) (acres)	80.4/40.2	42.2/21.1	-38.2/-19.1
Important Bird Area Crossed (miles)	0.0	0.0	0.0
Audubon Forest Blocks of Importance (miles)	0.0	0.0	0.0
Agricultural Land Crossed (miles)	3.3	1.5	-1.8
Agricultural Land Impacts (construction/operation) (acres)	44.0/20.0	19.6/8.9	-24.4/-11.1
Landfills, Quarries, Material Storage and Processing (number)	0	0	0
Property Owners			
Property Owners Affected (number of parcels crossed)	78	88	10
Residences Located within 50 feet of the Pipe Centerline (number)	0	0	0
Residences Located within 125 feet (number)	0	0	0
Residences Located within 250 feet (number)	7	14	7
Federal and State Land			
Federal Lands Crossed (number/miles)	0/0.0	0/0.0	0/0.0
State Forest/Parks (number/miles)	0/0.0	0/0.0	0/0.0
Trails			
Trails (number)	0	0	0
Other Physical Features			
Road Crossings (number)	13	12	-1
Railroads Crossed (number)	0	0	0
Other Environmental Features			
Shallow Depth to Bedrock Crossed (miles)	5.9	4.7	-1.3
Steep Slopes Crossed (30 degrees or greater) (miles)	0.4	2.3	2.0
Side Slope Construction (miles)	0.2	6.5	6.4
Environmental Hazards and/or Concerns (within 0.5 mile) (number)	0	13	13
Landslides / Unstable Lands Crossed (miles)	0.0	0.0	0.0

[a] Totals may not sum correctly due to rounding

Many of the routing factors considered above are similar between the two alternatives. Although alternative M segment 3 is collocated with the I-88 corridor or other existing corridors for 6.4 miles, the proposed route is 2.3 miles shorter overall. Alternative M segment 3 crosses fewer wetlands, forest interiors, and shallow bedrock areas. However, the proposed route segment 3 crosses fewer waterbodies, forested wetlands, forested lands overall, property owners, and side slopes. Therefore, we do not consider adoption of alternative M segment 3 to be preferable to the proposed pipeline.

Proposed Route Segment 5/6 Compared to Alternative M Segment 5/6

Alternative M segment 5/6 diverges from the proposed route at MP 77.4 in Delaware County, New York, and re-connects with the proposed route at MP 121.3. Alternative M segment 5/6 is collocated for about 27 miles but diverges from I-88 to avoid side slopes and the Town of Richmondville, New York. The collocation could be increased with a potential crossing of I-88 and then proceeding generally along the northern side of the roadway but this was not considered practical due to the presence of the Towns of Maryland, Schenevus, and Worcester, New York. However, alternative M segment 5/6 crosses under I-88 near the Town of Bramanville, New York and then proceeds along the northern side of the I-88 corridor for approximately 7 miles before crossing back under I-88 and re-connecting with the proposed route. A comparison of the environmental and other routing considerations associated with proposed route segment 5/6 compared to alternative M segment 5/6 is presented in table 3.4.1-4.

Many of the routing factors considered above are similar between the two alternatives. Although alternative M segment 5/6 is collocated with the I-88 corridor or other existing corridors for approximately 27 miles, the proposed route segment is 3.6 miles shorter overall. Alternative M segment 5/6 also crosses fewer forest interiors, Audubon-designated forest blocks of importance, property owners, and shallow bedrock areas. However, the proposed route segment 5/6 crosses fewer waterbodies, forested wetlands, and much fewer nearby residences and steep side slopes. Therefore, we do not consider adoption of alternative M segment 5/6 to be preferable to the proposed pipeline.

TABLE 3.4.1-4
Comparison of Proposed Route Segment 5/6 to Alternative M Segment 5/6

Factor	Proposed Route	Alternative Route	Difference (if Applicable)[a]
Length of Corresponding Segments (miles)	43.9	47.5	3.6
Type of Right-of-Way			
Length Adjacent to Existing Utility Right-of-Way (electric/pipeline) (miles)	0.0	0.0	0.0
Length Adjacent to Existing Roadways Paralleling and within an Existing Right-of-Way or Easement (miles)	0.0	0.0	0.0
Length Adjacent to Existing Roadway Paralleling and Abutting an Existing Right-of-Way or Easement (miles)	0.1	0.3	0.2
Length Adjacent to Existing Roadways Paralleling an Existing Right-of-Way or Easement within 300 feet (miles)	2.2	26.7	24.5
Right-of-Way Requirements			
Pipeline Construction Requirements (acres)	585.5	633.9	48.4
Pipeline Operation Requirements (acres)	266.1	288.1	22.0
Wetlands			
Total Wetland Complexes Crossed (number)	8	6	-2
Total Wetland Crossed (linear feet)	2,272	2,281	9
Total Wetland Impacts (construction/operation) (acres)	3.9/2.6	3.9/2.6	0.0/0.0

TABLE 3.4.1-4 (continued) Comparison of Proposed Route Segment 5/6 to Alternative M Segment 5/6			
Factor	**Proposed Route**	**Alternative Route**	**Difference (if Applicable)[a]**
Palustrine Forest Wetland Complexes Crossed (construction/operation) (acres)	0.4/0.2	3.1/2.1	2.7/1.8
Palustrine Scrub-Shrub Wetland Complexes Crossed (construction/operation) (acres)	1.3/0.8	0.4/0.3	-0.8/-0.6
Palustrine Emergent Wetland Impacts (construction/operation) (acres)	2.3/1.5	0.4/0.3	-1.9/-1.3
Waterbodies			
Waterbodies Crossed (number)	35	45	10
Major River Crossings (number greater than 100 feet)	1	2	1
Streams with Drinking Water Use Designation (number)	0	5	5
Cultural Resources			
National Historic Landmarks (number)	0	0	0
National Register of Historic Places Eligible or Potentially Eligible Cultural Resources Sites Crossed (number)	0	0	0
Land Use			
Forested Land Crossed (miles)	29.2	29.7	0.5
Forested Land Impacts (construction/operation) (acres)	389.5/177.0	395.9/179.9	6.4/2.9
Forest Edge Crossed (miles)	13.7	25.8	12.1
Forested Edge Impacts (construction/operation) (acres)	182.3/82.9	343.3/156.1	161.1/73.2
Forest Interior Crossed (miles)	15.5	3.9	-11.6
Forested Interior Impacts (construction/operation) (acres)	188.4/94.2	47.8/23.9	-140.6/-70.3
Important Bird Area Crossed (miles)	0.0	0.0	0.0
Audubon Forest Blocks of Importance (miles)	2.4	0.0	2.4
Agricultural Land Crossed (miles)	10.4	6.5	-3.9
Agricultural Land Impacts (construction/operation) (acres)	157.1/62.9	98.5/39.4	-58.6/-23.5
Landfills, Quarries, Material Storage and Processing (number)	3	1	-2
Property Owners			
Property Owners Affected (number of parcels crossed)	253	140	-113
Residences Located within 50 feet of the Pipe Centerline (number)	0	2	2
Residences Located within 125 feet (number)	1	12	11
Residences Located within 250 feet (number)	18	56	38
Federal and State land			
Federal Lands Crossed (number/miles)	0/0.0	0/0.0	0/0.0
State Forest/Parks (number/miles)	1/0.1	0/0.0	-1/-0.1
Trails			
Trails (number)	1	0	-1
Other Physical Features			
Road Crossings (number)	43	42	-1
Railroads Crossed (number)	0	0	0
Other Environmental Features			
Shallow Depth to Bedrock Crossed (miles)	19.5	7.6	-11.9

TABLE 3.4.1-4 (continued) Comparison of Proposed Route Segment 5/6 to Alternative M Segment 5/6			
Factor	**Proposed Route**	**Alternative Route**	**Difference (if Applicable)[a]**
Steep Slopes Crossed (30 degrees or greater) (miles)	3.6	10.1	6.6
Side Slope Construction (miles)	0.8	2.7	1.9
Environmental Hazards and/or Concerns (within 0.5 mile) (number)	1	6	5

[a] Totals may not sum correctly due to rounding

Proposed Route Segment 5/6 Compared to Alternative M Segment 5, Bridge 1, Proposed Route Segment 6

This section describes the comparative analysis of incorporating alternative M segment 5 into the project without alternative M segment 6. Because the division of these two segments is about 2 miles from the proposed route, a "bridge" was developed to connect the routes in a more direct fashion. This was therefore termed alternative M segment 5, bridge 1, proposed route segment 6. It diverges from the proposed route at MP 77.4 in Delaware County, New York and re-connects with the proposed route at about MP 107. A comparison of the environmental and other routing considerations associated with proposed route segment 5/6 compared to alternative M segment 5, bridge 1, proposed route segment 6 is presented in table 3.4.1-5. Note that both routes being compared include segment 6 of the proposed route due to the location of the bridge.

TABLE 3.4.1-5 Comparison of Proposed Route to Alternative Route M Segment 5, Bridge 1, Proposed Route Segment 6			
Factor	**Proposed Route**	**Alternative Route**	**Difference (if Applicable)[a]**
Length of Corresponding Segments (miles)	43.9	48.0	4.1
Type of Right-of-Way			
Length Adjacent to Existing Utility Right-of-Way (electric/pipeline) (miles)	0.0	3.9	3.9
Length Adjacent to Existing Roadways Paralleling and within an Existing Right-of-Way or Easement (miles)	0.0	0.0	0.0
Length Adjacent to Existing Roadway paralleling and abutting an existing Right-of-Way or easement (miles)	0.1	0.3	0.2
Length Adjacent to Existing Roadways paralleling an existing Right-of-Way or easement within 300 feet (miles)	2.2	14.9	12.7
Right-of-Way Requirements			
Pipeline Construction Requirements (acres)	585.5	639.6	54.1
Pipeline Operation Requirements (acres)	266.1	290.7	24.6

TABLE 3.4.1-5 (continued) Comparison of Proposed Route to Alternative Route M Segment 5, Bridge 1, Proposed Route Segment 6			
Factor	**Proposed Route**	**Alternative Route**	**Difference (if Applicable)[a]**
Wetlands			
Total Wetland Complexes Crossed (number)	8	7	-1
Total Wetland Crossed (linear feet)	2,272	2,377	105
Total Wetland Impacts (construction/operation) (acres)	3.9/2.6	4.1/2.7	0.2/0.1
Palustrine Forest Wetland Complexes Crossed (construction/operation) (acres)	0.4/0.2	3.1/2.1	2.8/1.8
Palustrine Scrub-Shrub Wetland Complexes Crossed (construction/operation) (acres)	1.3/0.8	0.4/0.3	-0.9/-0.6
Palustrine Emergent Wetland Impacts (construction/operation) (acres)	2.3/1.5	0.6/0.4	-1.7/-1.2
Waterbodies			
Waterbodies Crossed (number)	35	40	5
Major River Crossings (number >100 feet)	1	2	1
Streams with Drinking Water Use Designation (number)	0	0	0
Cultural Resources			
National Historic Landmarks (number)	0	0	0
National Register of Historic Places Eligible or Potentially Eligible Cultural Resources Sites crossed (Number)	0	0	0
Land Use			
Forested Land Crossed (miles)	29.2	33.9	4.7
Forested Land Impacts (construction/operation) (acres)	389.5/177.0	451.6/205.3	62.1/28.2
Forest Edge Crossed (miles)	13.7	25.1	11.4
Forested Edge Impacts (construction/operation) (acres)	182.3/82.9	334.7/152.1	152.1/69.3
Forest Interior Crossed (miles)	15.5	8.8	-6.8
Forested Interior Impacts (construction/operation) (acres)	188.4/94.2	106.3/53.2	-82.1/-41.0
Important Bird Area Crossed (miles)	0	0	0
Audubon Forest Blocks of Importance (miles)	2.4	0	-2.4
Agricultural Land Crossed (miles)	10.4	8.8	-1.5
Agricultural Land Impacts (construction/operation) (acres)	159.1/63.7	132.4/53.0	-26.7/-10.7
Landfills, Quarries, Material Storage and processing (number)	3	1	-2
Property Owners			
Property Owners Affected (number of parcels crossed)	253	167	-86
Residences located within 50 feet of the pipe Centerline (number)	0	2	2
Residences located within 125 feet (number)	1	6	5
Residences located within 250 feet (number)	18	34	16
Federal & State Land			
Federal Lands Crossed (number/miles)	0/0.0	0/0.0	0/0.0
State Forest/Parks (number/miles)	1/0.1	0/0.0	-1/-0.1
Trails			
Trails (number)	0	1	1

TABLE 3.4.1-5 (continued) Comparison of Proposed Route to Alternative Route M Segment 5, Bridge 1, Proposed Route Segment 6			
Factor	**Proposed Route**	**Alternative Route**	**Difference (if Applicable)[a]**
Other Physical Features			
Road Crossings (number)	43	38	-5
Railroads Crossed (number)	0	0	0
Other Environmental Features			
Shallow Depth to Bedrock Crossed (miles)	19.5	13.8	-5.7
Steep Slopes Crossed (30 degrees or greater) (miles)	3.6	10.5	6.9
Side Slope Construction (miles)	0.8	5.4	4.6
Environmental Hazards and/or Concerns (within 0.5 mile) (number)	1	1	0
Landslides / Unstable lands crossed (Length)	0.0	0.0	0.0

[a] Totals may not sum correctly due to rounding

Many of the routing factors considered above are similar between the two alternatives. Although alternative M segment 5 to bridge 1 to proposed route segment 6 is collocated with the I-88 corridor or other existing corridors for approximately 19 miles, the corresponding segment of the proposed route is 4.1 miles shorter overall. Alternative M segment 5 to bridge 1 to proposed route segment 6 also would cross fewer forest interiors, property owners, and shallow bedrock areas. However, the proposed route segment 5/6 crosses fewer forested wetlands, (and less forested land overall), nearby residences, and side slopes. Therefore, we do not consider adoption of alternative M segment 5, bridge 1, proposed route segment 6 to be preferable to the proposed pipeline route (proposed route segments 5/6).

Proposed Route Segment 5/6 Compared to Proposed Route Segment 5, Bridge 2, Alternative M Segment 6

Similar to the discussion of preceding section, here we discuss the comparative analysis of incorporating alternative M segment 6 into the project without alternative M segment 5. Because the division of these two segments is about 2 miles from the proposed route, a “bridge” was developed to connect the routes in a more direct fashion. This was therefore termed proposed route segment 5, bridge 2, alternative M segment 6. This segment diverges from the proposed route at about MP 105 in Delaware County, New York, and re-connects with the proposed route at MP 121.3 in Schoharie County, New York. A comparison of the environmental and other routing considerations associated with proposed route segment 5/6 compared to proposed route segment 5, bridge 2, alternative M segment 6 is presented in table 3.4.1-6.

TABLE 3.4.1-6 Comparison of Proposed Route to Proposed Route Segment 5, Bridge 2, Alternative Route M Segment 6			
Factor	**Proposed Route**	**Alternative Route**	**Difference (if Applicable)[a]**
Length of Corresponding Segments (miles)	43.9	44.2	0.3
Type of Right-of-Way			
Length Adjacent to Existing Utility Right-of-Way (electric/pipeline) (miles)	0.0	0.0	0.0
Length Adjacent to Existing Roadways Paralleling and within an Existing Right-of-Way or Easement (miles)	0.0	0.0	0.0
Length Adjacent to Existing Roadway Paralleling and Abutting an Existing Right-of-Way or Easement (miles)	0.1	0.2	0.0
Length Adjacent to Existing Roadways Paralleling an Existing Right-of-Way or Easement within 300 feet (miles)	2.2	13.5	11.3
Right-of-Way Requirements			
Pipeline Construction Requirements (acres)	585.5	589.9	4.4
Pipeline Operation Requirements (acres)	266.1	268.1	2.0
Wetlands			
Total Wetland Complexes Crossed (number)	8	5	-3
Total Wetland Crossed (linear feet)	2,272	2,181	-91
Total Wetland Impacts (construction/operation) (acres)	3.9/2.6	3.8/2.5	-0.2/-0.1
Palustrine Forest Wetland Complexes Crossed (construction/operation) (acres)	0.4/0.2	0.4/0.2	0.0/-0.1
Palustrine Scrub-Shrub Wetland Complexes Crossed (construction/operation) (acres)	1.3/0.8	1.4/1.0	0.2/0.1
Palustrine Emergent Wetland Impacts (construction/operation) (acres)	2.3/1.5	2.0/1.3	--0.3/-0.2
Waterbodies			
Waterbodies Crossed (number)	35	42	7
Major River Crossings (number greater than 100 feet)	1	1	0
Streams with Drinking Water Use Designation (number)	0	3	3
Cultural Resources			
National Historic Landmarks (number)	0	0	0
National Register of Historic Places Eligible or Potentially Eligible Cultural Resources Sites Crossed (number)	0	0	0
Land Use			
Forested Land Crossed (miles)	29.2	24.3	-4.9
Forested Land Impacts (construction/operation) (acres)	389.5/177.0	323.6/147.1	-65.9/-29.9
Forest Edge Crossed (miles)	13.7	13.7	0.0
Forested Edge Impacts (construction/operation) (acres)	182.3/82.9	182.1/82.8	-0.1/-0.1
Forest Interior Crossed (miles)	15.5	10.6	-4.9
Forested Interior Impacts (construction/operation) (acres)	188.4/94.2	128.6/64.3	-59.8/-29.9
Important Bird Area Crossed (miles)	0.0	0.0	0.0
Audubon Forest Blocks of Importance (miles)	2.4	2.4	0.0
Agricultural Land Crossed (miles)	10.4	9.5	-0.8

TABLE 3.4.1-6 (continued) Comparison of Proposed Route to Proposed Route Segment 5, Bridge 2, Alternative Route M Segment 6			
Factor	**Proposed Route**	**Alternative Route**	**Difference (if Applicable)[a]**
Agricultural Land Impacts (construction/operation) (acres)	157.1/62.8	144.4/57.8	-12.7/-5.1
Landfills, Quarries, Material Storage and Processing (number)	3	1	-2
Property Owners			
Property Owners Affected (number of parcels crossed)	253	220	-33
Residences Located within 50 feet of the Pipe Centerline (number)	0	0	0
Residences Located within 125 feet (number)	1	7	6
Residences Located within 250 feet (number)	18	39	21
Federal and State Land			
Federal Lands Crossed (number/miles)	0/0.0	0/0.0	0/0.0
State Forest/Parks (number/miles)	1/0.1	1/0.1	0/0.0
Trails			
Trails (number)	1	1	0
Other Physical Features			
Road Crossings (number)	44	49	5
Railroads Crossed (number)	0	0	0
Other Environmental Features			
Shallow Depth to Bedrock Crossed (miles)	19.5	13.8	-5.7
Steep Slopes Crossed (30 degrees or greater) (miles)	3.6	2.3	-1.3
Side Slope Construction (miles)	0.8	3.6	2.8
Environmental Hazards and/or Concerns (within 0.5 mile) (number)	1	6	5
Landslides / Unstable Lands Crossed (miles)	0.0	0.0	0.0

[a] Totals may not sum correctly due to rounding

Many of the routing factors considered above are similar between the two alternatives. Although proposed route segment 5, bridge 2, alternative M segment 6 is collocated with the I-88 corridor or other existing corridors for approximately 14 miles, the proposed route segment is 0.3 mile shorter overall. Proposed route segment 5, bridge 2, alternative M segment 6 crosses less forested land overall, and fewer forest interiors, property owners, and shallow bedrock areas. However, the proposed route segment 5/6 crosses fewer waterbodies, nearby residences, and side slopes. Therefore, we do not consider adoption of proposed route segment 5, bridge 2, alternative M segment 6 to be preferable to the proposed pipeline route.

Modified Alternative M

Following issuance of the draft EIS, the NYSDEC commented that the FERC should consider a modified version of alternative M that it described as a "third scenario," with two sub-routes incorporated into alternative M as depicted in figure 3.4.1-2. Our evaluation of the NYSDEC's westernmost alternative M route modification indicated that the alternative M segment in this location was already collocated with I-88 adjacent to the controlled access area, which is the purpose of alternative M. The suggested westernmost alternative M route modification would actually decrease collocation with I-88;

thus, given no obvious advantage otherwise, we conclude that it would not be preferable to the corresponding alternative M segment.

We also evaluated the easternmost route modification proposed by the NYSDEC, which would deviate from the beginning of alternative M segment 5, proceed north along a powerline right-of-way, then proceed northeast along I-88 before rejoining alternate M segment 5. A route similar or identical to this route was considered by Constitution early in the pre-filing process, but was dismissed for several reasons. Although the easternmost route modification would be located west of and avoid the Robert V. Riddell State Park in the area east of the powerline, it would cross state park property south of I-88 (since the park property crosses over I-88 to the north) or it would have to be located within the controlled access area of I-88, or both. Further, this area contains steep side slopes which become even more pronounced as the modified route proceeds northeast before rejoining the original alternative M segment 5 (which would again require additional workspaces). We did not consider the easternmost modified alternative M segments to be preferable to the corresponding alternative M segment for these reasons.

3.4.2 Minor Route Alternatives

Although they can extend for several miles, minor route alternatives deviate from the proposed route less substantially than major route alternatives. Minor route alternatives are often designed to avoid large environmental resources or engineering constraints, and typically remain within the same general area as the proposed route.

3.4.2.1 Minor Route Alternatives Adopted into the Proposed Route

Based on consultations with landowners, resource agencies, municipal governments, field review, and impact assessment, Constitution fully incorporated nine minor route alternatives and partially incorporated two additional minor route alternatives into the proposed route during the pre-filing and post-filing review stages of its project. As such, they are now part of the proposed action and are included in our impacts assessment in section 4.0. These changes were adopted primarily to increase collocation, avoid or minimize impacts on natural resources, reduce or eliminate safety and constructability concerns, and/or avoid or minimize conflicts with existing or proposed residential land uses. Minor route alternatives adopted into the proposed pipeline route are described in table 3.4.2-1 and depicted in figure 3.4.2-1.

TABLE 3.4.2-1
Minor Route Alternatives Adopted into the Proposed Pipeline Route

Alternative	Start Milepost	End Milepost	County, State	Adopted/ Partially Adopted	Description
Alternative A	0.0	9.8	Susquehanna County, PA	Adopted	The original route (A1) was designed to increase collocation with utility rights-of-way. However, alternative A was adopted to reduce impacts on wetlands, waterbodies, and property owners compared to route A1. Alternative T was subsequently adopted into alternative A (see below).
Alternative T	Sub-Part of alternative A	Sub-Part of alternative A	Susquehanna County, PA	Adopted	Alternative T was adopted in association with alternative A (see above) at the crossing of Martins Creek adjacent to State Route 11 to avoid steep slope construction, thereby resolving an issue with Alternative A.

TABLE 3.4.2-1 (continued) Minor Route Alternatives Adopted into the Proposed Pipeline Route					
Alternative	**Start Milepost**	**End Milepost**	**County, State**	**Adopted/ Partially Adopted**	**Description**
Brushville Road Minimization Route	11.6	14.1	Susquehanna County, PA	Adopted	The Brushville Road Minimization Route alternative was adopted to avoid a sensitive palustrine forested wetland hemlock forest and rare plants compared to the original route in this area (Brushville Road Route 1). This routing also fulfills landowner requests to move the proposed pipeline away from residences and toward the rear property boundaries. This route results in reduced impacts on wetlands and waterbodies compared to alternative Brushville Road Route 1.
Alternative S	18.8	23.6	Susquehanna County, PA	Adopted	Alternative S was adopted based upon the results of geotechnical analysis and field surveys to avoid potential landslide areas along a hillside north of Starrucca Creek. It also allows for safer construction, operation and maintenance of the pipeline compared to alternative S1. Although alternative S would increase impacts on forested lands, waterbodies, and property owners, it is still preferable to routing through the landslide area for constructability, long-term pipeline integrity, and safety reasons.
Alternative B	25.2	44.7	Susquehanna County, PA, Broome and Chenango Counties, NY	Adopted	Alternative B was adopted to increase collocation with existing utility corridors, thereby reducing impacts on forested lands, including interior forest compared to Alternative B2. It also avoids springs used as potable water supply for the town of Afton in Chenango County, NY. Although this route is slightly longer and would increase impacts on waterbodies compared to route B2, it is still preferable for the favorable reasons identified above.
Melondy Hill State Forest Minimization Route	41.5	44.7	Broome and Chenango Counties, NY	Adopted	The Melondy Hill State Forest Minimization route was adopted into the proposed project route, and minimizes impacts by being shorter overall, reducing impacts on forested lands, forested wetlands, having fewer side slopes, and limiting the crossing length to 0.1 mile within the Melondy Hill State Forest compared to the Melondy Hill State Forest Avoidance Reroute (see below). A route that would avoid Melondy Hill State Forest completely was also evaluated; however, that route would have been longer, and had more side slopes, forest impacts, and wetland crossings.

TABLE 3.4.2-1 (continued) Minor Route Alternatives Adopted into the Proposed Pipeline Route					
Alternative	**Start Milepost**	**End Milepost**	**County, State**	**Adopted/ Partially Adopted**	**Description**
Clapper Hollow State Forest Minimization Route	96.9	97.4	Schoharie County, NY	Adopted	The Clapper Hollow State Forest Minimization Route was adopted to reduce the crossing length of the state forest from the originally considered route. The current proposed route limits the crossing of Clapper Hollow State Forest to approximately 411 feet. A route that completely avoids Clapper Hollow State Forest was also evaluated (Clapper Hollow State Forest Avoidance Reroute); however, that route crosses an existing spring-fed trout pond that was the subject of landowner concern.
Alternative R	105.0	116.8	Schoharie County, NY	Adopted	Alternative R was adopted in response to comments from the town of Richmondville, NY to reduce the number of affected landowners, minimize crossing of agricultural land, and move the route away from the Cobleskill Reservoir to the maximum extent possible. This route is shorter and substantially reduces the number of waterbody crossings compared to Alternative R1. Although alternative R would increase impacts on forested lands, including forest interiors, it is preferable for the favorable reasons identified above. Alternative R incorporates components of alternatives L and O (see below).
Alternative L	Part of alternative R	Part of alternative R	Schoharie County, NY	Partially Adopted	A portion of alternative L was adopted in association with alternative R (see above) to minimize crossing of agricultural land (compared to the original route of Alternative R) at the request of the Schoharie County Planning Commission. By adopting alternative R, portions of alternative L are no longer connected to the proposed project route and were therefore not adopted.
Alternative O	Part of alternative R	Part of alternative R	Schoharie County, NY	Partially Adopted	A 5.4 mile portion of alternative O was adopted in association with alternative R (see above) to move the pipeline away from the Cobleskill Reservoirs to the maximum extent possible (compared to the original route of Alternative R) at the request of the Town of Cobleskill.
Alternative Q	116.6	124.1	Schoharie County, NY	Adopted	Alternative Q was adopted to collocate with the existing TGP right-of-way, to minimize potential impacts on Schoharie Creek, and to decrease potential impacts on the Barton Hill watershed compared to Alternative Q1. Although this segment is longer and would affect more forested land overall, forest interior, and property owners compared to Alternative Q1, it would reduce impacts on waterbodies and nearby residences.

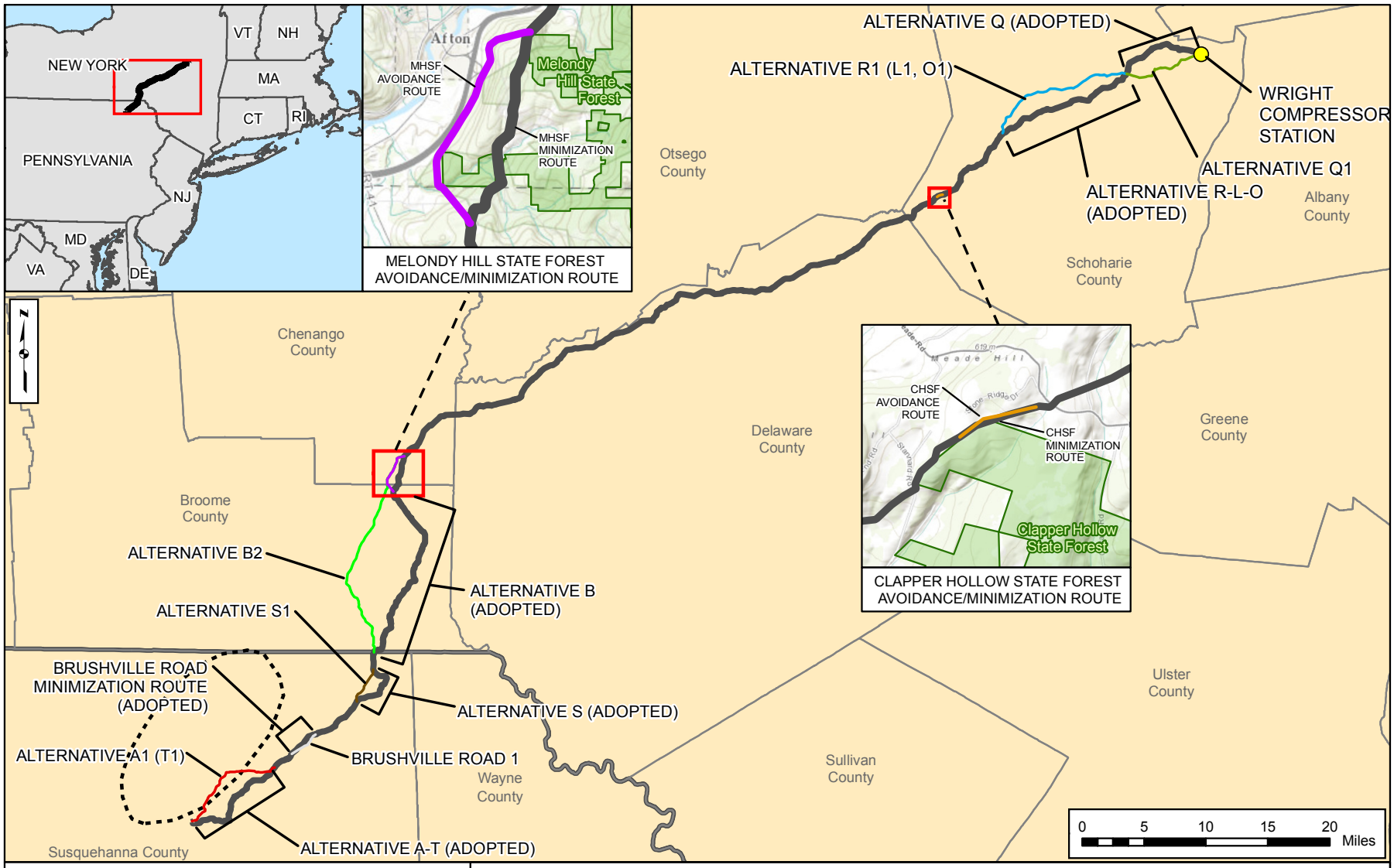


Figure 3.4.2-1
Constitution Pipeline Project
Adopted Minor Route Alternatives and Corresponding Non-adopted Segments

3.4.2.2 Minor Route Alternatives Not Adopted into the Proposed Route

We evaluated five additional alternatives based on review of environmental and other routing factors. Minor route alternatives, alternatives C, D, E1, G, and P are discussed below and comparative analyses relative to the proposed route are provided. These alternatives are depicted in figure 3.4.2-2.

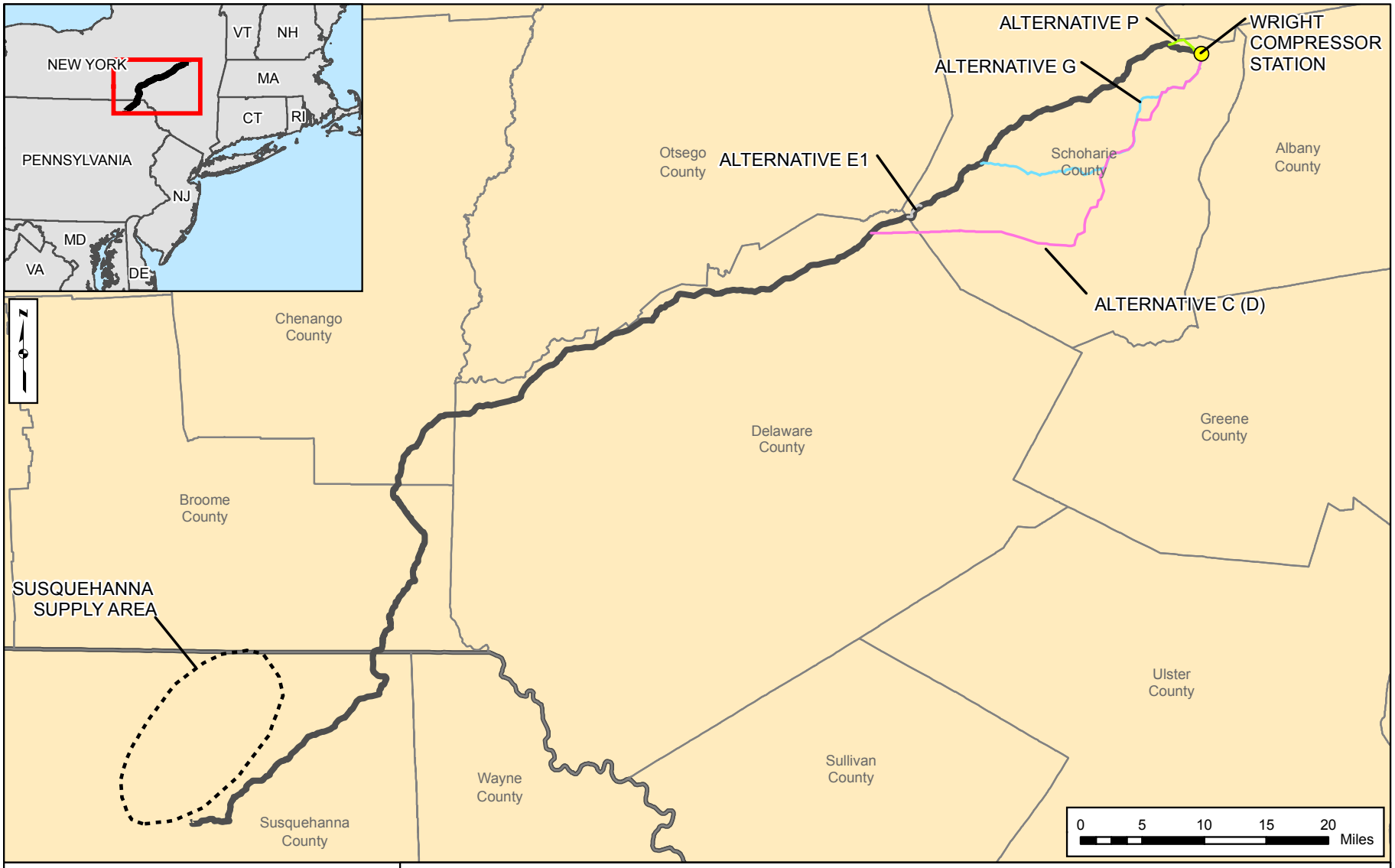
Alternatives C and D

Alternative C begins at MP 90.3 in Delaware County, New York and extends 38.2 miles into Schoharie County, New York, terminating at the proposed Westfall Road M&R Station. Constitution identified alternative C in an effort to increase collocation with existing utility rights-of-way, to avoid crossing several landowner tracts, and to locate the pipeline predominantly in agricultural land within the Schoharie Creek floodplain. A comparison of the environmental and other routing considerations associated with alternative C to the proposed route is presented in table 3.4.2-2.

Alternative D is a sub-alternative of alternative C, and was developed to avoid the floodplain valley along Schoharie Creek. Alternative D would minimize construction and operational concerns associated with siting the pipeline along Schoharie Creek. Alternative D is 1.3 miles west of Schoharie Creek, parallels the boundary of the Burnt-Rossman State Forest, and crosses mountain ridges before connecting back to alternative C.

Elected representatives in Schoharie County expressed interest in avoiding impacts on ridgelines for aesthetic reasons, as well as concerns about routing the pipeline through agricultural areas. Alternative C involves seven crossings of Schoharie Creek (a major waterbody); workspace constraints at many of these crossing locations would limit Constitution's ability to implement HDDs. Because Schoharie Creek is subject to flash flooding, safe construction, operation, and maintenance of the pipeline within the floodplain would be of concern. Also, alternative C crosses a portion of Burt-Rossman Hills State Reforestation Area (where it would be adjacent to an existing utility right-of-way). Adoption of alternative D into alternative C would decrease impacts on agricultural lands, but would increase impacts on forested habitat and crossings of land with shallow depth to bedrock.

Therefore, inclusion of alternative D into alternative C is not preferable due to the increase in forested impacts and amount of shallow bedrock crossed. Compared to the proposed route, alternative C is approximately 4 miles longer, crosses Schoharie Creek six more times, and would have increased impacts on wetlands, forested wetlands, waterbodies, property owners, and nearby residences. Therefore, we do not consider adoption of alternative C (or D) to be preferable to the proposed project.



Proposed Project Route with Adopted Alternatives

Susquehanna Supply Area

Alternative C (D)

Alternative G

Alternative E1

Alternative P

Figure 3.4.2-2

Constitution Pipeline Project

Minor Route Alternatives Not Adopted

TABLE 3.4.2-2 Comparison of the Proposed Pipeline Route to Alternative C (and D)			
Factor	**Proposed Route**	**Alternative Route**	**Difference (if Applicable)[a]**
Length of Corresponding Segments (miles)	34.2	38.2	4.0
Type of Right-of-Way			
Length Adjacent to Existing Utility Right-of-Way (electric/pipeline) (miles)	1.0	12.8	11.8
Length Adjacent to Existing Roadways Paralleling and within an Existing Right-of-Way or Easement (miles)	0.0	0.0	0.0
Length Adjacent to Existing Roadway Paralleling and Abutting an Existing Right-of-Way or Easement (miles)	0.1	0.1	-0.1
Length Adjacent to Existing Roadways Paralleling an Existing Right-of-Way or Easement within 300 feet (miles)	2.2	1.9	-0.3
Right-of-Way Requirements			
Pipeline Construction Requirements (acres)	455.9	509.3	53.5
Pipeline Operation Requirements (acres)	207.2	231.5	24.3
Wetlands			
Total Wetland Complexes Crossed (number)	4	16	12
Total Wetland Crossed (linear feet)	925	4,822	3,897
Total Wetland Impacts (construction/operation) (acres)	1.6/1.1	8.3/5.5	6.7/4.5
Palustrine Forest Wetland Complexes Crossed (construction/operation) (acres)	0.0/0.0	3.3/2.2	3.3/2.2
Palustrine Scrub-Shrub Wetland Complexes Crossed (construction/operation) (acres)	1.2/0.8	0.9/0.6	-0.3/-0.2
Palustrine Emergent Wetland Impacts (construction/operation) (acres)	0.4/0.3	4.1/2.7	3.7/2.5
Waterbodies			
Waterbodies Crossed (number)	23	35	12
Major River Crossings (number greater than 100 feet)	0	7	7
Streams with Drinking Water Use Designation (number)	0	0	0
Cultural Resources			
National Historic Landmarks (number)	0	0	0
Number of National Register of Historic Places Eligible or Potentially Eligible Cultural Resources Sites Crossed (number)	0	2	2
Land Use			
Forested Land Crossed (miles)	20.8	16.9	-3.9
Forested Land Impacts (construction/operation) (acres)	277.3/126.1	225.6/102.6	-51.7/-23.5
Forest Edge Crossed (miles)	9.7	16.0	6.3
Forested Edge Impacts (construction/operation) (acres)	129.6/58.9	213.7/97.2	84.1/38.2
Forest Interior Crossed (miles)	11.1	0.9	10.2
Forested Interior Impacts (construction/operation) (acres)	134.3/67.2	10.8/5.4	-123.5/-61.8
Important Bird Area Crossed (miles)	0	0	0
Audubon Forest Blocks of Importance (miles)	2.4	4.4	1.9

TABLE 3.4.2-2 (continued) Comparison of the Proposed Pipeline Route to Alternative C (and D)			
Factor	**Proposed Route**	**Alternative Route**	**Difference (if Applicable)[a]**
Agricultural Land Crossed (miles)	10.1	17.0	6.9
Agricultural Land Impacts (construction/operation) (acres)	153.0/61.2	257.1/102.9	104.1/41.6
Landfills, Quarries, Material Storage and Processing (number)	3	0	-3
Property Owners			
Property Owners Affected (number of parcels crossed)	191	207	16
Residences Located within 50 feet of the Pipe Centerline (number)	0	0	0
Residences Located within 125 feet (number)	0	5	5
Residences Located within 250 feet (number)	18	36	18
Federal and State Land			
Federal Lands Crossed (number/miles)	0	0	0
State Forest/Parks (number/miles)	1/0.1	1/0.3	0/0.2
Trails			
Trails (number)	1	0	-1
Other Physical Features			
Road Crossings (number)	34	35	1
Railroads Crossed (number)	0	0	0
Other Environmental Features			
Shallow Depth to Bedrock Crossed (miles)	15.2	8.2	-7.0
Steep Slopes Crossed (30 degrees or greater) (miles)	3.0	2.3	-0.8
Side Slope Construction (miles)	0.8	1.1	0.3
Environmental Hazards and/or Concerns (within 0.5 mile) (number)	1	1	0
Landslides / Unstable Lands Crossed (miles)	0.0	0.0	0.0

[a] Totals may not sum correctly due to rounding

Alternative E1

Alternative E was considered in response to comments from the Schoharie County Planning Commission regarding the potential to reduce the length of the route and to site the pipeline away from ridgelines. Alternative E evolved into alternative E1 based on six minor route deviations included at the request of landowners. Alternative E1 begins at MP 93.6 and re-connects to the proposed route at MP 95.3. A comparison of the environmental and other routing considerations associated with alternative E1 to the proposed route is presented in table 3.4.2-3.

TABLE 3.4.2-3 Comparison of the Proposed Pipeline Route to Alternative E1			
Factor	**Proposed Route**	**Alternative Route**	**Difference (if Applicable)[a]**
Length of Corresponding Segments (miles)	1.7	1.7	0.0
Type of Right-of-Way			
Length Adjacent to Existing Utility Right-of-Way (electric/pipeline) (miles)	0.0	0.0	0.0
Length Adjacent to Existing Roadways Paralleling and within an Existing Right-of-Way or Easement (miles)	0.0	0.0	0.0
Length Adjacent to Existing Roadway Paralleling and Abutting an Existing Right-of-Way or Easement (miles)	0.0	0.1	0.0
Length Adjacent to Existing Roadways Paralleling an Existing Right-of-Way or Easement within 300 feet (miles)	0.2	0.2	0.0
Right-of-Way Requirements			
Pipeline Construction Requirements (acres)	23.2	23.2	0.0
Pipeline Operation Requirements (acres)	10.6	10.6	0.0
Wetlands			
Total Wetland Complexes Crossed (number)	0	1	1
Total Wetland Crossed (linear feet)	0	221	221
Total Wetland Impacts (construction/operation) (acres)	0	0.4/0.3	0.4/0.3
Palustrine Forest Wetland Complexes Crossed (construction/operation) (acres)	0.0	0.0	0.0
Palustrine Scrub-Shrub Wetland Complexes Crossed (construction/operation) (acres)	0.0	0.0	0.0
Palustrine Emergent Wetland Impacts (construction/operation) (acres)	0	0.4/0.3	0.4/0.3
Waterbodies			
Waterbodies Crossed (number)	2	2	0
Major River Crossings (number greater than 100 feet)	0	0	0
Streams with Drinking Water Use Designation (number)	0	0	0
Cultural Resources			
National Historic Landmarks (number)	0	0	0
Number of National Register of Historic Places Eligible or Potentially Eligible Cultural Resources Sites Crossed (number)	0	0	0
Land Use			
Forested Land Crossed (miles)	1.3	1.3	0.0
Forested Land Impacts (construction/operation) (acres)	17.9/8.1	17.9/8.1	0.0/0.0
Forest Edge Crossed (miles)	1.1	1.2	0.1
Forested Edge Impacts (construction/operation) (acres)	14.3/6.5	15.6/7.1	1.3/0.6
Forest Interior Crossed (miles)	0.3	0.2	-0.1
Forested Interior Impacts (construction/operation) (acres)	3.3/1.6	2.1/1.0	-1.2/-0.6
Important Bird Area Crossed (miles)	0.0	0.0	0.0
Audubon Forest Blocks of Importance (miles)	1.5	1.3	-0.2

TABLE 3.4.2-3 (continued) Comparison of the Proposed Pipeline Route to Alternative E1			
Factor	**Proposed Route**	**Alternative Route**	**Difference (if Applicable)[a]**
Agricultural Land Crossed (miles)	0.2	0.1	-0.1
Agricultural Land Impacts (construction/operation) (acres)	2.9/1.2	1.8/0.7	-1.1/-0.4
Landfills, Quarries, Material Storage and Processing (number)	0	0	0
Property Owners			
Property Owners Affected (number of parcels crossed)	15	11	-4
Residences Located within 50 feet of the Pipe Centerline (number)	0	0	0
Residences Located within 125 feet (number)	0	0	0
Residences Located within 250 feet (number)	0	2	2
Federal and State Land			
Federal Lands Crossed (number/miles)	0/0.0	0/0.0	0/0.0
State Forest/Parks (number/miles)	0/0.0	0/0.0	0/0.0
Trails			
Trails (number)	0	0	0
Other Physical Features			
Road Crossings (number)	3	3	0
Railroads Crossed (number)	0	0	0
Other Environmental Features			
Shallow Depth to Bedrock Crossed (miles)	0.4	0.5	0.1
Steep Slopes Crossed (30 degrees or greater) (miles)	0.2	0.2	0.0
Side Slope Construction (miles)	0.1	0.0	-0.1
Environmental Hazards and/or Concerns (within 0.5 mile) (number)	0	0	0
Landslides / Unstable Lands Crossed (miles)	0.0	0.0	0.0

[a] Totals may not sum correctly due to rounding

The proposed route and alternative E1 are about the same length and would have similar impacts on waterbodies, wetlands, forested land, nearby residences, and side slopes. Further, the proposed route was already developed to satisfy both landowner concerns and the Schoharie County Planning Commission's request to move the pipeline away from ridges and into lower lying areas. For these reasons, we do not consider adoption of alternative E1 to be preferable to the proposed project.

Alternative G

Alternative G was considered in response to comments from the Schoharie County Planning Commission and Wright Township to locate the pipeline within predominantly agricultural land in the Schoharie Creek floodplain and to avoid karst geology. Alternative G starts at MP 101.8 and ends at the proposed Westfall Road M&R Station. Alternative G follows along the ridge of Towpath Mountain and parallels portions of alternatives C and D. A comparison of the environmental and other routing considerations associated with alternative G to the proposed route is presented in table 3.4.2-4.

TABLE 3.4.2-4 Comparison of the Proposed Pipeline Route to Alternative G			
Factor	**Proposed Route**	**Alternative Route**	**Difference (if Applicable)[a]**
Length of Corresponding Segments (miles)	22.7	25.3	2.6
Type of Right-of-Way			
Length Adjacent to Existing Utility Right-of-Way (electric/pipeline) (miles)	1.0	0.6	0.4
Length Adjacent to Existing Roadways Paralleling and within an Existing Right-of-Way or Easement (miles)	0.0	0.0	0.0
Length Adjacent to Existing Roadway Paralleling and Abutting an Existing Right-of-Way or Easement (miles)	0.1	0.1	0.0
Length Adjacent to Existing Roadways Paralleling an Existing Right-of-Way or Easement within 300 feet (miles)	1.8	2.6	0.8
Right-of-Way Requirements			
Pipeline Construction Requirements (acres)	302.4	337.3	34.9
Pipeline Operation Requirements (acres)	137.5	153.3	15.9
Wetlands			
Total Wetland Complexes Crossed (number)	3	5	2
Total Wetland Crossed (linear feet)	735	2,505	1,770
Total Wetland Impacts (construction/operation) (acres)	1.3/0.8	4.3/2.9	3.0/2.0
Palustrine Forest Wetland Complexes Crossed (construction/operation) (acres)	0.0/0.0	1.4/1.0	1.4/1.0
Palustrine Scrub-Shrub Wetland Complexes Crossed (construction/operation) (acres)	0.9/0.6	1.1/0.7	0.2/0.1
Palustrine Emergent Wetland Impacts (construction/operation) (acres)	0.4/0.3	1.8/1.2	1.4/1.0
Waterbodies			
Waterbodies Crossed (number)	13	22	9
Major River Crossings (number greater than 100 feet)	1	0	-1
Streams with Drinking Water Use Designation (number)	0	1	1
Cultural Resources			
National Historic Landmarks (number)	0	0	0
Number of National Register of Historic Places Eligible or Potentially Eligible Cultural Resources Sites Crossed (number)	0	1	1
Land Use			
Forested Land Crossed (miles)	13.4	9.7	3.7
Forested Land Impacts (construction/operation) (acres)	178.8/81.3	129.2/58.7	-49.6/-22.5
Forest Edge Crossed (miles)	6.8	8.3	1.4
Forested Edge Impacts (construction/operation) (acres)	91.1/41.4	110.0/41.4	18.9/8.6
Forest Interior Crossed (miles)	6.6	1.4	5.1
Forested Interior Impacts (construction/operation) (acres)	79.8/39.9	17.5/8.7	-62.3/-31.2
Important Bird Area Crossed (miles)	0.0	0.0	0.0
Audubon Forest Blocks of Importance (miles)	2.4	6.2	3.8

TABLE 3.4.2-4 (continued) Comparison of the Proposed Pipeline Route to Alternative G			
Factor	**Proposed Route**	**Alternative Route**	**Difference (if Applicable)[a]**
Agricultural Land Crossed (miles)	7.6	13.4	5.8
Agricultural Land Impacts (construction/operation) (acres)	115.0/46.0	202.3/80.9	87.3/34.9
Landfills, Quarries, Material Storage and Processing (number)	2	0	-2
Property Owners			
Property Owners Affected (number of parcels crossed)	110	142	32
Residences Located within 50 feet of the Pipe Centerline (number)	0	0	0
Residences Located within 125 feet (number)	0	2	2
Residences Located within 250 feet (number)	10	21	11
Federal and State Land			
Federal Lands Crossed (number/miles)	0/0.0	0/0.0	0/0.0
State Forest/Parks (number/miles)	0	1/2.4	1/2.4
Trails			
Trails (number)	0	2	2
Other Physical Features			
Road Crossings (number)	19	26	7
Railroads Crossed (number)	0	0	0
Other Environmental Features			
Shallow Depth to Bedrock Crossed (miles)	9.3	5.8	-3.5
Steep Slopes Crossed (30 degrees or greater) (miles)	2.7	1.2	-1.5
Side Slope Construction (miles)	0.7	0.9	0.2
Environmental Hazards and/or Concerns (within 0.5 mile) (number)	1	3	2

[a] Totals may not sum correctly due to rounding

Alternative G would be subject to the same construction, operation, and maintenance safety concerns as alternative C due to its location within the Schoharie Creek floodplain, as discussed above. Alternative G is longer than the proposed route and would result in additional impacts on Audubon Forest Blocks of Importance, trail crossings, wetlands, waterbodies, property owners, and nearby residences. It also crosses 2.4 miles of the Burt-Rossman Hills State Forest, which would be the largest state forest crossing associated with the project. This state forest is fully avoided by the proposed pipeline project route. Therefore, we do not consider adoption of alternative G to be preferable to the proposed projects.

Alternative P

Alternative P was considered to minimize potential impacts on the Barton Hill public water supply watershed at the request of the Town of Wright. Alternative P begins at MP 121.5 and end at the proposed Westfall Road M&R Station. A comparison of the environmental and other routing considerations associated with alternative P to the proposed route is presented in table 3.4.2-5.

TABLE 3.4.2-5 Comparison of the Proposed Pipeline Route to Alternative P			
Factor	**Proposed Route**	**Alternative Route**	**Difference (if Applicable)[a]**
Length of Corresponding Segments (miles)	2.9	3.3	0.3
Type of Right-of-Way			
Length Adjacent to Existing Utility Right-of-Way (electric/pipeline) (miles)	1.0	0.2	-0.8
Length Adjacent to Existing Roadways Paralleling and within an Existing Right-of-Way or Easement (miles)	0.0	0.0	0.0
Length Adjacent to Existing Roadway Paralleling and Abutting an Existing Right-of-Way or Easement (miles)	0.0	0.0	0.0
Length Adjacent to Existing Roadways Paralleling an Existing Right-of-Way or Easement within 300 feet (miles)	0.0	1.0	1.0
Right-of-Way Requirements			
Pipeline Construction Requirements (acres)	38.9	43.3	4.4
Pipeline Operation Requirements (acres)	17.7	19.7	2.0
Wetlands			
Total Wetland Complexes Crossed (number)	0	0	0
Total Wetland Crossed (linear feet)	0	0	0
Total Wetland Impacts (construction/operation) (acres)	0.0/0.0	0.0/0.0	0.0/0.0
Palustrine Forest Wetland Complexes Crossed (construction/operation) (acres)	0.0/0.0	0.0/0.0	0.0/0.0
Palustrine Scrub-Shrub Wetland Complexes Crossed (construction/operation) (acres)	0.0/0.0	0.0/0.0	0.0/0.0
Palustrine Emergent Wetland Impacts (construction/operation) (acres)	0.0/0.0	0.0/0.0	0.0/0.0
Waterbodies			
Waterbodies Crossed (number)	1	1	0
Major River Crossings (number greater than 100 feet)	0	0	0
Streams with Drinking Water Use Designation (number)	0	0	0
Cultural Resources			
National Historic Landmarks (number)	0	0	0
National Register of Historic Places Eligible or Potentially Eligible Cultural Resources Sites Crossed (number)	0	0	0
Land Use			
Forested Land Crossed (miles)	0.4	0.7	0.3
Forested Land Impacts (construction/operation) (acres)	5.2/2.4	9.5/4.3	4.3/1.9
Forest Edge Crossed (miles)	0.4	0.7	0.3
Forested Edge Impacts (construction/operation) (acres)	5.2/2.4	9.5/4.3	4.3/1.9
Forest Interior Crossed (miles)	0.0	0.0	0.0
Forested Interior Impacts (construction/operation) (acres)	0.0	0.0	0.0
Important Bird Area Crossed (miles)	0.0	0.0	0.0
Audubon Forest Blocks of Importance (miles)	0.0	0.0	0.0

TABLE 3.4.2-5 (continued) Comparison of the Proposed Pipeline Route to Alternative P			
Factor	**Proposed Route**	**Alternative Route**	**Difference (if Applicable)[a]**
Agricultural Land Crossed (miles)	2.4	2.4	0.0
Agricultural Land Impacts (construction/operation) (acres)	36.9/14.7	36.7/14.7	-0.2/-0.1
Landfills, Quarries, Material Storage and Processing (number)	0	0	0
Property Owners			
Property Owners Affected (number of parcels crossed)	13	11	-2
Residences Located within 50 feet of the Pipe Centerline (number)	0	1	1
Residences Located within 125 feet (number)	0	2	2
Residences Located within 250 feet (number)	1	4	3
Federal and State Land			
Federal Lands Crossed (number/miles)	0/0.0	0/0.0	0/0.0
State Forest/Parks (number/miles)	0/0.0	0/0.0	0/0.0
Trails			
Trails (number)	0	0	0
Other Physical Features			
Road Crossings (number)	3	3	0
Railroads Crossed (number)	0	0	0
Other Environmental Features			
Shallow Depth to Bedrock Crossed (miles)	0.2	0.1	-0.1
Steep Slopes Crossed (30 degrees or greater) (miles)	0.0	0.0	0.0
Side Slope Construction (miles)	0.0	0.0	0.0
Environmental Hazards and/or Concerns (within 0.5 mile) (number)	0	0	0
Landslides / Unstable Lands Crossed (miles)	0.0	0.0	0.0

[a] Totals may not sum correctly due to rounding

The proposed route is 0.3 mile shorter and slightly less collocated than alternative P. The proposed route and alternative P would have roughly equal impacts on wetlands and waterbodies. The proposed route would have fewer impacts upon forested land and nearby residences, while alternative P would have fewer impacts on the number of property owners. Both the TGP and Iroquois gas pipeline systems have operated within the Barton Hill watershed for many years without any known impact on the water supply. For these reasons, we do not consider adoption of alternative P to be preferable to the proposed projects.

3.4.3 Minor Route Variations

In addition to the major and minor route alternatives described above, we evaluated minor route variations which are much smaller in scale. Typically, they are shorter in length and involve minor shifts in the pipeline alignment to avoid a site-specific resource issue or concern. These site-specific issues included proximity to homes and property boundaries, avoidance of forested land, waterbodies, wetlands, side slopes, special agricultural areas, and addressing impacts on other construction-related, environmental, or landowner concerns. While many of these minor variations were incorporated, a smaller number were reviewed and rejected for environmental or construction engineering reasons, or

because some of them subsequently became isolated and obsolete due to the incorporation of other alternatives. A brief description of each variation, the reasons why it was adopted or rejected, and our assessments are presented below.

Prior to issuance of the draft EIS, Constitution indicated that it had evaluated 371 minor route variations over the course of project development and that over 50 percent of its originally considered pipeline route had changed due to incorporation of alternatives and smaller realignments since its original filing in May 2012. During our pre-filing process 200 of these minor route variations were evaluated by Constitution during the course of preliminary route review, engineering design, and field assessments. These 200 variations were part of the early phase, original route design process and are not discussed further below as the concerns for which they were developed have been addressed.

We assessed 20 minor route variations in the draft EIS to avoid or minimize potential impacts on wetlands and waterbodies. In many cases, the landowners, staff from the NYSDEC, and staff from the COE met with Constitution in the field to develop these potential minor route variations. All 20 minor route variations were incorporated by Constitution into its proposed route. Appendix H-1A (Status of Minor Route Variations Assessed for Impacts on Water Resources) details the parcel number, location, assessment, status of the alternative relative to the proposed route, and landowner resolution status for each minor route variation identified by the NYSDEC and the COE staff. We determined that these minor route variations, as incorporated in the proposed route prior to issuance of the draft EIS, would reduce impacts on the water resources, and have no reason to recommend further analysis along the segments of the proposed route.

Other minor route variations were identified by landowner or stakeholder input and were evaluated in the draft EIS. These minor route variations, 151 in total, were discussed in the draft EIS as either minor route variations reported to Constitution, reported by stakeholders, or assessed for impacts on agricultural land. These parcels are discussed in the following three sections below, along with Constitution's responses to our recommendations in the draft EIS that Constitution further assess minor route deviations and either incorporate a route that avoids the subject resource or otherwise explain how potential impacts have been effectively avoided, minimized, or mitigated. These issues were identified prior to issuance of the draft EIS based on input to Constitution directly from landowners, input to Constitution from our staff based on landowner comments supplied to us, as well as Constitution's coordination with the NYSDAM, the NYSDEC, and the COE.

Following issuance of the draft EIS, Constitution reported that it had adopted an additional 76 minor route variations into its proposed route. The reasons for the minor route variations were numerous and varied, but included justifications such as accommodation of landowner concerns, avoidance of buildings or cultural resources, resolution of construction or engineering issues, and minimization of impacts on springs, waterbodies, and wetlands. The location, description, and status of these adopted reroutes is presented in appendix H-1B (Minor Route Deviations Adopted by Constitution Since Issuance of the Draft EIS). The minor route variations adopted post-draft EIS are included in the updated pipeline route maps presented in appendix B and are depicted in greater detail in comparison to the original route

on Constitution's alignment sheets. The alignment sheets containing the reroutes can be accessed through the internet and were filed on March 14, 2014.[3]

We determined that these additional minor route variations, as incorporated into the proposed route, would generally reduce impacts or are otherwise appropriate. We have no reason to recommend further analysis along the segments of the proposed route except as specifically identified and discussed in this final EIS under the general project proposal. Where these minor route variations are relevant to unresolved landowner concerns previously identified in the draft EIS or newly identified landowner issues following issuance of the draft EIS, we provide our analyses in the sections below.

3.4.3.1 Minor Route Variations Reported to Constitution

Constitution reported 96 minor route variations prior to issuance of the draft EIS based on requests from potentially affected landowners (appendix H-1) that cross 257 individual tracts. Constitution adopted 81 of these 96 minor route variations into its proposed route or otherwise resolved the landowners' concerns. Constitution stated that the remaining 15 minor route deviations were not adopted for reasons such as:

- rendering the route variation as obsolete or replacement by another route;
- routing conflicts with other infrastructure;
- substantial increases in pipeline length or added points of inflection (PI);
- substantial increases in the number of affected landowners; and
- increases in environmental impacts.

Appendix H-1 details the parcel number, location, assessment, status of the alternative relative to the proposed route, and landowner resolution status for each minor route variation identified by Constitution prior to issuance of the draft EIS. We concurred with Constitution's assessment for its identified minor route variations in the draft EIS with one exception. In this case a variation was developed (but not adopted) that would increase the distance between the pipeline and a water well on tract ALT-B-NY-BR-082.003. We determined that this deviation or possibly another minor pipeline realignment could reduce potential impacts on this well and recommended in the draft EIS that Constitution further assess the route in this area. Constitution reported in April 2014 (in response to the recommendation in the draft EIS) that it had recently obtained survey permission, visited the site with the landowner to examine the well, and was considering a minor route variation. Constitution then filed an updated list of minor route variations that it had adopted in June 2013. Although parcel ALT-B-NY-BR-082.003 was mentioned in association with a reroute at MP 41.7, the reroute purpose was described as routing away from a waterbody that paralleled the construction right-of-way. Further, Constitution did not state that there was a landowner issue that needed resolution at this parcel. However, based on our review of Constitution's reroute, the proposed route now would proceed on the west side of O'Brien Road at this parcel across the road from the house and well. Additionally, the reroute would not bisect the subject property, rather it would be located in the northwestern corner (the pipeline would be about 60

[3] (http://elibrary.FERC.gov/idmws/file_list.asp?accession_num=20140314-5111); June 3, 2014 (http://elibrary.FERC.gov/idmws/file_list.asp?accession_num=20140603-5153); June 19, 2014 (http://elibrary.FERC.gov/idmws/file_list.asp?accession_num=20140619-5027), and August 5, 2014 (http://elibrary.ferc.gov:0/idmws/file_list.asp?document_id=14240117).

feet from the corner) of the sub-parcel west of O'Brien Road. Given this analysis, we conclude that Constitution's reroute adequately minimizes impacts on parcel ALT-B-NY-BR-082.003, including the well. We have eliminated our original recommendation number 11 from the EIS accordingly.

3.4.3.2 Minor Route Variations Reported By Stakeholders

We assessed 48 minor route variations prior to issuance of the draft EIS that would affect 102 individual tracts as a result of comments we received from potentially affected landowners (appendix H-2). We developed potential minor route variations based on our field visits, landowner input, and our review of desktop data; and supplied those variations to Constitution for assessment. Constitution adopted 41 of these 48 minor route variations into its proposed route or otherwise resolved the landowners' concerns prior to issuance of the draft EIS. Constitution stated that the seven remaining minor route deviations were not adopted for reasons such as the route variation was unnecessary or there were routing conflicts with other infrastructure.

Appendix H-2 details the parcel number, location, assessment, status of the variation relative to the proposed route, and landowner resolution status for each minor route variation we identified prior to issuance of the draft EIS. We generally concurred with Constitution's assessment and conclusions for these stakeholder-identified minor route variations listed in appendix H-2 and found that these variations result in fewer impacts. However, we received comments that landowner resolution for one of the parcels was not yet complete, and we received comments regarding 11 other parcels where issues remained unresolved at the time of issuance of the draft EIS. These tracts are listed below in table 3.4.3-1 along with Constitution's responses to our recommendation in the draft EIS that these tracts be assessed further. Based on our analyses, we conclude that the issues for five parcels have been adequately resolved and that a minor route variation is either not needed or we could not identify a viable reroute or modified construction method that was preferable to the proposed route (table 3.4.3-1). We have identified four new minor route variations and/or modifications of construction methods for the remaining six tracts (one minor route variation involves three parcels and one other minor route variation involves two parcels) that we conclude are preferable to the proposed route and construction methods. These minor route variations are depicted in figures in appendix H-2A. In order to address landowner concerns for the six remaining tracts, **we recommend that:**

- **Constitution should adopt the minor route variations and/or modifications of construction methods for the tracts specified in table 3.4.3-1 of the EIS and as depicted in appendix H-2A. As part of its Implementation Plan, Constitution should file with the Secretary updated alignment sheets incorporating these minor route variations and modifications of construction methods <u>prior to the start of construction</u>.**

Following issuance of the draft EIS, other stakeholders provided comments about specific impacts on their properties, stated that prior issues at their parcels remained unresolved, or also requested that the FERC evaluate minor route variations that might avoid resources on their parcels. Some of these issues were later resolved due to Constitution's incorporation of minor route variations after issuance of the draft EIS as described in this section. The location, description, and status of each of the remaining unresolved requests for evaluation of minor route variations are provided in table 3.4.3-2.

TABLE 3.4.3-1
Status of Minor Route Variations Reported by Stakeholders Prior to Issuance of the Draft EIS

Land Parcel ID	MP	Requested Minor Route Deviation Description	Constitution's Response to the Recommendation in the Draft EIS	FERC Assessment and Conclusion or Recommendation
ALT-S-PA-SU-007.002	21.1	Landowner concerned with proximity of alignment to future house site.	Constitution stated that it did not have permission for parcel access, were not given future development plans, and could not further assess the site until access was granted.	We reviewed the proposed route across this parcel. The proposed route follows a ridge, and there would be increased side slope construction if the line were moved to either side. The proposed route follows an existing, cleared pathway for approximately one-half of the parcel crossing, and there has been prior disturbance in the vicinity as there are clearings or homes to the east, northeast, and north nearby. The exact location of a possible future building site is not known, but it appears that at least 500 feet of road frontage along Route 1057 and potential building sites would not be disturbed by the proposed route. Based on our analysis, we could not identify a viable route crossing for this parcel that was preferable to the proposed route.
NY-BR-077.000	40.6	Landowner concerned current alignment would prohibit future development of the land.	Constitution stated that it met with the landowner in March 2014 and clarified misunderstandings, which alleviated most of the landowner's concerns. Constitution stated that it believed a route modification was no longer necessary.	Based on available information, we conclude that a route modification is no longer necessary.
ALT-B-NY-BR-082.000	41.4	Landowner was concerned about rights to build a house, removal of trees and berry bushes, and ability to cross the pipeline.	Constitution stated that it met with the landowner in March 2014 and clarified misunderstandings regarding use of the property during both construction and operations, and discussed the landowner's preferred location for future development. Constitution stated that it believed a route modification was no longer necessary.	Based on available information and the update provided by Constitution, we conclude that a route modification is no longer necessary and that the landowner's concerns, including future plans to build a house have been resolved.
NY-CH-001.007	42.5	Landowner requested the pipeline be moved to the back of their property so as to not impact a future gas well or home site.	Constitution stated that it had incorporated a reroute for this parcel that satisfied the landowner's concerns.	Based on available information, we conclude that a route modification is no longer necessary.
NY-DE-111.000	72.9	Landowner concerned about damage to a woodlot, wetlands, and stream on the property.	Constitution stated that it did not have permission for parcel access and could not further assess the site until access was granted.	We reviewed the proposed route across this parcel. The proposed route follows a portion of a ridge, and wetlands are present north of the route. The area to the south of the proposed route is closer to parcel access from Grange Hall Road. As proposed, the route would cross a small portion of the northern corner of the property. Based on our analysis, we could not identify a viable route crossing for this parcel that was preferable to the proposed route.

TABLE 3.4.3-1 (continued)
Status of Minor Route Variations Reported by Stakeholders Prior to Issuance of the Draft EIS

Land Parcel ID	MP	Requested Minor Route Deviation Description	Constitution's Response to the Recommendation in the Draft EIS	FERC Assessment and Conclusion or Recommendation
NY-DE-137.000 (and adjacent parcel NY-DE-138.000)	77.2	Landowner concerned with proximity of pipeline to home (100 feet) and because the alignment cuts the property in half.	Constitution stated that it did not have permission for parcel access and could not further assess the site until access was granted.	We reviewed the proposed route across this parcel. The proposed route bisects at least 6 parcels in this area. We evaluated an alternative route that would push the path farther back within the property away from parcel access from Prosser Hollow Road. This would substantially decrease impacts on the subject parcel (NY-DE-137.000), an adjacent parcel where the landowner has also requested a reroute (NY-DE-138.000), and four other adjacent parcels (NY-DE-133.000, NY-DE-134.000, NY-DE-135.000, and NY-DE-136.000). Although the reroute would be about 300 feet longer than the proposed route, the topography appears to be favorable for construction (no significant steep side slopes) and there would be no known additional impacts on waterbodies or wetlands. No new landowners would be affected. This reroute is depicted in appendix H-2A. **Based on our analysis, we recommend that Constitution adopt this minor route variation.**
NY-DE-199.000	86.6	Landowner concerned with proximity of pipeline to home.	Constitution stated that it did not have permission for parcel access, did not observe a nearby structure while reviewing aerial photography, and could not further assess the site until access was granted.	We reviewed the proposed route across this parcel. The proposed route bisects the middle of this 210-foot-wide parcel at 96 Road and then exits the subject parcel to the northeast. Based on review of Constitution's alignment sheets, it appears that two structures and a driveway are located just south of the proposed alignment. The parcels to the immediate north and south of the subject parcel both contain houses. Based on our analysis, avoidance of this parcel altogether is not a favorable option due to the presence of the adjacent homes. However, we conclude that the proposed route could be shifted slightly north to abut the northern parcel boundary, farther away from the structures, and that Constitution could reduce its construction right-of-way width to 75 feet within this parcel (crossing length of about 400 feet). Although impacts on the parcel would still occur, they would be reduced. This reroute would also require a slight adjustment to the route on the parcel to the west (NY-DE-197.000). No additional waterbodies or wetlands would be affected, and the topography appears favorable for construction. No new landowners would be affected. **Based on our analysis, we recommend that Constitution adopt this minor route variation and modified construction right-of-way width.**

TABLE 3.4.3-1 (continued)
Status of Minor Route Variations Reported by Stakeholders Prior to Issuance of the Draft EIS

Land Parcel ID	MP	Requested Minor Route Deviation Description	Constitution's Response to the Recommendation in the Draft EIS	FERC Assessment and Conclusion or Recommendation
NY-DE-226.000 (also relevant to NY-DE-025.000 and other landowners potentially affected by possible minor route variations in this area; these landowners were the subject of FERC correspondence issued on May 29, 2014. These tracts have not been assigned parcel numbers by Constitution).	90.3	The landowners of parcel NY-DE-226.000 filed numerous and substantive comments about the route across this parcel and about the project in general during all phases of the project. The comments filed after issuance of the draft EIS are included, along with our responses, in appendix S of this EIS. Specifically see comments/responses CO4, CO5, CO6, CO9, CO12, CO24, CO37, CO43, CO50, CO54, CO70, IND263, and PM2. The parcel-specific comments were primarily related to impacts on wetlands (including Clapper Lake and Mud Pond which were allegedly hydrologically connected), the spread of invasive species, impacts upon the timbering operation for specialty veneer products, and potential reroutes to avoid the parcel, some of which would collocate with an existing propane line in the area.	Constitution stated that it did not have survey permission at the parcel and that no further assessment of minor route variations was possible until it was able to conduct surveys. Constitution also stated that it had reduced the construction right-of-way width to 100 feet in interior forests in this tract.	The FERC staff met with the landowner, toured the subject parcel, and attempted throughout the project to facilitate discussion between the landowner and Constitution; however the issues remained unresolved. Following our receipt of Constitution's response to our recommendation in the draft EIS, the FERC issued a data request in May 2014 requesting that Constitution assess eight minor route deviations suggested by the landowners and their agents, and also to assess the use of HDD at the parcel. Constitution's responses in June 2014 and detailed information are available at http://elibrary.ferc.gov:0/idmws/file_list.asp?document_id=14222572 and http://elibrary.ferc.gov:0/idmws/file_list.asp?document_id=14227429. A cooperating agency for the development of this EIS, the COE, reported that it visited the subject parcel in August 2014 and determined that the proposed pipeline route would cross both uplands and wetlands in the vicinity of Clapper Lake and Mud Pond, and that the Clapper Lake and Mud Pond wetland complexes were not hydrologically connected in the area examined. We conclude that minor route variations would not be preferable to the proposed route based on the COE's findings and because the minor route variations all would be longer than the proposed segment and would in many cases also affect wetlands. The minor route variations also would affect as many or more landowners and in many cases residences (which the proposed route segment would not affect). The existing propane line adjacent to the minor route variations was the subject of documented pipeline incidents in 1990 and 2010, (NTSB 1991; NewsChannel10 2014) and Constitution reported safety concerns about placing its new proposed pipeline near it. However, to further minimize impacts on forested wetlands, we recommend that Constitution implement a trenchless Direct Pipe crossing from an upland area at about MP 90.67 (at the southeast corner of parcel NY-DE-225.000) to an upland area at about MP 90.89 (in parcel NY-DE-226.000; see figure in appendix H-2A). To further minimize impacts on parcel NY-DE-226.000 overall and on the timber operation, we recommend that the standard construction right-of-way in uplands should be reduced to 75-feet-wide (instead of 100 feet) within this parcel to reduce overall construction impacts. Additionally, maintenance during

TABLE 3.4.3-1 (continued)
Status of Minor Route Variations Reported by Stakeholders Prior to Issuance of the Draft EIS

Land Parcel ID	MP	Requested Minor Route Deviation Description	Constitution's Response to the Recommendation in the Draft EIS	FERC Assessment and Conclusion or Recommendation
				operations should be limited to a corridor 30-feet-wide (instead of 50 feet). Given that the crossing of this parcel is about 5,200 feet long, this would avert about 3 acres of clearing during construction and avert about 2.4 acres of maintained right-of-way during operation. These actions would minimize impacts during both construction and operation. **Based on our analysis, we recommend that Constitution adopt the impact minimization measures described above.** We also are recommending in section 4.5 that Constitution extend monitoring for invasive species based on inspections performed by the FERC.
ALT-O-NY-SC-015.000, ALT-O-NY-SC-017.000, and ALT-O-NY-SC-022.000 (also relevant to the landowner of ALT-O-UA-NY-SC-019.000, who did not want to be affected by the proposed pipeline, as well as other landowners potentially affected by possible minor route variations in this area. These landowners were the subject of FERC correspondence issued on May 15, 2014. These tracts have not been assigned parcel numbers by Constitution).	114.1, 115.0, and 115.6	The route could disrupt farming operations, planned developments, and cause the landowner to be out of compliance with their agricultural permits.	Constitution initially stated that it had already adopted one reroute identified by the NYSDAM and the landowner in this area. Further, it stated that an additional reroute suggested by the NYSDAM and the landowner to allow for future expansion of dairy operations was not needed because the proposed pipeline was within a 75-foot setback from the property line where development is prohibited (thereby preventing the building of new farm structures within the setback) and that a reroute was not preferable because it would affect new landowners, would be closer to homes, and could possibly affect a cultural resources site. In response to the FERC's May 15, 2014 environmental information request, Constitution provided additional information regarding these parcels on June 3 and 19, 2014, including adoption of a new reroute that shifted the alignment slightly to the south to avoid planned farm structures. Constitution also evaluated an HDD crossing at this area at our request, and reported that on-site geotechnical studies would be needed, but desktop data indicated that an HDD was potentially feasible. However, Constitution also reported that gravel or cobbles in the soil could cause issues with successful completion of the HDD. The landowner responded on July 3, 2014, that the new route would interfere with delivery of water from a new well to the proposed new barn,	We further evaluated a minor route variation trending north and east that would largely avoid the farming operation and that also would avoid the planned farm structures, the new well, and the planned retirement home. Virtually all of this minor route variation would remain on the farm owners' parcels. Although one new landowner (ALT-O-UA-NY-SC-019.000) would be crossed, that parcel would only be affected slightly (crossing length of approximately 90 feet, centerline located about 40 feet from the corner of Keyser Road and an unnamed spur road) at the extreme southeastern property corner. The minor route variation would actually be shorter than the proposed route by approximately 75 feet. One home at Keyser Road would now be approximately 150 feet from the pipeline, but that parcel would not be directly affected (crossed). The topography appears to be favorable for construction (no significant steep side slopes) and there would be no known additional impacts on waterbodies or wetlands. **Based on our analysis, we recommend that Constitution adopt this minor route variation.**

TABLE 3.4.3-1 (continued)
Status of Minor Route Variations Reported by Stakeholders Prior to Issuance of the Draft EIS

Land Parcel ID	MP	Requested Minor Route Deviation Description	Constitution's Response to the Recommendation in the Draft EIS	FERC Assessment and Conclusion or Recommendation
			would cause drainage problems and permit violations, and that the pipeline would be subject to heavy traffic. The landowner further commented on August 4, 2014, that they planned to build a retirement home near the pipeline crossing and had already finished a well in the area. One adjacent landowner potentially affected by a reroute objected to relocation of the route onto his property.	

For parcels noted in bold, we are recommending a minor route variation and/or a modification to the proposed construction method.

TABLE 3.4.3-2
Status of Minor Route Variations Reported by Stakeholders After Issuance of the Draft EIS

Land Parcel ID	MP	Requested Minor Route Deviation Description	FERC Assessment and Conclusion or Recommendation
ALT-A-PA-SU-020.000	**5.3**	The landowner noted potential impacts on trees, syrup producing maple trees, crop fields, a stream, and proximity to the house and well.	The proposed route on the property is largely collocated with the west and then north property boundaries west of 3 Lakes Road, then continues east and northeast before exiting the northern part of the property. A quarry is located to the west. We recommended in section 4.8.4 of the draft EIS that Constitution file an impact avoidance, minimization, or mitigation plan for specialty crops (which could include maple syrup producing trees), which would address those potential impacts. We did not identify a viable route preferable to the proposed route on this parcel and conclude that the proposed route minimizes impacts on the subject property to the extent possible.
ALT-A-PA-SU-033.000	7.8	Landowner reported impacts on his farm, hay fields, and future plans to subdivide the property.	We reviewed the proposed route across this parcel. The proposed route would be near the southern property boundary on both sides of Highway 2061, approximately 180 feet away on the west side (opposite some adjacent homes) and approximately 100 feet away on the east side. We conclude that the proposed route follows the southern property boundary to the extent practical considering the location of the adjacent homes, thereby minimizing impacts on the property overall and to potential future building plans. Farming and hay production would still be allowed over the pipeline and the landowner would be compensated for any temporary losses. We conclude that the proposed route already minimizes impacts on the landowner's parcel.
ALT-A-PA-SU-038.000	8.8	Landowner is not agreeable to the pipeline crossing his property, he had a much better experience working with Bluestone to allow a prior pipeline crossing of his property.	The proposed route would cross this parcel on a portion that is a cleared field, minimizing impacts on forest, and would be approximately 1,000 feet from the owner's home and approximately 1,300 feet from parcel access via Sutton Road. Based on our analysis, we did not identify an alternative crossing for this parcel that was preferable to the proposed route.
PA-SU-087.000	14.3	The landowner stated that the pipeline was too close (about 100 feet) to their home and that the pipeline would cause drainage issues.	The proposed route would cross the southern portion of this parcel largely through an open field, cross the parcel immediately to the south (80 feet crossing length located about 50 feet from the northern property corner), then re-enter the extreme southeast corner of the subject parcel before crossing Brushville Road. Although some extra workspace associated with the Brushville Road crossing would be within about 80 feet of the main house, the pipeline centerline would be about 200 feet from the main house. The proposed route would proceed along a hill, but the topographic contours would be restored following construction, thereby minimizing impacts on drainage patterns. We conclude that the proposed route already minimizes impacts on the subject parcel to the extent practical.
UA-NY-BR-001.002 and ALT-B-NY-BR-001.000	25.7	Landowner requests collocation with the Bluestone pipeline and moving the pipeline farther from the house.	Constitution adopted a slight minor route variation following issuance of the draft EIS which moved the route about 90 feet farther away from this landowner's house, making the total distance approximately 325 feet. We conclude that this slight minor route variation minimizes the pipeline's proximity to the house to the extent practical given the topography in the area. However, based on our analysis, the proposed route could be shifted slightly to better align with the Bluestone pipeline depicted in the commentor's filing within parcel UA-NY-BR-001.002 to reduce impacts on the parcel overall in the vicinity of MP 25.7**. Based on our analysis, we recommend that Constitution adopt this minor route variation.**

TABLE 3.4.3-2 (continued)
Status of Minor Route Variations Reported by Stakeholders After Issuance of the Draft EIS

Land Parcel ID	MP	Requested Minor Route Deviation Description	FERC Assessment and Conclusion or Recommendation
ALT-B-NY-BR-016.003	29	Landowner concerned about proximity of the pipeline, 100 feet from the home.	The proposed route crosses the center of the landowner's property, and the pipeline would be approximately 130 feet from the owner's home. We evaluated a minor route variation that would move the pipeline further back towards the property boundary, minimizing impacts on the property overall and increasing the distance to the home to about 290 feet. Additionally, this minor route variation would increase the pipeline distance (from 150 feet to 275 feet away) from an adjacent home to the south at parcel ALT-B-UA-NY-BR-015.001, and would reduce overall impacts on that parcel as well. The number of PIs would remain the same at two. The topography appears favorable for construction and no known new landowners, wetlands, or waterbodies would be affected. The length of the pipeline would increase for this segment by approximately 175 feet. **Based on our analysis, we recommend that Constitution adopt this minor route variation.**
ALT-B-NY-BR-028.000	31.8	The landowner reported that there were issues with proximity to a dwelling and isolation of a portion of the property.	The proposed route enters this parcel from the south near an eastern property line, crosses diagonally across the southeastern portion of the parcel, before turning north near two other eastern property boundaries. The proposed centerline would be approximately 500 feet from the house. We conclude that impacts on the parcel overall and in relation to proximity to the house are already adequately minimized.
ALT-B-NY-BR-054.000	37.1	Landowner reported that the proposed route would affect trees and bisect the property, leaving it landlocked.	We reviewed the proposed route across this parcel. The parcel is already bisected by an existing powerline right-of-way. The proposed pipeline would be located to the east of the powerline, away from parcel access via Clark Road. Collocation is not preferable on the west side of the powerline because that would impact the portion of the parcel nearest access from Clark Road. Collocation is not viable on the east side of the powerline because of a neighboring home located to the north. We evaluated a minor route variation that would move the pipeline farther east closer to the property boundary before proceeding northwest near an existing dirt road. This would reduce impacts on the parcel overall, it would likely reduce the amount of side slope construction and tree clearing, reduce the number of PIs from two to one, and would not affect any new landowners, waterbodies, or wetlands. The minor route variation would be approximately 150 feet longer than the proposed route. **Based on our analysis, we recommend that Constitution adopt this minor route variation.**
ALT-B-NY-BR-083.000	41.8	The landowner wants the route along the west side of the parcel near an existing powerline, not the east side of the property where future uses of the land may be precluded.	Our assessment of this parcel indicated although the route would be located on the eastern side, the proposed route is generally collocated with the southeastern corner of the property, well away from the parcel's road frontage along Perry Road. We conclude that the proposed route already minimizes impacts on this parcel.

TABLE 3.4.3-2 (continued)
Status of Minor Route Variations Reported by Stakeholders After Issuance of the Draft EIS

Land Parcel ID	MP	Requested Minor Route Deviation Description	FERC Assessment and Conclusion or Recommendation
ALT-B-NY-BR-083.006	42.3	Landowner stated that the route would prevent future plans to build on the parcel.	We reviewed the proposed route across this parcel. The route crosses the northwest corner of this parcel (crossing length of about 420 feet approximately 180 feet from the northwest corner of the parcel) away from the home (approximately 980 feet away) and away from parcel access by Perry Road. We conclude that the proposed route already minimizes impacts on the landowner's parcel.
NY-CH-014.000	45.2	The landowner reported that the proposed route would remove many trees, including sugar maples tapped annually, affect the parcel's road frontage, and affect the parcel overall.	We evaluated a minor route variation that would minimize impacts on the parcel overall and that would not bisect the parcel's frontage on Melondy Hill Road. The variation shifts the route to the west and links up to a minor route variation developed and recommended for parcel NY-CH-015.000 for agricultural purposes. This minor route variation is about 100 feet shorter than the proposed pipeline segment, and it would not affect new landowners, wetlands, or waterbodies. The route would not result in new PIs and the topography appears favorable. **Based on our analysis, we recommend that Constitution adopt this minor route variation.**
NY-CH-033.000 and NY-CH-031.000	49.4	The landowners requested that the pipeline workspace be moved off of parcel NY-CH-031.000.	Constitution adopted a minor route variation in the area after issuance of the draft EIS. The minor route variation moved the easterly trending portion of the route off of parcel NY-CH-031 and onto parcel NY-CH-033.000. Based on our analysis, the landowners' concerns have been adequately addressed.
NY-DE-029.000	56.9	Landowners were concerned about the proposed route bisecting the forested part of their parcel and causing visual impacts.	Constitution initially reported that it had adopted a minor route variation for this parcel. However, the landowner stated (after issuance of the draft EIS) that the impacts on forest and associated visual impacts had not been resolved. We evaluated a minor route variation that would proceed north through the parcel and then extend northeast along the property line. This minor route variation would also slightly decrease impacts on the adjacent parcel (NY-DE-030) by placing the route closer to the property boundary (see below). Although the minor route variation would be approximately 200 feet longer, it would minimize impacts on forest in the central part of the parcel by routing much closer to the northern property boundary. The number of PIs would be the same, the topography appears favorable for construction, and no new wetlands or new landowners would be affected. Additionally, it appears that the minor route variation would reduce the number of waterbodies crossed by one through avoidance of a tributary to Carr's Creek. **Based on our analysis, we recommend that Constitution adopt this minor route variation.**
NY-DE-030.000	57.1	The landowner expressed concern with access to and access across the farm during both construction and operations.	We assessed the route for this parcel. See above for the assessment of parcel NY-DE-029. The proposed route crosses the northwest corner and northern portion of this parcel, and the fields would still be available for farming after the pipeline is in operation. However, a shift in routing related to a minor route variation for parcel NY-DE-029 would also have some benefits for this parcel by placing the route closer to the northern property boundary. **Based on our analysis, we recommend that Constitution adopt this minor route variation.**
NY-DE-057.000	63.1	The landowner indicated that the parcel would be cut in half.	Based on our analysis of the proposed route on this parcel, the pipeline route is within the back one-third of the property, avoiding side slopes located further north (i.e., farther back on the parcel), along or near ridge tops, and well away from parcel access via Patent Line Road to the south. Extra workspace would be required on the subject parcel to facilitate crossing of a palustrine emergent wetland on the adjacent parcel to the east. Based on our analysis, we conclude that the proposed route and workspace location are preferable to other potential variations in this area.

TABLE 3.4.3-2 (continued)
Status of Minor Route Variations Reported by Stakeholders After Issuance of the Draft EIS

Land Parcel ID	MP	Requested Minor Route Deviation Description	FERC Assessment and Conclusion or Recommendation
NY-DE-072.000	65.4	The landowner stated that the route was too close to the house, and cut through the center of their property that they planned to subdivide.	Based on our analysis of this parcel, a minor route variation could more closely align with the southern property boundary of the subject sub-parcel on the west side of Bissell Road. It could then continue straight across Bissell Road and most of the sub-parcel on the east side of Bissell Road before turning north and rejoining the proposed route at the property boundary. The number of PIs and the topography would be the same, and no new landowners, waterbodies, or wetlands would be affected. Although the minor route variation is about 325 feet longer than the proposed route, overall impacts on the sub-parcel west of Bissell Road would be minimized and the distance of the centerline of the pipeline to the house would increase from about 225 feet to about 575 feet. **Based on our analysis, we recommend that Constitution adopt this minor route variation.**
UA-NY-DE-076.000	65.7	Landowner stated that the route behind their property would affect their quality of life and wells.	We reviewed the proposed route near this parcel. Constitution adopted a reroute that moves the pipeline even further away from the subject parcel (now 60 feet away). The parcel would not be directly affected. We conclude that potential direct impacts on this parcel have been avoided and potential indirect impacts have been adequately minimized.
Parcel NY-DE-080.000	66.7	Landowner was concerned about overall impacts on the parcel, ponds, wetlands, and future building sites and wants the pipeline routed to the rear of the property.	The proposed route crosses near the center of the parcel, including in the area of property access from Steward Road. We assessed a minor route variation that would start at and also minimize impacts on the adjacent parcel to the south (NY-DE-079.000), would collocate with the northwestern property boundaries of both parcels before angling southeast to rejoin the proposed route. The home at parcel NY-DE-079.000 and would still be approximately 300 feet from the pipeline. This minor route variation would minimize overall impacts on both parcels by not bisecting them and it would not affect any new landowners, waterbodies, or wetlands. The topography appears favorable for construction. The minor route variation would add approximately 1,400 feet to the overall length of the pipeline segment. **Based on our analysis, we recommend that Constitution adopt this minor route variation.**
UA-NY-DE-100.003	71.0	Landowner was concerned about impacts on his well, which he reported was 35 feet from the proposed pipeline easement.	Based on our review of this parcel, the proposed pipeline of the pipeline would not cross this parcel, nor would the permanent easement. Temporary workspaces would affect the northern corner of the property. Constitution would implement measures to test and protect wells that could be affected as discussed in section 4.3.1 of the EIS. Given those measures and because this parcel would not be affected by the pipeline centerline or permanent easement, we conclude that a minor route variation is not warranted at this location.
NY-DE-127.000	75.8	The landowner opposes the pipeline on their property and is concerned about steep slopes.	The proposed route proceeds directly down a slope on the subject property to the southeast in the southern one-third of the parcel. The route could not be adjusted to the north without encountering side slopes and being closer to the house (currently about 225 feet from the centerline) and could not be adjusted to the south without encountering additional side slopes and a neighboring home. We did not identify a viable and practical route on this parcel and conclude that proposed route is preferable.
NY-DE-130.000	76.5	The landowner stated that the proposed route would encumber the only suitable building location for a planned retirement home; other locations would require an easement for a driveway over	The proposed route for the parcel would be located along the extreme northern property boundary. The property has about 750 feet of road frontage along Coe Hill Road. The centerline of the pipeline would be about 150 feet from the property boundary at Coe Hill Road, but tapers to about 65 feet from the property boundary where the route exits the parcel to the northeast. Based on our review of the topography in the area near the Coe Hill Road frontage, it appears that the topography is relatively similar in the area east of the road frontage and that reasonable access from Coe Hill Road would not be precluded by the pipeline. Given that assessment and that the proposed route is

TABLE 3.4.3-2 (continued)
Status of Minor Route Variations Reported by Stakeholders After Issuance of the Draft EIS

Land Parcel ID	MP	Requested Minor Route Deviation Description	FERC Assessment and Conclusion or Recommendation
		steep terrain.	generally aligned with the northern property boundary, we conclude that impacts on this parcel have been minimized to the extent practical.
NY-DE-144.003	79.2	Landowner reported that the proposed route affects the best woodlot and future projected building site for a home.	Based on our evaluation of the proposed route on this parcel, the pipeline could be adjusted slightly toward the north property corner, further minimizing impacts on the property overall. The topography appears favorable in this area, and no new waterbodies, wetlands, or landowners would be affected. One PI would be added, but the variation would be about 60 feet shorter than the proposed route segment. **Based on our analysis, we recommend that Constitution adopt this minor route variation.**
UA-NY-DE-148.002	79.3	Landowner reported that the route was close to the house, well, and stream.	Based on our evaluation of the proposed route and the property, we conclude that the route minimizes impacts on the landowner's parcel to the extent possible by collocating with the southern property boundary and by leaving a forested buffer between the house and the proposed right-of-way. The pipeline would be approximately 285 feet from the house. We do not recommend a reroute at this location.
NY-DE-165.002	81.8	Landowner reported impacts on the parcel and quality of life.	Constitution adopted a reroute that moved the pipeline route to the south and off of the subject parcel. We conclude that a reroute is no longer necessary.
NY-DE-165.006	81.9	Landowner requested that the route be moved to the rear of the property to minimize impacts on the parcel and to preserve future building sites.	We reviewed the proposed route across this parcel. The proposed route crosses near the center of the property. We further evaluated a minor route variation that would move the route farther back nearer the rear property line. This minor route variation appears viable topographically, and would not affect any new wetlands, waterbodies, or adjacent landowners. The minor route variation would be about 120 feet longer than the proposed route. **Based on our analysis, we recommend that Constitution adopt this minor route variation.**
NY-DE-175.002	82.8	Landowner reported impacts on trees that provide a visual buffer to the neighbors, fruit trees, wildlife, and quality of life with the pipeline located 100 feet from the home.	We reviewed the proposed route across this parcel and conclude that the proposed route would impact trees, including part of visual screening relative to a neighboring home to the southeast. Some trees may remain along the southeastern property line on the neighboring property. Because there are existing homes on either side of the subject parcel, avoiding the property altogether is not a favorable option and options to modify the route are limited. However, the construction right-of-way could be reduced to 75-feet-wide (or less if practical) within this parcel and aligned to abut the property boundary to minimize overall construction impacts. Additionally, maintenance during operations could be limited to a corridor 30-feet-wide instead of 50-feet-wide. These actions would minimize impacts during operations and increase the amount visual screening relative to the neighboring home. Constitution also could develop a visual screening plan in coordination with the landowner, such as the planting of trees, for the construction zone outside the 30-foot-wide maintenance corridor. **Based on our analysis, we recommend that Constitution adopt the impact minimization measures described above.**

TABLE 3.4.3-2 (continued)
Status of Minor Route Variations Reported by Stakeholders After Issuance of the Draft EIS

Land Parcel ID	MP	Requested Minor Route Deviation Description	FERC Assessment and Conclusion or Recommendation
NY-DE-185.000	84.6	Landowner reported a visual impact from clearing of a forested buffer.	According to our assessment of parcel NY-DE-185.000, the proposed route would impact a small corner on the northeast side of the parcel. Even with accounting for tree clearing for the route and an extra work space at Brick House Hill Road during construction, an approximate 125-foot-wide or greater forested buffer would remain after clearing, and this buffer would increase in size over the longer term as trees regrow within the former temporary extra work space outside of the permanent right-of-way. We conclude that the proposed route already minimizes impacts on the landowner's parcel.
NY-SC-024.003	96.8	Landowner reported likely impacts on wetlands on the property.	The proposed route proceeds along the far southern end of the parcel, away from access by Poplar Way Road, thereby minimizing impacts on the parcel overall. Field survey access was denied by the landowner. Based on our review of available desktop data, including topographic maps and the NYSDEC wetlands GIS database, no wetlands are located in this area. It appears that wetlands may be on an adjacent parcel about 70 feet to the northwest. We conclude that the proposed route already minimizes impacts on this parcel overall and to wetlands on this tract.
NY-SC-061.000	101.7	Landowner reported impacts on the parcel, a stream gorge, and trees.	We reviewed the proposed route across this parcel. Based on our evaluation, the route would cross the extreme rear corner of the parcel. Access to the residence is from the opposite end of the property off of Davis Road, and the proposed pipeline centerline is approximately 850 feet from the home. An undisturbed forested buffer (approximately 650 feet) would remain between the home and the construction right-of-way. The proposed route crosses perennial waterbody SC-1E-S102 and PFO wetland SC-1E-W103 (crossing length of 8 feet). We conclude that the proposed route already minimizes impacts on the landowner's parcel.
NY-SC-062.000	101.8	The landowner stated that the proposed route would cut his property in half.	Constitution adopted a reroute in August 2014 so that now the proposed route crosses the northwestern, back corner of the property instead of proceeding across the entire northern one-third of the property. We conclude that the current route adequately minimizes impacts on this parcel.
ALT-O-NY-SC-007.000	111	The landowner stated that the proposed pipeline could disrupt future development plans and that it should be moved south onto state lands. They also requested that if necessary, the route be situated on their property along the boundary.	Based on our assessment, we conclude that the proposed route is viable and that it is already located along the southeastern property boundary away from parcel access via Greenbush Road, thereby minimizing impacts on the parcel overall. We conclude that the proposed route already minimizes impacts on the landowner's parcel.

TABLE 3.4.3-2 (continued)
Status of Minor Route Variations Reported by Stakeholders After Issuance of the Draft EIS

Land Parcel ID	MP	Requested Minor Route Deviation Description	FERC Assessment and Conclusion or Recommendation
ALT-O-NY-SC-013.010	113.1	Landowners reported impacts on farmland, a small maple syrup operation, wetlands, and that the proposed route would cut the property in half.	We assessed the proposed route across this parcel. The route would enter the property in a northeasterly direction descending down a forested ridgeline, cross relatively flat fields adjacent to Bixby Road, cross in front of the home (centerline approximately 200 feet from the house), before exiting the property to the northwest and ascending up another slope. We included a recommendation in section 4.8.4 of the EIS that Constitution file an impact avoidance, minimization, or mitigation plan for specialty crops (which could include maple syrup producing trees); this would address those potential impacts. Given the slopes and topography on both sides of the parcel, the location of the house and the pond, we did not identify a viable route that was preferable to the proposed route.
ALT-Q-NY-SC-020.000	120.6	The technical school indicated that the proposed route was a threat to the safe operation of the school, it would interfere with students' training with heavy equipment, and that a proposed access road would also interfere with school operations.	Constitution stated that it would remove access road PAR-73A from the school's property thereby preventing any impacts associated with the road. In addition, Constitution adopted a minor route variation that moved the route away from the student training area about 180 feet farther to the north property line except in the vicinity of a ravine. **However, we conclude that a temporary safety fence and signage installed along the southern edge of the construction right-of-way and a permanent fence and signage installed along the southern edge of the permanent right-of-way could prevent inadvertent contact between a student training with heavy equipment and the pipeline.** We conclude that avoidance of this parcel is not practical due to development and homes along Highway 30A/30 and the number of new parcels that would be affected. Further, this revised route minimizes impacts on the school property to the extent possible. **Based on our analysis, we recommend that Constitution adopt the impact avoidance measure described above regarding safety fencing.**
ALT-Q-NY-SC-025.000 and ALT-Q-NY-SC-026.000	121.4	The landowner reported likely impacts on residential visual resources and setting.	Based on our assessment of tracts ALT-Q-NY-SC-025.000 and ALT-Q-NY-SC-026.000, the parcels are located adjacent to Interstate 88 in a non-forested area. Further, the subject home is adjacent to two existing natural gas pipelines. Given these factors, we conclude that the parcels have already been subject to the type of disturbance described in the attached letter and that the proposed route is preferable to other minor route variations.

For parcels noted in bold, we are recommending a minor route variation and/or a modification to the proposed construction method.

Based on our analyses, we conclude that the issues for 23 parcels (21 areas) have been adequately resolved, that a minor route variation is not needed, or we could not identify a viable reroute or construction method that was preferable to the proposed route (table 3.4.3-2). We have identified 12 new minor route variations (13 parcels) and/or modifications of construction methods for the remaining tracts that we conclude are preferable to the proposed route and/or construction methods. These minor route variations are depicted in appendix H-2B. In order to address landowner concerns for the 13 remaining tracts, **we recommend that:**

- **Constitution should adopt the minor route variations and/or modifications of construction methods for the tracts specified in table 3.4.3-2 of the EIS and as depicted in appendix H-2B. As part of its Implementation Plan, Constitution should file with the Secretary updated alignment sheets incorporating these minor route variations, and modifications of construction methods, with the Secretary <u>prior to the start of construction</u>.**

3.4.3.3 Minor Route Variations Assessed for Impacts on Agricultural Land

We assessed seven minor route variations based on requests to reduce construction or operational impacts on agricultural areas affecting 26 tracts of land prior to issuance of the draft EIS (appendix H-3). We evaluated these tracts with assistance from the NYSDAM. In many cases, the NYSDAM staff visited the sites of these potential variations in the field with both the landowner and Constitution. Constitution indicated that it had adopted all seven of the variations into its proposed route or otherwise resolved the landowners' concerns. However, prior to issuance of the draft EIS the NYSDAM indicated that issues remained unresolved for six tracts where construction activity may result in limited access to other farmable fields during construction or conflict with terms of agricultural conservation agreements. Based on our analysis, we conclude that potential impacts on three of these tracts have been resolved due to Constitution's adoption of a minor route variation (table 3.4.3-3). However, issues remain unresolved for the other three tracts. We have identified one new minor route variation for the remaining tracts (one minor route variation covers all three parcels) that we conclude is preferable to the proposed route. This minor route variation is depicted in a figure in appendix H-3A. In order to address landowner concerns for the three remaining tracts, **we recommend that:**

- **Constitution should adopt the minor route variation for tracts UA-NY-CH-015.001, NY-CH-015.000, and NY-CH-016.000 as specified in table 3.4.3-3 of the EIS and as depicted in appendix H-3A. Constitution should file updated alignment sheets incorporating this minor route variation with the Secretary <u>prior to the start of construction</u>.**

TABLE 3.4.3-3
Status of Minor Route Variations Assessed for Impacts on Agricultural Lands Prior to Issuance of the Draft EIS

Land Parcel ID	MP	Requested Minor Route Deviation Description	Constitution's Response to the Recommendation in the Draft EIS	FERC Assessment and Conclusion or Recommendation
UA-NY-CH-015.001	45.9	Deviation to minimize impact on farmland.	Constitution reported that it visited the site with the NYSDAM and the landowners in March 2014 and concluded that a possible reroute added length to the pipeline, did not adequately minimize impacts on farmland, and incorporated a severe angled PI. Further, Constitution stated that it would compensate the landowner for agricultural losses.	We further assessed a minor route variation that minimized impacts on the agricultural field by routing closer to the western property boundary. Additionally, the variation further minimized impacts on parcel NY-CH-016.000 as requested by the landowner. Although the variation would be about 300 feet longer than the corresponding proposed segment, the topography appears favorable and no new waterbodies, wetlands, or landowners would be affected. There would be one less (slight) PI, and it would avoid a NYSDOT-owned area along Melondy Hill Road that Constitution was concerned about. **Based on our analysis, we recommend that Constitution adopt this minor route variation.**
NY-CH-015.000, **UA-NY-CH-015.001, and NY-CH-016.000**	46.5	Deviation to minimize impact on farmland.	See above for parcel UA-NY-CH-015.001.	**See above for parcel UA-NY-CH-015.001**
NY-SC-156.000, NY-SC-152.000, and NY-SC-160.000	116.4	Deviation to minimize impact on farmland.	Constitution adopted a minor route variation developed with the NYSDAM to minimize impacts on agricultural fields and reported that the landowner issues had been resolved.	Based on available information, we conclude that a route modification is no longer necessary.

For parcels noted in bold, we are recommending a minor route variation and/or a modification to the proposed construction method.

3.5 ABOVEGROUND FACILITY SITE ALTERNATIVES

We evaluated the locations of the proposed aboveground facilities to determine whether environmental impacts would be reduced or mitigated by the use of alternative facility sites. Our evaluation involved inspection of aerial photography and mapping, as well as our own field work along the proposed projects' corridor and location. The aboveground facilities for the proposed projects include Constitution's Turnpike Road M&R Station (including one MLV site, communication tower, and pig launcher), the White Road Tie-in, the Sutton Road Tie-in, 9 other MLVs with collocated communication towers (proposed after issuance of the draft EIS), the Westfall Road M&R Station (which would include one additional MLV site and a pig receiver), and Iroquois' new compressor transfer station at the terminus of Constitution's pipeline.

Because the locations of the two proposed meter stations would be linked to the general location of the associated natural gas receipt and delivery points near the proposed Constitution project origin and at the pipeline terminus, the search for alternatives was constrained to sites adjacent to the existing Central Compressor Station and the existing Wright Compressor Station, respectively. We did not identify any reasonable alternative sites for the proposed meter stations that would offer a major environmental advantage to the proposed sites for these facilities.

The proposed locations of MLVs along the proposed pipeline route were partly determined based on DOT safety regulations that specify the maximum distance between sectionalizing block valves, and require that these facilities be located in readily accessible areas. Constitution proposed to move the location of MLV No. 6 in Delaware County, New York from MP 66.7 to MP 65.9 after issuance of the draft EIS. The location for the White Road Tie-in was determined by the location of the proposed non-jurisdictional White Road M&R Station and Miller Compressor Station facilities. Similarly, the location for the Sutton Road Tie-in was determined by the location of the proposed non-jurisdictional Sutton Road M&R Station. In addition, the proposed White Road Tie-in, Sutton Road Tie-in, communication towers, and MLVs would all be located wholly within Constitution's proposed pipeline operational right-of-way. Constitution did identify alternative sites for five of the proposed communication tower locations (Nos. 2, 4, 5, 6, and 7) where landowner easement negotiations are ongoing for the proposed sites. These alternative communication tower sites are all located relatively near (200 feet to 1,650 feet away) the corresponding proposed sites. No additional land disturbance beyond that already accounted for within the proposed pipeline's permanent right-of-way would be required for the White Road Tie-in, Sutton Tie-in, communication towers, or proposed MLVs, and we did not identify any site alternatives for these facilities that would be preferable to the proposed locations. Furthermore, as discussed above, the tie-ins and MLVs would only have minimal operational impacts on visual aesthetics, which did not necessitate the need for additional analysis. The potential visual impacts of the communication towers upon receptors are discussed in section 4.8.6 of the EIS.

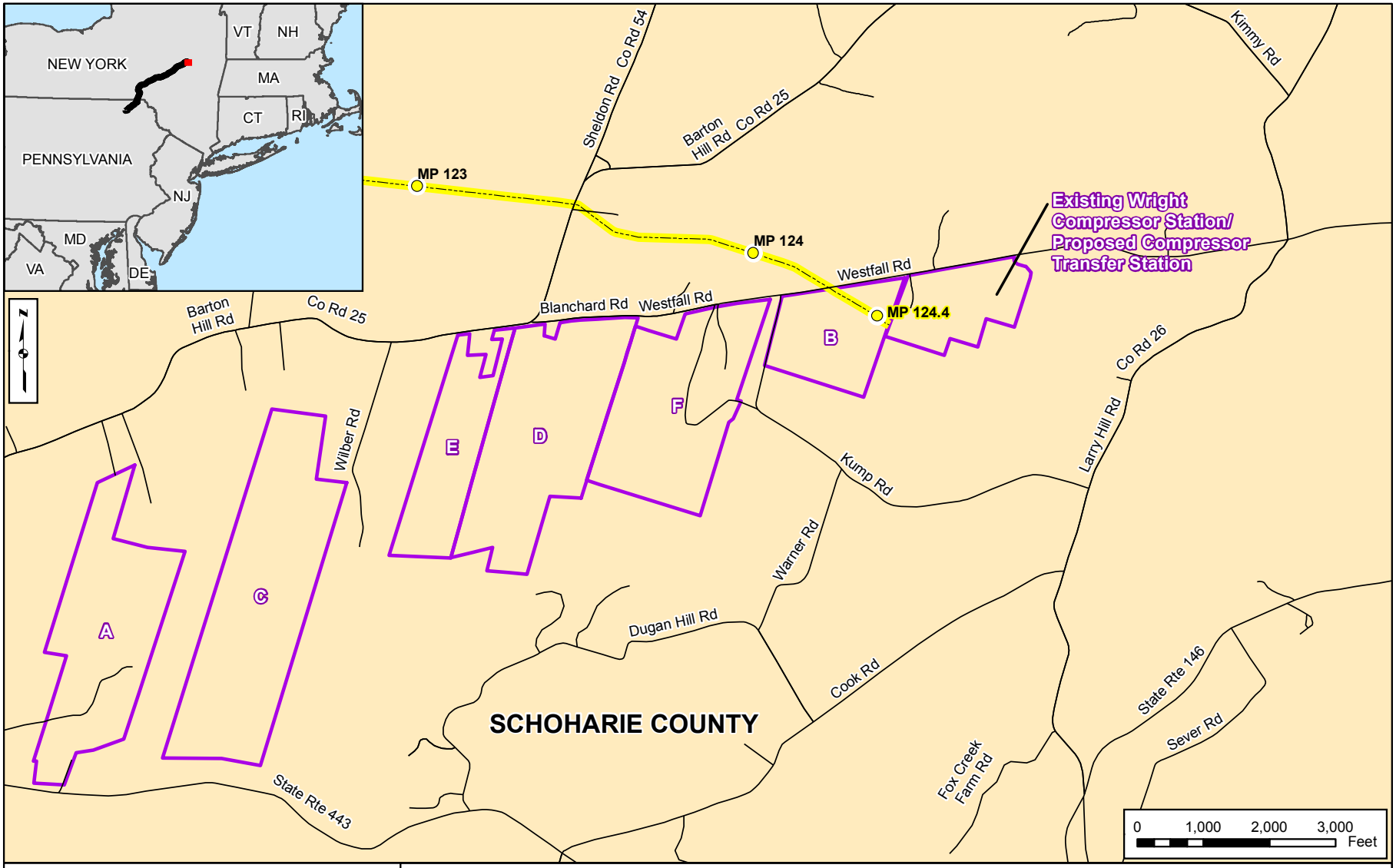
Early in the pre-filing process in May 2012, Constitution proposed to construct a new greenfield compressor station on an undeveloped parcel near the existing Wright Compressor Station. Constitution identified six potential locations for a new compressor station (figure 3.5-1). In February 2013, Constitution re-evaluated hydraulic modeling estimates and determined that the compression needed to deliver natural gas from the proposed pipeline into Iroquois' system could be met by modifying the existing Wright Compressor Station owned by Iroquois. These modifications eliminated the need for a new, greenfield compressor station. As such, Iroquois has proposed a new compressor transfer station adjacent to its existing compressor station and wholly on its own property that would provide Constitution with the needed compression. Furthermore, adding compression on Iroquois' property would allow it to optimize the new compressors in tandem with the existing facilities. Therefore, this resulted in a decrease in the total amount of compression needed to complete the project. Iroquois has proposed to construct

20,500 horsepower of compression, while Constitution would have been required to construct 32,000 horsepower of compression without Iroquois' optimizations.

Alternative locations for the proposed Iroquois compressor transfer station included six parcels in the vicinity of the existing Wright Compressor Station along Westfall Road or Barton Hill Road. While these parcels were potentially viable alternative sites, siting the compressor transfer station within the existing parcel owned by Iroquois would have several advantages. These advantages include:

- use of an existing industrially developed parcel;
- elimination of the need for survey permission and right-of-way acquisition from other private landowners;
- making use of existing compressor facilities where possible instead of construction of completely new facilities;
- reduced air emissions from reductions in total compression needed;
- use of existing access roads; and
- lack of impacts on environmental resources such as waterbodies, wetlands, agricultural land, residences, or cultural resources.

For these reasons, we concluded that construction of the compressor transfer station on the existing Iroquois parcel was preferable to construction on a previously non-industrial site.



Proposed 30-inch Diameter Natural Gas Pipeline Alignment

Compressor Station Alternatives

Figure 3.5-1

Compressor Station Site Alternatives

4.0 ENVIRONMENTAL ANALYSIS

This section describes the affected environment as it currently exists and discusses the environmental consequences of the proposed projects. The discussion is organized by the following major resource topics: geology; soils; water resources; wetlands; vegetation; wildlife and aquatic resources; special status species; land use, recreation, special interest areas, and visual resources; socioeconomics (including transportation and traffic); cultural resources; air quality and noise; reliability and safety; and cumulative impacts.

The environmental consequences of constructing and operating the projects would vary in duration and significance. Four levels of impact duration were considered: temporary, short-term, long-term, and permanent. Temporary impacts generally occur during construction with the resource returning to pre-construction condition almost immediately afterward. Short-term impacts could continue for up to 3 years following construction. Impacts were considered long-term if the resource would require more than 3 years to recover. A permanent impact could occur as a result of any activity that modifies a resource to the extent that it would not return to pre-construction conditions during the life of the projects. We considered an impact to be significant if it would result in a substantial adverse change in the physical environment.

The Applicants, as part of their proposals, developed certain mitigation measures to reduce the impact of the projects. In some cases, we determined that additional mitigation measures could further reduce the project's impacts. Our additional mitigation measures appear as bulleted, boldfaced paragraphs in the text of this section and are also included in section 5.2. We will recommend to the Commission that these measures be included as specific conditions in the Certificate the Commission may issue to the Applicants for these projects.

The conclusions in the EIS are based on our analysis of the environmental impact and the following assumptions:

- the Applicants would comply with all applicable laws and regulations;
- the proposed facilities would be constructed as described in section 2.0 of the EIS; and
- the Applicants would implement the mitigation measures included in their applications and supplemental submittals to the FERC and cooperating agencies, and in other applicable permits and approvals.

4.1 GEOLOGY

4.1.1 Geologic Setting

Constitution's pipeline would cross three sections of the Appalachian Plateau physiographic province: Glaciated Low Plateau, Southern New York, and Catskills sections. Table 4.1.1-1 describes the geology and topographic relief of these physiographic sections (Sevon 2000). Iroquois' project would be located in the Southern New York physiographic province.

TABLE 4.1.1-1 Physiographic Section and Geologic Formation along the Proposed Projects				
State/County	**Physiographic Province**	**Physiographic Section**	**Geological Formation/ Stratigraphic Unit**	**Local Relief**
Pennsylvania				
Susquehanna	Appalachian Plateaus	Glaciated Low Plateau	Till underlain by sandstone shale.	High
New York				
Broome	Appalachian Plateaus	Southern New York	Till underlain by sandstone, shale and limestone.	High
Chenango	Appalachian Plateaus	Southern New York	Till underlain by sandstone, shale and limestone.	High
Delaware	Appalachian Plateaus	Catskill	Till underlain by sandstone and shale.	Very High
Otsego	Appalachian Plateaus	Southern New York	Till underlain by sandstone, shale and limestone.	Very High
Schoharie	Appalachian Plateaus	Southern New York[a]	Till underlain by sandstone, shale and limestone.	Very High

Sources: Sevon 2000; Fenneman, NM., and Johnson, D.W. 1946; Cadwell 1986

[a] Iroquois' project would be located within this physiographic province and section.

Pennsylvania

The proposed pipeline alignment in Susquehanna County, Pennsylvania consists of Mesoproterozoic metamorphic rock, which is overlain by Devonian-aged sedimentary rock. The Devonian sedimentary bedrock is made up of sandstones, shale, and limestone (Barnes and Sevon 2002). The landscape in the project area was shaped by the Late Wisconsinan glaciation that occurred approximately 22,000 to 17,000 years ago. The majority of the proposed pipeline route in Pennsylvania is covered by moderately thick sandy Olean till or very thin Olean till, the majority of which has been identified as Wisconsinan Till (Sevon et al. 1999). There is very little preserved vertical stratigraphy along the proposed pipeline route (Sevon et al. 1999). Table 4.1.1-2 presents the cumulative length of the surficial geology crossed by the proposed pipeline alignment. Elevation change and topography along the proposed pipeline route are characterized by high relief with an approximately 800 feet elevation change from approximately 1,000 to 1,800 feet above mean sea level. The topography of Constitution's project area includes rounded hills and valleys. Geologic structures and surficial geology along the proposed pipeline route in Pennsylvania includes low-amplitude folds, glacial and re-sedimented till, glacial deposits, swamp, and peat bogs (Sevon 2000).

New York

The bedrock underlying the New York portion of the pipeline project consists of deeply buried Mesoproterozoic metamorphic rock, the majority of which is overlain by till, recent alluvium, kame deposits, or is exposed bedrock. Table 4.1.1-2 displays the cumulative length of the surficial geology crossed by the proposed pipeline. The topography and surficial geology of Constitution's project area in New York was affected by glaciation that took place approximately 20,000 years ago, and glacial deposits make up much of the surficial geology in this area. Broome, Chenango, and Schoharie Counties are characterized by high relief with approximately 600 to 1,000 feet in elevation change across the proposed pipeline route. These counties are also characterized by flat-topped hills and deeply dissected valleys. Shallow bedrock within these counties consists of alternating strata of sandstone and shale. Delaware County contains very high relief with a more than 1,000 feet in elevation change. Topography in

Delaware County is similar to that of the other counties in New York. All of the counties crossed by the proposed pipeline in New York have relatively similar geology. The proposed pipeline route through New York has elevations ranging from approximately 600 to 2,200 feet above mean sea level. Elevations in Otsego County range from 970 to 2,430 feet above mean sea level.

TABLE 4.1.1-2
Surficial Geology Crossed by the Proposed Pipeline

State	Length (miles)	Geologic Unit
Pennsylvania		
	0.7	Alluvium
	1.7	Bedrock (sandstone, siltstone, and shale)
	0.2	Fill
	6.8	Sandstone and Shale Bedrock
	0.1	Wetland
	0.1	Kame Deposits
	15.8	Till
New York		
	5.8	Bedrock (sandstone, siltstone, and shale)
	3.6	Kame deposits
	1.2	Kame moraine
	0.2	Lacustrine sand
	0.4	Lacustrine silt and clay
	2.4	Outwash sand and gravel
	4.3	Recent alluvium
	81	Till
	0.4	Till Moraine
Project Total	**124.4**	

Sources: Sevon 2000; Cadwell 1986

Aboveground Facilities

The Turnpike Road M&R Station, and the Westfall Road M&R Station and Iroquois' compressor station would be located in the Glaciated Low Plateau Section and Southern New York Section of the Appalachian Plateau Physiographic Province, respectively. Topography surrounding the proposed location of both M&R Stations and the compressor station is characterized as low relief with elevation changes of less than 100 feet. Surficial geology at the Turnpike Road M&R Station site is made up of glacial and re-sedimented till. Glacial till with small areas of kame, kame-moraine, and alluvial deposits make up the surficial geology at the Westfall Road M&R Station site and the proposed compressor station. Bedrock at the Turnpike Road M&R Station site consists of various Devonian age sandstones, siltstones, and shales, while the bedrock geology of the Westfall Road M&R Station and compressor station sites is made up of sedimentary shale, siltstones, sandstone, and limestone.

Contractor Yards and Access Roads

The proposed access roads and contractor yards are in the same general vicinity as the proposed pipeline discussed above.

4.1.1.1 Bedrock Geology

Pennsylvania

Information on the bedrock geology in Pennsylvania was provided by the Pennsylvania Department of Conservation and Natural Resources (PADCNR) Bureau of Topographic and Geologic Survey. The majority of the bedrock within the Project areas in Pennsylvania is the Devonian age Catskill Formation consisting of grayish-red sandstone, siltstone, and shale.

New York

Information on bedrock geology in New York was obtained from geologic maps by Rickard and Fisher (1970). Bedrock within the project areas in New York consists of shale, siltstones, sandstone, limestone, and dolostone. The majority of the bedrock is made up of four groups: the Hamilton group, the Genesee group and Tully limestone, the Sonyea Group, and the West Falls group. The Hamilton group is made up of shale, sandstone, and siltstone and covers 17.7 miles of the proposed alignment. The pipeline would cross 38.2 miles of the Genesee group and Tully limestone and 19.3 miles of the Sonyea group, both of which consists of shale, sandstone, and conglomerate. Lastly, the proposed route crosses 17.1 miles of the West Falls group, which consists of sandstone, shale, black shale, siltstone, and conglomerate. The terminus of the pipeline would also cross small portions of the Onondaga Limestone and Helderberg Group. These rocks consist of shale, limestone, siltstone, and dolostone. Through New York it is anticipated that about 37.4 miles of the pipeline would traverse through shallow bedrock terrain (within 5 feet of ground surface) (see section 4.1.3.7).

4.1.1.2 Geotechnical Investigations for the Trenchless Crossings

Constitution performed geotechnical feasibility studies to evaluate subsurface conditions at the proposed trenchless crossing sites. The purpose of these investigations was to confirm the understanding of the geology of the immediate area and to help design each trenchless crossing. Constitution has conducted or is currently conducting geotechnical investigations along the proposed pipeline route. These geotechnical investigations would help determine the feasibility of using a trenchless crossing method. Constitution is currently proposing to cross these 21 locations via 13 trenchless crossings. Geotechnical studies at three locations have been completed, and Constitution determined that one site would not require a geotechnical investigation due to the short crossing distance. Studies for the remaining nine sites are either on-going or not started due to lack of site access. Data analysis for two of the completed locations (Lake View Road at MP 15.3 and Schoharie Creek at MP 119.8) has determined that the proposed crossing methods (HDD and Direct Pipe, respectively) are feasible. However, following issuance of the draft EIS, Constitution reported that an HDD crossing would not be feasible at MP 15.3. Constitution is currently proposing to cross this location via a dry open-cut. Constitution has conducted the geotechnical survey for the Middle Brook site (MP 87.8) but has not finalized the report. Since Constitution has not provided the results of the geotechnical studies for all proposed trenchless crossings, **we recommend that:**

- **<u>Prior to construction</u>, Constitution should file with the Secretary all outstanding geotechnical feasibility studies for trenchless crossing locations.**

Table 4.1.1-3 summarizes the results of the geotechnical investigations that have been conducted to date for each of the proposed trenchless crossings.

TABLE 4.1.1-3
Summary of Geotechnical Investigations for Trenchless Construction Methods Along the Proposed Pipeline Route

Location	Approximate Milepost	Method	Crossing Length (feet)	Feature Avoided	Status
Sutton Road Bore Crossing	9.2	CB	140	Avoidance of Waterbody: • SU-1D-S230	Design complete, successful CB anticipated based on minimal crossing distance.
State Route 492 Road Bore Crossing[a]	9.9	CB	66	Avoidance of Waterbody: • SU-1C-S029G	Design complete, successful CB anticipated based on minimal crossing distance.
Rockwell Road Bore Crossing[a]	22.6	CB	40	Avoidance of Waterbody: • SU-1C-S282	Design complete, successful CB anticipated based on minimal crossing distance.
Baker Road Bore Crossing	38.7	CB	55	Avoidance of Wetland and Waterbody: • BR-1Q-S209 • BR-1H-W240	Design complete, successful CB anticipated based on minimal crossing distance.
Melondy Hill Road Bore Crossing	45.3	CB	60	Avoidance of Waterbody: • CH-1A-S048	Design complete, successful CB anticipated based on minimal crossing distance.
Bennettsville Creek[a]	47.7	DP	≤900	Avoidance of Wetlands and Waterbodies: • CH-1A-W063 • CH-1A-S010 • CH-1C-010B • CH-1C-010C • CH-1H-010D • CH-1H-010E	Constitution reported an HDD crossing would be infeasible. The crossing method was changed from an HDD to a DP.
Rathbun Hill Road Bore Crossing	79.4	CB	55	Avoidance of Waterbody: • DE-XX-S79.36	Design complete, successful CB anticipated based on minimal crossing distance.
NYSDEC Wetland DN-11[a]	85.8	DP	≤900	Avoidance of Wetland: • DE-1N-W156A • DE-XX-W85.72	Constitution reported an HDD crossing would be infeasible. The crossing method changed from an HDD to a DP.
Middle Brook[a]	87.8	DP	≤900	Avoidance of Highway 23 and Wetlands and Waterbodies: • DE-1T-W051 • DE-1C-050A • DE-1P-W050 • DE-1P-W052 • DE-1T-W053 • DE-1T-W055 • DE-1C-051A • DE-1T-S051 • DE-1T-S052	Constitution reported an HDD crossing would be infeasible. The crossing method changed from an HDD to a DP.

TABLE 4.1.1-3 (continued) Summary of Geotechnical Investigations for Trenchless Construction Methods Along the Proposed Pipeline Route					
Location	**Approximate Milepost**	**Method**	**Crossing Length (feet)**	**Feature Avoided**	**Status**
Schoharie Creek[a]	119.8	DP	744	Avoidance of Smith Road, Holiday Way and Waterbody: • SC-1Q-S289	Conceptual design and feasibility study complete. DP is judged feasible. Final design pending.

HDD = Horizontal Directional Drill, DP – Direct Pipe, CB = Conventional Bore

[a] – Constitution has proposed a re-route in this area. See section 3.4.3.

4.1.2 Mineral Resources

Mineral resources identified in the vicinity of the proposed pipeline include a small number of oil and gas wells, as well as aggregates including bluestone, sandstone, and slate (U.S. Geological Survey [USGS] 2012a, 2012b). New York and Pennsylvania are the only two states in which bluestone, a bluish-color, layered feldspathic sandstone is produced for constructing patios, walkways, fences, and countertops (Barnes and Smith 2001). Information regarding mineral resources in Pennsylvania was obtained though the PADEP Bureau of Mining Programs (PADEP 2013a), the PADEP mining facility database (PADEP 2013b) and the Pennsylvania Spatial Data Access Geographic Information System data layer for Industrial Mineral Mining Operations (PASDA 2013a, 2013b, 2013c). Additional information on proposed mining operations was provided by the Pennsylvania Office of Active and Abandoned Mine Operations (Houtz 2013) and the Pottsville District Mining Office (Walck 2013). Information regarding mineral resources in the state of New York came from the NYSDEC, Division of Mineral Resources, GIS data layer for Mining Operations, NYSDEC Division of Mineral Resources Mined Land Database (NYSDEC 2013a, ESOGIS 2013).

4.1.2.1 Mining

Pennsylvania

Mineral resources within 0.25 mile of the proposed pipeline alignment in Pennsylvania consist mainly of bluestone, sandstone, and slate. Of all the nonfuel mineral resources produced in Pennsylvania, crushed stone, sand and gravel aggregate is the most significant in terms of both tons mined and dollars earned (Barnes and Smith 2001). In total, 34 active, inactive, or proposed mining operations were identified within 0.25 mile of the proposed pipeline, contractor yards, access roads, and M&R station in Susquehanna County, Pennsylvania (PASDA 2013a, 2013b, 2013c). The closest mineral resource to the proposed pipeline is a bluestone surface mine located 171 feet from MP 5.3. Table 4.1.2-1 identifies mineral resources within 0.25 mile of the proposed project.

TABLE 4.1.2-1 Mineral Resources within 0.25 miles of the Constitution's Project				
Component/County/MP	**Type**	**Commodity**	**Status**	**Distance from Pipeline Facility (feet)**
PIPELINE				
Susquehanna County				
0	Surface Mine	Sandstone	Inactive	517
2.18	Oil/Gas Well	Gas	Active	940
2.18	Oil/Gas Well	Gas	Active	911
2.18	Oil/Gas Well	Gas	Active	925
2.18	Oil/Gas Well	Gas	Active	897
2.75	Surface Mine	Bluestone	Active	385
3.47	Oil/Gas Well	Gas	Active	478
3.47	Oil/Gas Well	Gas	Active	458
3.47	Oil/Gas Well	Gas	Active	438
3.47	Oil/Gas Well	Gas	Active	418
3.47	Oil/Gas Well	Gas	Active	498
4.37	Oil/Gas Well	Gas	Active	348
4.37	Oil/Gas Well	Gas	Active	367
4.37	Oil/Gas Well	Gas	Active	420
4.37	Oil/Gas Well	Gas	Active	381
4.37	Oil/Gas Well	Gas	Active	400
5.33	Surface Mine	Bluestone	Active	171
5.55	Surface Mine	Bluestone	Proposed	307
5.8	Surface Mine	Bluestone	Active	1,503
9.45	Oil/Gas Well	Gas	Active	453
9.45	Oil/Gas Well	Gas	Active	435
9.46	Oil/Gas Well	Gas	Inactive	428
9.46	Oil/Gas Well	Gas	Active	428
9.54	Surface Mine	Sandstone	Active	1,090
10.72	Surface Mine	Slate	Active	897
12.54	Oil/Gas Well	Gas	Active	895
12.54	Oil/Gas Well	Gas	Active	876
12.54	Oil/Gas Well	Gas	Active	856
13.17	Oil/Gas Well	Gas	Active	1,343
14.02	Oil/Gas Well	Gas	Active	526
14.02	Oil/Gas Well	Gas	Active	500
14.05	Surface Mine	Bluestone	Active	969
14.73	Oil/Gas Well	Gas	Active	754
16.64	Surface Mine	Sandstone	Active	1,513
79	Surface Mine	Sandstone	Active	909
19.15	Surface Mine	Sandstone	Active	1,012
19.17	Surface Mine	Sandstone	Active	514

TABLE 4.1.2-1 (continued) Mineral Resources within 0.25 miles of the Constitution's Project				
Component/County/MP	**Type**	**Commodity**	**Status**	**Distance from Pipeline Facility**
19.74	Surface Mine	Bluestone	Active	787
21.58	Surface Mine	Bluestone	Active	324
22.9	Surface Mine	Bluestone	Active	325
Broome County				
28.77	Surface Mine	Sand & Gravel	Inactive	1,537
31.36	Surface Mine	Sand & Gravel	Inactive	1,481
37.12	Oil/Gas Well	Gas	Inactive	798
37.18	Oil/Gas Well	Gas	Inactive	1,276
38.68	Oil/Gas Well	Gas	Inactive	1,162
Chenango County				
45.36	Surface Mine	Sand & Gravel	Inactive	1,138
Delaware County				
51.84	Surface Mine	Bluestone	Active	821
52	Surface Mine	Bluestone	Active	696
ACCESS ROADS				
Susquehanna County				
1.74/PAR1	Surface Mine	Bluestone	Active	1,001
1.74/PAR1	Surface Mine	Bluestone	Active	988
1.74/PAR1	Surface Mine	Bluestone	Proposed	989
7.25/PAR6	Surface Mine	Shale	Proposed	1,265
9.46/PAR7	Surface Mine	Bluestone	Active	1,252
12.20/PAR10	Surface Mine	Bluestone	Proposed	1,310
12.20/PAR10	Surface Mine	Bluestone	Proposed	955
12.20/PAR10	Oil/Gas Well	Gas	Active	628
12.20/PAR10	Oil/Gas Well	Gas	Active	604
12.20/PAR10	Oil/Gas Well	Gas	Active	604
12.20/PAR10	Oil/Gas Well	Gas	Active	660
12.20/PAR10	Oil/Gas Well	Gas	Active	653
13.37/PAR11	Surface Mine	Bluestone	Active	182
13.37/PAR11	Surface Mine	Bluestone	Active	152
13.37/PAR11	Surface Mine	Bluestone	Active	171
Broome County				
28.48/PAR22	Surface Mine	Sand & Gravel	Inactive	1,109
58.85/PAR37	Surface Mine	Sand & Gravel	Inactive	1,476
69.98/PAR44	Surface Mine	Sand & Gravel	Inactive	1,045
CONTRACTOR YARD				
Susquehanna County				
Spread One Contractor Yard	Surface Mine	Bluestone	Active	579
Spread One Contractor Yard	Surface Mine	Bluestone	Active	1,352

TABLE 4.1.2-1 (continued) Mineral Resources within 0.25 miles of the Constitution's Project				
Component/County/MP	**Type**	**Commodity**	**Status**	**Distance from Pipeline Facility**
Spread One Contractor Yard	Surface Mine	Bluestone	Inactive	1,138
Spread One Contractor Yard	Surface Mine	Bluestone	Active	563
Spread One Contractor Yard	Surface Mine	Bluestone	Active	835
Spread One Contractor Yard	Surface Mine	Bluestone	Active	925
Spread One Contractor Yard	Surface Mine	Bluestone	Active	1,030
Spread One Contractor Yard	Surface Mine	Bluestone	Active	57
Spread One Contractor Yard	Surface Mine	Bluestone	Active	852
Otsego County				
Spread 4a Contractor Yard	Surface Mine	Sand and Gravel	Active	Within Contractor Yard Boundary
Spread 4a Contractor Yard	Surface Mine	Sand and Gravel	Inactive	145

Sources: PASDA 2013a, 2013b, 2013c, NYSDEC 2013a, 2013b, ESOGIS 2013

New York

Mineral resources within 0.25 mile of the proposed pipeline consist mainly of bluestone, sand, and gravel. Ten mining operations were identified within 0.25 mile of the proposed pipeline, contractor yards, and access roads in New York. According to the NYSDEC Division of Mineral Resources there are no proposed surface mines within 0.25 mile of Constitution's project in New York (NYSDEC 2013a, Mahoney 2013, and Rodriquez 2013). Table 4.1.2-1 identifies mineral resources within 0.25 mile of the proposed pipeline, access roads, and aboveground facilities. The NYSDEC Division of Mineral Resources did not report any mining operations in proximity to Iroquois' proposed compressor station facilities (Evans 2013).

Oil and Gas Production

In Susquehanna County, Pennsylvania there are 29 active and 1 inactive oil and gas operations within 0.25 mile of Constitution's project (including contractor yards and access roads). The closest active location to the proposed pipeline in Susquehanna County is 348 feet away. Three inactive gas wells have been identified within Constitution's project area in New York (ESOGIS 2013). Oil and gas wells within 0.25 mile of the proposed pipeline are identified in table 4.1.2-1.

4.1.3 Geologic Hazards

Geologic hazards including seismicity (e.g., earthquakes), surface faults, soil liquefaction, landslides, flash flooding, karst topography, shallow bedrock, and blasting were evaluated for the proposed projects. These hazards are discussed in the following sections. Conditions necessary for the development of other geologic hazards, including avalanches and volcanism, are not present in the project area and therefore not discussed.

4.1.3.1 Seismicity

The majority of significant earthquakes around the world are associated with tectonic subduction zones, where one crustal plate is overriding another (e.g., the Japanese islands), where tectonic plates are

sliding past each other (such as in California), or where tectonic plates are converging (e.g., the Indian Sub-Continent). Unlike these highly active tectonic regions, the east coast of the United States is a passive tectonic plate boundary located on the "trailing edge" of the North American continental plate, which is relatively seismically quiet. Earthquakes, however, do occur in the area of the projects, largely due to trailing edge tectonics and residual stress release from past orogenic (i.e., mountain building) events.

The shaking during an earthquake can be expressed in terms of the acceleration due to gravity. Based on USGS seismic hazard mapping, the proposed projects are in an area where peak horizontal ground accelerations of 6 to 9 percent of the force of gravity (g) along the proposed alignment have a 2 percent chance of being exceeded in 50 years (Petersen 2011). Peak horizontal ground accelerations between 1 and 3 percent g have a 10 percent chance of being exceed in 50 years (Petersen 2011). Peak ground accelerations less than 10 percent g are considered as having little to no potential for damage. In general, modern electric arc welded steel pipelines 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 (MMI) of VIII (O'Rourke and Palmer 1994a).

Information for earthquakes in Pennsylvania was provided by Earthquake Epicenters mapping from 1724 to 2003 and the USGS Lamont Doherty Earth Observatory (Faill 2004, Lamont-Doherty Earth Observatory 2013). There was one seismic event with a magnitude of 1.8 on the Richter scale in Susquehanna County in 1982. The largest recorded seismic event in Pennsylvania took place on September 25, 1998 in Crawford County (located in extreme northwestern Pennsylvania, approximately 225 miles from Constitution's project) and registered 5.2 on the Richter scale. An event such as this today could cause considerable damage to poorly built structures, but only negligible damage to buildings of good design and construction.

Information for seismicity in New York was provided by the USGS and Lamont-Doherty Cooperative Seismographic Network (Lamont-Doherty Earth Observatory 2013). The largest earthquake recorded in New York registered 5.8 on the Richter scale and took place in 1944 in St. Lawrence County (located in extreme northern New York, approximately 150 miles from the proposed projects). There have been no recorded seismic events within Broome and Chenango counties. In Delaware County three seismic events were recorded which were less than 2.9 on the Richter scale. In Schoharie County six seismic events were recorded that were below 2.9 on the Richter scale, and one event that was 4.1 on the Richter scale occurred in 1991 (Lamont-Doherty Earth Observatory 2013). The Schoharie County All-Hazards Mitigation Plan supplied no records of earthquakes resulting in damage (Schoharie County Hazard Mitigation Committee et al. 2006). Seismicity in the area of the proposed projects including aboveground facilities is considered low and the potential for seismic activity to affect the operational integrity of the pipeline would be low.

4.1.3.2 Faults

Faults, fractures in rock where there has been displacement, can cause seismic events. Tectonic faulting is not known along the proposed pipeline route but small seismic events have been recorded. For a fault to be considered active, displacement must have taken place in the last 10,000 years (USGS 2008).

In Pennsylvania the proposed pipeline would not intersect any known, mapped, or inferred fault lines (Alexander et al. 2005). Mapped faults can be found in northwestern and southeastern Pennsylvania, and inferred faults to the southeast and northwest but none of these are in proximity to the proposed pipeline. In New York, there are two faults of note within the area of the proposed projects. The Sprakers (near MP 105.8) and Nose (near MP 110.3) Faults are two parallel faults which run north to south in Schoharie County (Isachsen and McKendree 1977). The Susquehanna River/Scranton Gravity

High Fault intersects the proposed pipeline route at several locations in Pennsylvania and New York. According to the Jacobi (2002), this fault may have been active 420 million years ago. The Susquehanna River/Scranton Gravity High Fault intersects the pipeline at MPs 78.4, 58.1, 51.4, 44.8, 44.4, and 38.2. Geologic mapping of New York from 2002 identified additional proposed faults and lineaments (Jacobi 2002). Lineaments are straight line or gently curving topographical features that are generally expressed as ridges or depressions. The New York State Geologist (Smith 2012) stated that no recent activity has been observed in the area of the projects that is associated with the faults and lineaments shown in the 2002 mapping. According to research provided by GeoEngineers, the proposed pipeline does not cross any recognized Quaternary faults based upon review of the USGS Quaternary Fold and Fault Database (USGS 2012c).

There are seven class C and D features which are crossed by the proposed pipeline route. Class D features are defined by the USGS as not to be seismogenic. Class C features do not have enough sufficient data to classify them as either class A or class B faults. Class A faults have geologic evidence that demonstrates the existence of a quaternary fault of tectonic origin either exposed by mapping or inferred deformational features. Class B faults have geologic evidence that is indicative of a quaternary deformation but the fault is not deep enough to be a potential source for earthquakes or the evidence available is too significant to assign a fault as class C but not enough to assign as class A (USGS 2013a). There are no class C features within 40 miles of the proposed projects (USGS 2013b).

4.1.3.3 Soil Liquefaction

Soil liquefaction is a phenomenon often associated with seismic activity in which saturated, non-cohesive soils temporarily lose their strength and liquefy (i.e., behave like viscous liquid) when subjected to forces such as intense and prolonged ground shaking. Areas susceptible to liquefaction may include soils that are generally sandy or silty and are generally located along rivers, streams, lakes, and shorelines or in areas with shallow groundwater (University of Washington 2000). There have been no documented occurrences of soil liquefaction from seismicity in the project area, and due to the low potential for seismicity; hazards from soil liquefaction are not anticipated.

4.1.3.4 Landslides

Landslides are defined as the movement of rock, debris, or soil down a slope. Slope failure causing a landslide can be initiated by precipitation, seismic activity, slope disturbance due to construction or other activity, or a change in groundwater conditions, such as a seasonal high groundwater table. Construction factors that may increase the potential for slope failure could include trenching along slopes and the burden of construction equipment on unstable surfaces.

Information on landslides incidence and susceptibility was provided by a digitally compiled Landslide Overview Map of the Conterminous United States (Radbruch-Hall et al. 1982, Godt 2002). Several locations were identified as having the susceptibility for landslides within the vicinity of the proposed pipeline. Approximately 25 miles of the pipeline route in Pennsylvania is considered to have a moderate to low susceptibility to landslides. In New York, approximately 15 miles of the proposed alignment has a moderate to low susceptibility to landslides, and the remaining 83 miles has a low susceptibility (Godt 2002). Table 4.1.3-1 provides the location and landslide susceptibility and locations of these areas.

TABLE 4.1.3-1 Landslide Potential in the Project Area					
State	**County**	**Start Milepost**	**End Milepost**	**Total Distance**	**Susceptibility to Landsliding[a]**
Pennsylvania	Susquehanna	0	25.2	25.24	Moderate/Low
New York	Broome	25.2	40.0	14.71	Moderate/Low
		40.0	42.2	2.29	Low
	Chenango	42.2	50.5	8.3	Low
	Delaware	50.5	93.5	43	Low
	Schoharie	93.5	124.4	30.9	Low

Sources: Godt 2002.

[a] Low < 1.5% of area affected by landslides
Moderate 1.5% to 15% of area affected by landslides
High > 15% of area affected by landslides

Constitution hired a geotechnical consulting firm to provide a geotechnical analysis of the entire proposed pipeline alignment including several potential steep slope and karst areas crossed by the proposed pipeline. Constitution's geotechnical firm identified several areas along the proposed pipeline route that would require special construction procedures (table 4.1.3-2). Constitution's geotechnical firm provided site-specific construction recommendations and mitigation measures for several steep slope and karst areas. However, Constitution has not indicated if it would adhere to these mitigation measures; therefore, to adequately assess the impacts on these karst and steeply sloped areas, **we recommend that:**

- **Constitution should adopt the recommendations and mitigation measures for steep slope and karst areas provided in the Geological Reconnaissance Memorandum dated October 4, 2013.**

Constitution identified a potential landslide hazard at the proposed crossing of Starrucca Creek (MP 21.9). Constitution has since revised the proposed route through this area so as to avoid the potential landslide hazard.

A well-defined landslide feature was identified in the area of MP 30.3. This site has been established by mature trees and there is very little evidence of recent movement. However, this feature has been identified as an area with a high potential for landslide activity. In the draft EIS, we recommended that Constitution file the results of a formal slope stability study for the area at MP 30.3. However, following issuance of the draft EIS, Constitution proposed a minor route change that would avoid the landslide hazard at MP 30.3. Therefore, the recommendation was no longer applicable and removed from the final EIS.

During construction, EIs and construction crews would be responsible for identifying potential landslide conditions and would utilize geologic hazard maps included in Constitution's state-specific ECPs. Constitution would employ a geotechnical specialist to assess potential landslide locations, if necessary. Due to the specialized nature of identifying landslide areas and Constitution's lack of a firm commitment, **we recommend that:**

- **Constitution should employ a geotechnical expert to identify and develop mitigation measures (where applicable) regarding potential landslide hazards during construction of the pipeline.**

TABLE 4.1.3-2 Identified Measures for Steep Slopes Associated with the Constitution Pipeline Project		
Milepost	**Description**	**Recommended Measures**
1.2 – 1.3	Steep slope at an old quarry	Prepare to work on unstable soils adjacent to a rock wall and rock overhang. Protect workers and nearby public road from falling and rolling rock. Prepare rock management plan and blasting plan if necessary.
8.2 - 8.6	Possible landslide/recent fill	Re-grade or remove fill from foreign pipeline; bury proposed pipeline in native ground with a minimum of 3 feet of cover.
8.6 - 8.9	Possible older landslide	Access restrictions limited complete evaluation.
10.0 – 10.1	Steep slope adjacent to stream with potential minor channel migration	Bury pipeline 3 feet deeper than normal within the channel. Provide bank protection, such as rip-rap or bury the pipeline deeper.
17.0 – 17.1	Moderate to steep slopes/partial access	Access restrictions limited complete evaluation.
26.5 – 27.5	Steep side slopes and potentially loose material	Trench shoring may be required. Falling rocks may impact construction.
30.3 – 30.4	Steep slope, landslide and potential channel migration	Re-route to the east or install the pipeline below the depth of landslide and utilize seepage barriers.
31.3 – 31.6	Steep side slope/ partial access	Access restrictions limited complete evaluation. Avoid stockpiling soil on or near slopes greater than 50%. Manage stormwater and seepage.
32.1 – 32.2	Moderate to steep slopes/ side slopes/ partial access	Access restrictions limited complete evaluation.
32.5 – 32.7	Moderate to steep slopes	No special recommendations.
45.3	Steep slope	Compact backfill, install jute matting and waddles at 10-15 foot spacing, add articulated concrete mats if soils ravel.
46.8 – 47.0	Moderate slopes	No special measures.
45.3 – 45.4	Steep slope	Compacted fill, reinforced fill.
55.0 – 55.1	Steep slope	No special measures.
78.9 – 79.1	Steep side slope and seepage	Avoid stockpiling soil on or near slopes greater than 50%. Manage stormwater and seepage.
81.2 – 81.6	No access	
94.4 – 94.5	Steep slope	No special measures.
109.0 – 109.2	Moderate to steep side slope and drainage paths	Avoid stockpiling soil on or near slopes greater than 50%. Provide rock-lined swales for drainage.
114.4 – 114.7	Moderate to steep side slopes	No special measures.
116.3 – 116.8	Very steep slope with indications of shallow slope movement	Compacted fill reinforced fill/ slop stabilization.
117.4 – 117.5	Man-made pond (not karst)	No special measures.

The proposed pipeline crosses several areas of steep terrain where slopes or side slopes are greater than 30 percent. In Pennsylvania, approximately 2 miles of steep slopes (and 3.8 miles of steep side slopes [15 to >30 percent]) would be crossed by the pipeline. The New York portion contains 2.8 miles of steep slopes and 9.1 miles of steep side slopes (15 to >30 percent). Steep slopes and side slopes are discussed in section 2.3.2.9. Constitution would implement best management practices (BMPs) on a site-specific basis as specified in its state-specific ECPs to address slope stability and construction on steep slopes. The BMPs that would be implemented are based on past experience and the measures identified in the FERC Plan. Constitution's BMPs would be submitted to regulatory agencies for approval before construction activities begin. Constitution states that any construction that would take

place in a high risk or known landslide area would be monitored by over flights and on-the-ground routine inspections. In addition, we have recommended above that Constitution adhere to the site-specific construction recommendations and mitigation measures for several steep slope and karst areas provided in the Geological Reconnaissance Memorandum dated October 4, 2013.

Iroquois' project is in an area of low landslide incidence and no steep slopes (Godt 1997). Additionally, Iroquois indicated that it did not anticipate the need to re-contour slopes during restoration based on the generally level nature of the site.

4.1.3.5 Flash Flooding

The National Weather Service defines a flash flood as a flood caused by heavy or excessive rainfall in a short period of time, generally less than 6 hours (NWS 2010). The potential for flash flooding to occur and significantly impact construction or operation of the proposed pipeline is low, but possible on streams in the area of the proposed pipeline. The greatest potential for flash flooding to occur along waterbodies in the area of Constitution's project is associated with high intensity short duration storm events, which are usually accompanied by significant precipitation over a short period of time. The National Weather Service Flash Flood Guidance estimates that the amount of rainfall needed to generate flash flooding in the counties crossed by the proposed projects is 1.5 to 1.7 inches per hour (NOAA 2013a). The potential for higher water levels during flash flooding events may be increased by the clearing of vegetation and soil disturbance caused by the construction of the pipeline; however, any such impacts would be minimized by the requirements in our Plan to commence cleanup operations immediately following backfill of the trench, install temporary and permanent slope breakers to minimize the volume and velocity of runoff, and timely seeding (within 6 days of final grading) and establishment of vegetation.

The Catskill area of New York (including Delaware and Schoharie Counties) suffered extensive flooding due to Hurricane Irene on August 28, 2011, and Tropical Storm Lee on September 2, 2011. Following Hurricane Irene, President Obama issued a Major Disaster Declaration for New York State on August 31, 2011. Nearly a foot of rain fell on the Southern Tier of New York due to Tropical Storm Lee (NY Responds 2012). Hurricane Sandy impacted the east coast of the United States, including the project area on October 28, 2012 resulting in flooding. Precipitation in the area from Hurricane Sandy ranged from 0.4 inch to 3 inches (NASA 2012). Flash flooding may also be caused by other weather events such as thunderstorms, sudden downpours, and rain events occurring during periods of snow melt. Precipitation is fairly evenly distributed on an average monthly basis within the project vicinity (2.2 inches in February to 4.1 inches in July for Albany, New York) (NCDC 2014). The winter months (December through February) are somewhat drier than the other months. Additional information on flooding can be found in section 4.3.3.2.

4.1.3.6 Karst Topography

Common causes of ground subsidence include the presence of karst terrain, underground mining, and significant groundwater or fluid withdrawal, such as associated with oil-producing regions. Karst features such as sinkholes, caves, and caverns can form as a result of the long-term action of groundwater on soluble carbonate rocks (e.g., limestone and dolostone). The risk of the development of sinkholes along the pipeline is relatively low based on a geologic literature review including the digital map of karst topography (Tobin and Weary 2004), and a thesis by Mylroie 1997. Additionally a field review of potential karst features was completed by Constitution. Constitution's project would only cross karst terrain in Schoharie County, New York (about 12.4 miles from approximately MPs 109.1 to 124.4).

Three potential sinkhole ponds were identified within 200 feet of MPs 117.1, 118.1, and 118.5. An area of karst pavement (open cracks) is located within a property near MP 118.5. In addition, two closed depressions were identified near MP 122.6, between MP 123.0 and MP 123.2, and a cave feature was located near MP 123.1. Table 4.1.3-3 provides the locations of known or potential karst features located in proximity to the proposed pipeline.

TABLE 4.1.3-3
Karst Features in Proximity to the Proposed Pipeline

Name	Feature	Closest Milepost	Distance and Direction from the proposed Pipeline (feet)
Halftubes	Cave	122.1	2,210 north
Keyhole Cave	Cave	122.7	2,315 north
Dead Sink	Pit	122.5	2,190 south
Gage Caverns & Green Cave	Cave	122.7-122.8	1,100-2,000 north
Joober Hole	Cave	123.1	400 south
Halfhole Cave	Cave	123.4	2,760 north
Ewalds Fissures	Cave	124.2	1,187 south

Source: Mylroie 1977.

MPs 118.5 to 118.8 and 123.0 to 123.2 are considered to be areas of concern for karst development, and karst features have been identified in these areas by Constitution. Constitution's geotechnical firm performed subsurface investigations in the area of MPs 118.0 to 118.6 to evaluate potential karst features. The subsurface investigations found that karst pavement, sinkholes, and caves were common east of MP 118.3; voids and soft rock conditions in the limestone bedrock were encountered in the study area. Constitution developed a Karst Mitigation Plan specifically for these areas, as discussed below.

4.1.3.7 Shallow Bedrock

Soils with bedrock present within 5 feet of the surface are considered to have shallow depth to bedrock. Areas with shallow bedrock classifications were identified using the NRCS' Soil Survey Geographic Database (SSURGO). To excavate the trench line in the areas identified with shallow bedrock, blasting may be necessary in order install the pipeline to the proper depth. If shallow bedrock is encountered, other methods of bedrock removal such as ripping, chipping, or grinding would be attempted first before blasting would be used. Constitution anticipates that ripping would be possible in areas of shale and sandstone and potentially possible in areas of limestone depending on weathering of the rock. In areas of sandstone, conglomerate, and limestone, other excavation methods would be tried such as grinding or chipping. Blasting would not be used in areas of limestone to prevent the possible opening of fractures in the rock thereby potentially contaminating groundwater. The proposed pipeline in Pennsylvania would traverse 8.1 miles of shallow bedrock while the New York portion would traverse 37.4 miles of shallow bedrock. Areas of shallow depth to bedrock are listed in appendix I.

4.1.3.8 Blasting

The potential for blasting exists at all locations where shallow bedrock may be encountered. The proposed pipeline crosses 45.5 miles of shallow depth to bedrock that may require blasting. Constitution expects that based on previous work in similar areas, a large portion of the bedrock would be ripped using

conventional excavation techniques and would not require the use of blasting or chipping. If blasting does become necessary, it typically involves a small scale, controlled, rolling detonation procedure resulting in limited ground upheaval. These blasts do not typically result in large, above ground explosions.

Blasting in areas of karst topography can create fractures in the rock, potentially changing groundwater flow, creating the potential for groundwater contamination, and temporarily affect yield and increase turbidity in nearby water wells and/or springs. Constitution has stated the blasting in areas of limestone and karst features would be avoided. Hard limestone would be removed by using conventional methods or techniques such as hydraulic chipping or ripping.

Potential impacts on water wells, springs, wetlands, steep slopes, paleontological resources, nearby aboveground facilities, and adjacent pipelines and utility lines could result from blasting. Potential impacts on water wells and springs are discussed in section 4.3. Constitution has proposed to offer both pre-construction and post-construction testing of water quality and quantity in wells, and to mitigate any damages caused by construction. Any required blasting would be conducted in accordance with all federal, state, and local regulations. Constitution has developed a Blasting Plan as part of its state-specific ECPs. As outlined in the Blasting Plan, Constitution would:

- use the minimum charges needed;
- use heavy mats to prevent the scattering of debris;
- use seismograph equipment to monitor the velocity of the blasts at all structures within 150 feet of blasting activities (peak particle velocity would not exceed 4 inches per second);
- inspect aboveground and underground facilities within 150 feet of blasting activities before and after blasting; and
- identify potential impacts, and minimization and mitigation measures for areas that have been identified as having steep slopes.

We have reviewed these measures and Constitution's Blasting Plan and find them acceptable.

Aboveground Facilities

Iroquois' project would be installed in an area of shallow bedrock. While Iroquois does not anticipate the need for blasting, if blasting is required for construction of the proposed compressor facility it would be conducted in accordance with all federal, state, and local regulations. Blasting would be conducted in a safe manner so that off-site water supplies would not be affected.

4.1.4 Paleontological Resources

Paleontological resources including plant, invertebrates, and vertebrate fossils may be found in a variety of geologic formations. The Federal Land Policy and Management Act and NEPA enforce the protection of significant paleontological resources on federally owned and/or managed lands. Potential impacts on paleontological resources associated with the proposed pipeline may occur as a result of construction and may include impacts from trenching the pipeline, the use of heavy equipment, grading, and excavation. It is not anticipated that construction of Constitution's project would uncover significant paleontological resources, and no known paleontological sites have been identified. However, there is the potential for unanticipated discovery of fossils along the entirety of the proposed route especially in areas of shallow bedrock or where bedrock removal is necessary. To minimize impacts on paleontological

resources that may be uncovered during pipeline construction, Constitution would follow the procedures provided in its Discovery Plan and would notify the PADCNR Bureau of Topographic and Geologic Survey or the New York State Paleontologist and other relevant agencies. The Discovery Plan's procedures include:

- shutdown of construction activities if sensitive paleontological resources are encountered;
- notification of Constitution's cultural resource consultant (URS) who would contact the FERC and the Pennsylvania Historical and Museum Commission (PHMC), or the New York Office of Parks, Recreation, and Historic Preservation (OPRHP) as applicable[1];
- adherence to the FERC and the PHMC or the OPRHP instructions regarding stabilization of the area (if necessary); and
- consultation with the FERC and the PHMC or the OPRHP to determine and implement any additional mitigation measures deemed necessary.

Previous surveys conducted at the proposed compressor station parcel did not discover any paleontological finds. In addition, the closest catalogued paleontological artifact was discovered more than a mile from Iroquois' project site (NYSDEC 2013b). However, the bedrock that underlies Iroquois' project area could contain paleontological resources. Nevertheless, impacts on bedrock are expected to be minimal and localized to foundation installations.

4.1.5 General Impacts and Mitigation

The overall effect of Constitution's project on geologic resources would be minor. The primary effect of pipeline construction on geologic resources would be disturbances to steep topographic features found along the construction right-of-way. As described in section 2.3 all areas disturbed during construction including those considered rugged terrain would be graded and restored as closely as possible to pre-construction contours during cleanup and restoration. Restoration would be started within 10 days after the completion pipeline construction.

There are approximately 15 active mines (generally, sandstone and bluestone) within 0.25 mile of the proposed pipeline. Constitution's pipeline would not pass through any active or proposed mines, and the closest active mine would be 171 feet away. The nearest active gas well is about 348 feet away from the pipeline construction right-of-way. There are no mining or oil and gas operations near Iroquois' proposed project. Construction and operation of the projects would not result in a significant impact or additional restriction on current or future mining or oil and gas operations in the area.

Based on the low probability of localized earth movements or geologic hazards in the vicinity of the proposed projects, we do not anticipate any impacts attributable to such movements or hazards. Maintained pipelines constructed using modern arc-welding techniques have performed well in seismically active areas of the United States, such as California (O'Rourke and Palmer 1994b). Only large, abrupt ground displacements have caused serious impacts on pipeline facilities. Due to the limited potential for large seismically induced ground movements in the area of the projects there is very little risk of earthquake-related impacts on the pipeline and other project facilities. Conditions necessary for soil liquefaction to occur would likely be present in some portions of the project area. However, due to the low potential for strong and prolonged ground shaking associated with a seismic event to occur, the potential for soil liquefaction to occur in the vicinity of the projects is very low.

[1] These agencies contain each state's respective Historic Preservation Office, commonly referred to as a "SHPO."

Several areas exist along the proposed route that have steep slopes and that have experienced landslide activity in the recent past. Constitution would follow its ECPs and employ erosion and slope stability BMPs as needed. Constitution would conduct on the ground and over-flight monitoring of the pipeline in areas where there is a potential landslide hazard. Additional measures and techniques that may be used to prevent impacts include:

- use of slope gauges;
- drainage systems (french drain) to drain storm water away from the right of way;
- use of trench breakers to prevent water from draining down the trench;
- use of temporary and permanent trench plugs; and
- periodic inspection of the right-of-way for the life of the pipeline and inspection after rain events during construction and restoration.

Flash flooding in the area could potentially occur if rainfall amounts of 1.5 to 1.7 inches per hour are realized. Federal regulations administered by the DOT-PHMSA (49 CFR 192.317) require that the pipeline "operator must take all practicable steps to protect each transmission line or main from washouts, floods, unstable soil, landslides, or other hazards that may cause the pipeline to move or to sustain abnormal loads." Constitution has designed waterbody crossings to minimize potential impacts from flash flooding, scouring, and high flow velocities during pipeline construction and operation. High flow mitigation measures during construction include providing equipment to handle increased flow such as standby pumps at dam-and-pump locations and sizing flume pipes to be able to accommodate storm level flows. Additionally, a concrete coating would be applied to the pipeline where installed beneath waterbodies to reduce the buoyancy of the pipe and prevent surfacing of the pipeline during a flooding event. Flash flood events in areas cleared of vegetation could cause sedimentation and erosion. Constitution's Plan requires the inspection and maintenance of temporary erosion control measures on at least a daily basis in areas of active construction or equipment operation, on a weekly basis in areas with no construction or equipment operation, and within 24 hours of each 0.5 inch rainfall event. Within 20 days of backfilling the trench, all work areas would be final graded and restored to preconstruction contours and natural drainage patterns as closely as possible, weather permitting. Remaining vegetation and erosion and control measures such as waterbars or slopebreakers would assist in minimizing erosion until vegetation grows back. At waterbody crossings the pipeline would be buried to a greater depth allowing for a minimum of 60 inches of soil cover or 24 inches of cover in consolidated rock. Additional information on the required minimum specification for the depth of cover can be found in table 2.3.1-1. None of the proposed aboveground facilities, including Iroquois' project would be within a FEMA flood hazard zone (FEMA 2013a). Flooding would not be anticipated at Iroquois' project due to the absence of waterbodies on-site and nearby.

Karst features such as sinkholes, caves, and caverns can form as a result of the long-term action of groundwater on soluble carbonate rocks (for example, limestone and dolostone). The risk of the development of sinkholes along the proposed pipeline is low. There are still however several areas where karst hazards have been identified or may potentially be present along the pipeline route. Constitution has developed a Karst Mitigation Plan to mitigate potential impacts and hazards from karst features. BMPs that may be used by Constitution during construction in areas of karst terrain include:

- installing storm water control measures;
- monitoring of sediment/ erosion control measures throughout the construction process and after rain events;

- using additional erosion control techniques such as two rows of silt fencing where water flows into a karst feature such as a sinkhole, swallow hole, karst conduit or cave;
- positioning of staging areas at least 200 feet from a waterbody, sinkhole, spring, or cave;
- staging of construction waste and debris away from karst terrain;
- servicing of equipment, overnight parking, and refueling of equipment at least 200 feet from karst features and waterbodies;
- adherence to Constitution's Spill Plan to minimize and remediate any inadvertent releases or spills;
- monitoring of existing and any previously unidentified wells and springs within karst areas;
- maintaining natural waterbody features;
- minimizing removal of riparian vegetation;
- revegetating disturbed areas after construction activities are complete;
- applying fertilizers, herbicides, pesticides, or other chemicals at least 200 feet from sinkholes, waterbodies, springs, cave openings or karst features in areas of karst terrain;
- discharging of hydrostatic test waters away from areas of known karst terrain;
- contacting geotechnical specialists if karst feature are found during construction; and
- conducting a geologic subsurface evaluation of the area using exploratory boreholes, electrical resistivity, seismic, or ground penetrating radar.

According to Constitution, areas where bedrock is exposed by construction and exhibits jointing or near-surface epikarst features would require special measures. Due to the potential for contamination and increased turbidity, Constitution would conduct additional monitoring for wells and springs within karst areas. This additional monitoring would apply to the three springs that supply water to the Village of Schoharie (Young, Dugan, and Westfall Springs) and three private drinking water wells between MP 115 and MP 124. Monitoring would be conducted by Constitution before the start of construction to establish a baseline and would continue through construction at a rate of twice a day when construction is occurring within 2,000 feet of the wells, springs, or groundwater flow path. Monitoring would include water column height, flow rate of existing equipment, water column drawdown, rebound time, volatile organic compounds, total petroleum hydrocarbons, and compounds used in blasting (if blasting has occurred nearby). In addition to the standard BMPs for controlling erosion at locations where water may flow into a karst feature, additional measures would be employed by Constitution. These measures may include the use at least two rows of silt fencing, monitoring of sediment and erosion control measures throughout construction and after a rain event, routing of runoff to sediment ponds, routing water away from the open trench, and use of geotextile fabric to line the trench and act as a runoff sediment barrier.

Additional BMPs and the Karst Mitigation Plan are available in Constitution's state-specific ECPs and provide further details on how karst features encountered during construction would be handled. Shallow depth to bedrock may be encountered. Constitution would first attempt to remove bedrock by using conventional methods such as ripping but blasting may become necessary (blasting would be avoided in karst areas). In order to minimize potential impacts from blasting, Constitution would comply with all federal, state, and local regulations for blasting and has developed a Blasting Plan that would be implemented during construction. As discussed in section 4.1.3.8 above, mitigation measures include installation of blasting mats in congested areas, shallow waterbodies, and near

structures as well as the use of warning signals, flags, and barricades. Adjacent pipelines would be manned at valves in case of an emergency. In addition, Constitution's Blasting Plan requires the blasting contractor to also prepare a site-specific blasting plan that includes site-specific details and blasting procedures. Blasting would be avoided in areas of limestone bedrock where cracks can form and the potential for contaminating groundwater exists. In these locations, bedrock would be removed by conventional means such as ripping or chipping. Constitution would investigate damage claims associated with blasting and would provide an alternative water source or mitigate damage through agreements with the well/spring owner if a well/spring is impaired. If structural damage due to blasting activities occurred, Constitution would compensate the affected owner or repair the damage.

Iroquois stated that if blasting would be required for construction of the proposed compressor station, then it would:

- develop a site-specific blasting plan;
- locate and check both Iroquois and foreign facilities;
- obtain an engineering assessment to gauge safety concerns;
- coordinate with Tennessee regarding protection of their nearby facilities; and
- use both blast monitoring and post-blast surveys to assess any potential concerns.

Impacts on geologic resources from the proposed projects during post-construction operations are expected to be minimal or none. Permanent features resulting from the projects would include the subterranean pipeline and aboveground facilities, which include the proposed Westfall Road M&R station, Turnpike Road M&R station, associated facilities such as valves, and Iroquois' compressor station. However, as no additional ground would be excavated during operation of the projects, no operational impacts are expected related to geologic hazards. Based on the overall geologic conditions present in the projects' area, and the Applicants' proposed construction and operational methods, construction of the projects would not significantly alter the geologic condition of the area of the projects.

4.2 SOILS

4.2.1 Existing Conditions

4.2.1.1 Pipeline

The soils crossed by Constitution's project were identified and assessed using various data sources including digital soils data such as the SSURGO database and published soil surveys, where available. The SSURGO database is a digital version of the original county soil surveys developed by the U.S. Department of Agriculture (USDA) and the NRCS for use with GIS (NRCS 2013a). It provides the most detailed level of soils information for natural resource planning and management. The attribute data within the SSURGO database provide the proportionate extent of the component soils and their properties for each soil map unit. The U.S. General Soil Map was obtained from the NRCS Soil Data Mart and the NCRS Web Soil Survey (NRCS 2013b). Additional information was obtained through published NRCS soil surveys for Susquehanna County, Pennsylvania and Broome, Chenango, Delaware, Otsego, and Schoharie Counties, New York. The pipeline would cross 239 different soil series types, primarily loams, that have a wide variety of characteristics. The soil series types that would be crossed by the pipeline are listed by milepost in appendix J.

4.2.1.2 Aboveground Facilities and Access Roads

Constitution's M&R Stations would cross four soil series types. Slopes range from 0 to 30 percent, with soils derived from sandstone, siltstone, limestone, dolomite, and calcareous shale. Constitution's proposed MLVs would be within the proposed pipeline right-of-way so soil types would be the same as discussed above for the pipeline. Constitution's six proposed contractor yards would cross 21 soil series types, and the access roads would cross 112 soil series (see appendix J).

4.2.2 Standard Soil Limitations

Several soil characteristics have the potential to affect, or be affected by, construction and operation of pipeline. These include erosion potential, depth to shallow bedrock, stony and rocky soils, compaction potential, revegetation concerns, drainage patterns, hydric soils, and prime farmlands or farmlands of statewide importance. Table 4.2.2-1 summarizes the amounts of soil characteristics in acres that would be impacted by construction of the pipeline.

4.2.2.1 Erosion by Water and Wind

Erosion is a continuing natural process that can be accelerated by human disturbance. Factors such as soil texture, structure, slope, vegetative cover, rainfall intensity, and wind intensity can influence the degree of erosion. Soils most susceptible to erosion by water are typified by bare or sparse vegetative cover, non-cohesive soil particles with low infiltration rates, and moderate to steep slopes. Soils typically more resistant to erosion by water include those that occupy low relief areas, are well vegetated, and have high infiltration capacity and internal permeability. Wind erosion processes are less affected by slope angles than water erosion processes. Wind-induced erosion often occurs on dry soil where vegetative cover is sparse and strong winds are prevalent.

The potential for soils to be eroded by water was evaluated based on the K factor, where available, and slope. The K factor represents a relative quantitative index of the susceptibility of bare soil to particle detachment and transport by water and is one of the factors used in the Revised Universal Soil Loss Equation to calculate soil loss.

The proposed pipeline would impact 49.9 acres of soils that are classified as having very severe or severe water erosion potential classifications. These areas are primarily in Susquehanna County, Pennsylvania and Schoharie County, New York. Potential wind erosion would only affect 0.4 acre, all in Delaware County, New York (table 4.2.2-1 and appendix J).

TABLE 4.2.2-1
Potential Soil Limitations (in acres) for the Constitution Pipeline Project

County/State	Potential Water Erosion[a]	Potential Wind Erosion[b]	Stony/ Rocky Soils[c]	Shallow Depth to Bedrock[d]	Soil Compaction Potential[e]	Poor Revegetation Potential[f]	Poor Drainage Potential[g]	Hydric Soils[h]	Prime Farmlands[i]
Pennsylvania									
Susquehanna County	25.8	--	--	75.2	0.2	--	3.4	3.4	84.6
Pennsylvania (sub-total)	**25.8**	**--**	**--**	**75.2**	**0.2**	**--**	**3.4**	**3.4**	**84.6**
New York									
Broome County	1.0	--	--	26.1	19.9	42.2	12.3	--	89.1
Chenango County	--	--	--	24.3	9.6	--	2.4	--	59.0
Delaware County	2.7	0.4	--	144.0	--	--	5.5	0.2	277.5
Schoharie County	21.0	--	3.6	150.4	--	--	18.0	15.4	125.9
New York (sub-total)	**24.7**	**0.4**	**3.6**	**344.8**	**29.5**	**42.2**	**38.2**	**15.6**	**551.5**
Constitution Pipeline Project Total	**50.5**	**0.4**	**3.6**	**420.0**	**29.7**	**42.2**	**41.6**	**19.0**	**636.1**

TABLE 4.2.2-1 (continued)
Potential Soil Limitations (in acres) for Areas by the Constitution Pipeline Project

County/State	Potential Water Erosion[a]	Potential Wind Erosion[b]	Stony/ Rocky Soils[c]	Shallow Depth to Bedrock[d]	Soil Compaction Potential[e]	Poor Revegetation Potential[f]	Poor Drainage Potential[g]	Hydric Soils[h]	Prime Farmlands[i]

Source: NCRS 2013a

Table includes temporary and permanent access roads.

Totals may not sum correctly due to rounding.

[a] Areas identified as Highly Water Erodible Soils are ranked as “Very Severe” or “Severe” by SSURGO Erosion Hazard (Off-Road, Off-Trail) criteria.

[b] Areas identified as Highly Wind Erodible Soils have a Wind Erodibility Index of 134 or greater as determined by SSURGO.

[c] Areas identified to have shallow depth to bedrock are described as having bedrock less than 5 feet from the surface as determined by SSURGO.

[d] Areas identified to have Stony/Rocky Soils are lands that are composed of 20% or more of rock fragments larger than 3 inches in the surface layer as determined by SSURGO.

[e] Areas identified to have a severe compaction potential are limited to agricultural and residential lands that contain soils with a mean high water table of 1.5 feet or less below the surface elevation and have a surface texture of sandy clay loam, or finer as determined by SSURGO.

[f] Areas identified to have poor revegetation potential are lands that contain a Capability Class 3 or greater, a low available water capacity, and slopes greater than 8% as determined by SSURGO.

[g] Areas identified to have poor drainage potential are ranked as “poor” or “very poor” as determined by SSURGO.

[h] Areas identified to have a hydric rating meet the all hydric criteria as determined by SSURGO.

[i] Areas identified as Prime Farmland are identified as lands that meet the All Prime Farmland or Farmland of Statewide Importance criteria as determined by NRCS SSURGO.

4.2.2.2 Shallow Depth to Bedrock and Stony-Rocky Soils

Soils with textural classifications including stony, cobbly, gravelly, shale, slate, and droughty in any layer, or with stones larger than 3 inches in the surface layer in greater than 15 percent of the area, may be characterized as stony or rocky soil. Shallow bedrock is considered prevalent where the depth to bedrock is less than 5 feet below the ground surface.

The pipeline would impact 3.6 acres of stony or rocky soils, all in Schoharie County, New York. The proposed route crosses 413.3 acres of shallow bedrock, which primarily would be encountered in Delaware and Schoharie Counties, New York. Potential impacts from stony-rocky soils would be minimized on agricultural lands through the removal of rock fragments brought to the surface during construction. Topsoil removed from the trench line would be segregated and stockpiled during construction activities. In residential areas replacement soil may be used instead of topsoil segregation methods. Prior to topsoil replacement, topsoil would be screened for rock fragments greater than 4 inches in diameter. The trench may be back filled with excavated material, but would only be filled to the height of the existing bedrock horizon. In agricultural lands the trench would generally only be backfilled to 2 feet below the B horizon sub-soil surface in mesic soils or 30 inches in frigid soils to prevent incorporation of rock into agricultural lands.

4.2.2.3 Compaction Potential

Soil compaction modifies the structure and reduces the porosity and moisture-holding capacity of soils. The degree of compaction was evaluated based on the drainage class of the soil. Very poorly and poorly drained soils were considered to have a high potential for compaction. The proposed pipeline would impact 29.6 acres of soils considered to have high compaction potential, almost completely in Broome and Chenango Counties, New York.

4.2.2.4 Poor Revegetation Potential

The vegetation potential of soils is based on several characteristics including topsoil thickness, soil texture, available water capacity, wetness, susceptibility to flooding, soil temperature, and slope. Some soils have characteristics that cause a high seed mortality. These areas may need additional management and may be difficult to revegetate. The clearing and grading of soils with poor revegetation potential could result in a lack of adequate vegetation following construction and restoration of the right-of-way, which could lead to increased erosion, a reduction in wildlife habitat, and adverse visual impacts. The proposed pipeline crosses 42.2 acres of soils classified as having poor revegetation potential, all in Broome County, New York.

4.2.2.5 Poor Drainage

The drainage potential is the degree, frequency, and duration of wetness for a given soil. Soils that are considered to be well drained do not hold water well, will not pond, and dry quickly. Poorly drained soils are usually associated with high groundwater, will remain soggy, and do not conduct water well. Poorly drained soils are more likely to be compacted and are more prone to rutting than well drained soils. The pipeline would impact 40.8 acres of soils with poor drainage potential. The majority of these soils (37.4 acres) occur in the New York portion of the project, with the largest acreage (18.0 acres) occurring in Schoharie County. Table 4.2.2-1 identifies the impacts of soils with poor drainage potential.

4.2.2.6 Hydric Soils

The National Technical Committee for Hydric Soils defines hydric soils as soils that formed under conditions of saturation, flooding, or ponding long enough during the growing season to develop anaerobic conditions in the upper part (Federal Register 1994). These soils are typically indicative of areas with a high mean water table and wetlands. However, agricultural lands can contain hydric soils that are no longer saturated due to managed hydrology for crop development. Agricultural lands often employ the use of ditches and drain tiles to allow for the production of crops. The proposed pipeline crosses 19.0 acres of hydric soils, the majority (15.4 acres) of which is in Schoharie County, New York. Table 4.2.2-1 identifies the impacts of soils that are considered to be hydric.

4.2.2.7 Prime Farmland and Farmland of Statewide Importance

The USDA defines prime farmland as "land that has the best combination of physical and chemical characteristics for producing food, feed, fiber, and oilseed crops" (USDA 1993). This designation includes cultivated land, pasture, woodland, or other lands that are either used for food or fiber crops, or are available for these uses. Urbanized land, built-up land, and open water cannot be designated as prime farmland. Prime farmland typically contains few or no rocks, is permeable to water and air, is not excessively erodible or saturated with water for long periods, and is not subject to frequent or prolonged flooding during the growing season. Soils that do not meet the above criteria may be considered prime farmland if the limiting factor is mitigated (e.g., by draining or irrigating).

The methods for defining and listing farmland of statewide importance are determined by the appropriate state agencies such as the Pennsylvania Department of Agriculture and NYSDAM, typically in association with local soil conservation districts or other local agencies. Farmland of statewide importance generally includes areas that almost satisfy the requirements for prime farmland and which grow high yields of crops when managed in accordance with best farming methods.

The proposed pipeline crosses 636.1 acres of prime farmland or farmland of statewide importance (table 4.2.2-1). These farmlands would be crossed in each of the five counties traversed by the route, but the largest acreages affected would be in Delaware and Schoharie Counties, New York. The locations of prime farmland and farmland of statewide importance crossed by the proposed pipeline are listed in appendix J. Specialty and organic farms and related programs are discussed in section 4.8.

Farmlands that are considered to be prime or of statewide importance can be further broken down into several subcategories including active agricultural land, agricultural land/fallow field, managed forest land, and open field/open land. Table 4.2.2-2 identifies impacts on these farmland subcategories both through construction and operation.

In addition to farmlands that are considered prime or of statewide importance the pipeline would cross several miles of vulnerable soils. These soils are considered vulnerable due to characteristics of high erodibility, vulnerability to wetness, shallow depth to bedrock, or are organic mucklands. The pipeline would cross 22.6 miles of vulnerable soils (see table 4.2.2-3).

4.2.2.8 Contaminated Soil

As discussed in section 2.3.1, no areas of contaminated soils were identified along the proposed pipeline alignment or at the proposed aboveground facility locations. Constitution has developed a Contamination Plan, which would be used in the event that unanticipated contamination is encountered during the construction.

TABLE 4.2.2-2
Impacts on Prime Farmlands and Farmlands of Statewide Importance (in acres) for the Proposed Constitution Pipeline Project

			Farmland Type							
	Total Farmland Impacts		Active Agricultural Land		Agricultural Land/Fallow Field		Managed Forest Land		Open Field/Open Land	
Farmland Classification	**Construction Impacts**	**Operation Impacts**	**Construction Impacts**	**Operation Impacts**	**Construction Impacts**	**Operation Impacts**	**Construction Impacts**	**Operation Impacts**	**Construction Impacts**	**Operation Impacts**
Pipeline	471.1	226.7	292.6	118.7	0.6	0.2	14.9	6.6	163.0	101.2
Access Roads	14.2	9.6	7.3	5.2	--	--	--	--	6.9	4.4
Turnpike Road M&R Station	0.7	0.7	--	--	--	--	--	--	--	--
Westfall Road M&R Station	1.7	1.7	--	--	--	--	--	--	--	--
Contractor Yards	70.5	--	36.2	--	--	--	--	--	57.7	--
Project Total	**555.4**	**240.1**	**335.8**	**125.3**	**0.6**	**0.2**	**14.9**	**6.6**	**225.3**	**105.4**

Source: NCRS 2013a

Totals may not sum correctly due to rounding.

The data presented in table 4.2.3-1 are for informational purposes only and included potentially overlapping data where access roads overlapped with construction workspaces. For these reasons, the data in table 4.2.2-2 and table 4.2.3-1 may not match.

TABLE 4.2.2-3 Vulnerable Soils (in miles) Along the Proposed Constitution Pipeline Route						
Vulnerable Soil Types[a]	County					
	Susquehanna	Broome	Chenango	Delaware	Schoharie	Project Total
V/B	0.1	0.1	0.0	1.3	0.1	**1.6**
V/W	0.1	0.4	0.1	0.1	0.4	**1.1**
V/W; VE	2.0	0.1	0.0	0.0	1.9	**4.0**
V/W; VE; V/B	0.0	0.0	0.0	0.0	0.1	**0.1**
V/W; V/OR	0.0	0.0	0.0	0.0	0.1	**0.1**
VE	2.7	1.9	0.8	3.1	4.3	**12.8**
VE; V/B	0.5	0.3	0.0	1.0	1.1	**2.9**
Totals	**5.4**	**2.8**	**0.9**	**5.5**	**8.0**	**22.6**

Source: NCRS 2013a.

Totals may not sum correctly due to rounding.

[a] VE – Highly erodible land; V/W – Vulnerability due to wetness; V/B – Shallow depth to bedrock; V/OR – Unavoidable organic mucklands.

4.2.2.9 Ground Heaving

Ground heaving is the uplifting of soil, typically based on the development and growth of ice lenses underneath the upper soil layer. Ground heaving or frost heaving is based on soil saturation, soil characteristics, and freezing temperatures. The maximum depth of frost penetration within the area of the projects does not exceed 5 feet and in most years it is approximately 4 feet or less (NOAA 1978). The pipeline would have a typical bottom depth of 5.5 feet (except in consolidated rock), and the likelihood of frost affecting soils completely surrounding the buried pipeline is low. Additionally, the ground surrounding the buried pipeline would be warmed by natural gas flow in the winter. Based on these circumstances the risk of ground heaving and associated potential impacts on or from a pipeline, from freeze-thaw action is low.

4.2.3 Aboveground Facilities

4.2.3.1 M&R Stations, Mainline Valves, and Iroquois' Project

The areas of the proposed Turnpike Road M&R Station, Westfall Road M&R station, and Iroquois' facility do not contain any soils that have associated limitations, except for shallow bedrock and incidences of prime farmland or farmland of statewide importance. An estimated 3.7 acres of shallow bedrock would be potentially impacted with regards to the construction of the Turnpike Road M&R Station, and 1.7 acres of soils with shallow bedrock would be encountered at the Westfall Road M&R Station. If bedrock is encountered during construction, Constitution would attempt to employ mechanical means of bedrock removal before blasting is considered. At the Turnpike Road and Westfall Road M&R Stations there are 0.1 and 1.7 acres of prime farmlands or farmlands of statewide importance, respectively. These prime farmlands or farmlands of statewide importance would be permanently encumbered by the M&R stations. An additional breakdown of impacts on prime farmlands and farmlands of statewide importance can be found in table 4.2.2-2 for both the Turnpike Road and Westfall Road M&R Stations.

The work associated with Iroquois' project would be within or directly adjacent to soils that have been previously disturbed by Iroquois' existing Wright Compressor Station. Modifications and construction at Iroquois' Wright Compressor Station for the new proposed compressor station would occur within the existing property boundary of the station site. Construction of Iroquois' project would require 12.5 acres of temporary workspace, including 2.1 acres within the existing fence line, 2.4 acres outside the existing fence line, but within the new, expanded fence line (this area also would be retained permanently for operations), and 8.0 acres of temporary workspace outside the proposed new, expanded fence line that eventually would be allowed to return to its pre-construction state. No additional property would need to be acquired by Iroquois.

Soils potentially impacted by construction of the compressor station are similar to the soils series located at the terminus of the pipeline. Based on information provided by Iroquois, the construction area for Iroquois' project is within the Honeoye-Farmington complex. This complex does not have poor revegetation potential or soil compaction potential, and only a slight risk of erosion.

Prime farmland and farmland of statewide importance are listed for the soil types that do exist in the area of the proposed compressor station. However, the site is an existing industrial facility with adjacent idle woodlands and pasture used for hay production. The property containing the existing compressor station and Iroquois' project are owned by Iroquois and no crops are grown. Facility expansion associated with the proposed compressor station would permanently encumber designated prime farmland and/or farmland of statewide importance, but given the property ownership and current land use, there would be no substantive impacts on farming. No contaminated soils or sites were identified in proximity to Iroquois' proposed project.

The MLVs would be constructed along the pipeline route. Therefore, existing conditions and potential impacts would generally be the same as those discussed above for the pipeline during construction. The installation of MLVs would encumber 0.8 acre of prime farmland or farmland of statewide importance at 9 MLV sites (the other two MLVs would be located at the M&R stations).

4.2.3.2 Contractor Yards

Constitution identified six contractor yards that would be used during construction. These yards would be located within 5.0 acres of highly erodible soils, 3 acres of shallow bedrock, 18.6 acres of soils with poor revegetation potential, 0.3 acres of soils with poor drainage potential, and 70.5 acres of prime farmland or farmland of statewide importance. These yards would be returned to preconstruction conditions following construction and would not represent new permanent impacts on soil resources. The majority land use type for the contractor yards is agricultural lands, followed by open land with a smaller amount of sand and gravel, road, and commercial and industrial land. Site improvements that would be made at the contractor yards include sediment and erosion control, topsoil segregation on agricultural lands, grading, gravel base, and creation of a construction entrance. An additional breakdown of impacts on prime farmlands and farmlands of statewide importance can be found in table 4.2.2-2.

4.2.3.3 Access Roads

Construction of access roads associated with the pipeline would not impact soils that are potentially susceptible to wind erosion or stony and rocky soils. Potential impacts associated with other soil limitations would be relatively minor, except for shallow bedrock and prime farmland or farmland of statewide importance. Table 4.2.3-1 identifies soil limitations by county for access roads associated with the proposed pipeline. Shallow bedrock would not be of concern since no trenching would take place on the access roads. Potential impacts on 40.9 acres of prime farmland or farmland of statewide importance would be largely permanent as most of the access roads would be permanent roads as currently proposed.

Only impacts on 5.1 acres of prime farmlands and 3.2 acre of shallow depth to bedrock would be attributable to temporary access roads. An additional breakdown of impacts on prime farmlands and farmlands of statewide importance can be found in table 4.2.2-2. Information regarding site-specific justification for permanent access roads can be found in section 4.8 and appendix E.

4.2.3.4 Extra Workspace

Extra workspace to be utilized during the construction of the pipeline would not impact soils that are potentially susceptible to wind erosion or contain stony or rocky soils. Table 4.2.3-2 identifies soil limitations by county for extra workspaces associated with the pipeline. Shallow bedrock would not be of concern since no trenching would take place at any of the extra workspace locations. The proposed extra workspaces would cross 60.1 acres of prime farmlands or farmlands of statewide importance, but impacts associated with extra workspaces would be temporary as these spaces would be allowed to revert to pre-construction conditions and uses following construction.

4.2.4 General Impact and Mitigation

Construction activities such as clearing, grading, trench excavation, backfilling, and the movement of construction equipment along the right-of-way would affect soil resources. Clearing removes protective cover and exposes the soil to the effects of wind and rain, which increases the potential for soil erosion and sedimentation of sensitive areas. Grading, spoil storage, and equipment traffic can compact soil reducing porosity and increasing runoff potential. Excess rock or fill material brought to the surface during trenching operations could hinder restoration of the right-of-way.

To prevent soil erosion Constitution would follow the BMPs that are outlined in its state-specific ECPs. Constitution's BMPs contain guidance from the PADEP's Erosion and Sediment Pollution Control Program Manual (March 2012), the NYSDEC's New York State Standards and Specifications for Erosion and Sediment Control, and the Plan and Procedures, which Constitution has adopted from the FERC. Constitution would also prepare site-specific erosion and sediment control plans describing specific BMPs that would be used to prevent impacts from construction such as: temporary and permanent slope breakers, topsoil segregation, restoration of soil layering, restoration of surface contours, and revegetation using recommended seed mixes. To minimize potential impacts near waterbodies and wetlands, temporary erosion control devices would be installed prior to construction. These would be inspected regularly to determine whether repair or replacement is necessary and would only be removed following the successful revegetation of an affected area. Constitution would also employ permanent erosion control devices such as installing trench breakers at the base of slopes greater than 5 percent and within 50 feet of a waterbody or wetland and constructing slope breakers in all areas except for cultivated areas.

TABLE 4.2.3-1
Soil Limitations (in acres) for Access Roads for the Constitution Pipeline Project

State/County	Length (miles)	Potential Water Erosion[a]	Potential Wind Erosion[b]	Stony/ Rocky Soils[c]	Shallow Depth to Bedrock[d]	Soil Compaction Potential[e]	Poor Revegetation Potential[f]	Poor Drainage Potential[g]	Hydric Soils[h]	Prime Farmlands[i]
Pennsylvania										
Susquehanna	8.8	3.3	--	--	12.8	--	--	--	--	12.6
New York										
Broome	1.9	--	--	--	0.1	0.2	0.9	0.3	--	1.6
Chenango	0.4	--	--	--	0.9	0.0	--	0.0	--	0.9
Delaware	12.2	--	--	--	11	--	--	0.7	--	21.7
Schoharie	13.4	0.2	--	--	3.5	--	--	<0.1	0.0	4.1
Project Total	**36.7**	**3.5**	**0.0**	**0.0**	**28.3**	**0.2**	**0.9**	**1.0**	**0.0**	**40.9**

Source: NCRS 2013a

Table includes temporary and permanent access roads.

Totals may not sum correctly due to rounding.

The data presented in table 4.2.3-1 are for informational purposes only and included potentially overlapping data where access roads overlapped with construction workspaces. For these reasons, the data in table 4.2.2-2 and table 4.2.3-1 may not match.

[a] Areas identified as Highly Water Erodible Soils are ranked as “Very Severe” or “Severe” by SSURGO Erosion Hazard (Off-Road, Off-Trail) criteria.

[b] Areas identified as Highly Wind Erodible Soils have a Wind Erodibility Index of 134 or greater as determined by SSURGO.

[c] Areas identified to have shallow depth to bedrock are described as having bedrock less than 5 feet from the surface as determined by SSURGO.

[d] Areas identified to have Stony/Rocky Soils are lands that are composed of 20% or more of rock fragments larger than 3 inches in the surface layer as determined by SSURGO.

[e] Areas identified to have a severe compaction potential are limited to agricultural and residential lands that contain soils with a mean high water table of 1.5 feet or less below the surface elevation and have a surface texture of sandy clay loam, or finer as determined by SSURGO.

[f] Areas identified to have poor revegetation potential are lands that contain a Capability Class 3 or greater, a low available water capacity, and slopes greater than 8% as determined by SSURGO.

[g] Areas identified to have poor drainage potential are ranked as “poor” or “very poor” as determined by SSURGO.

[h] Areas identified to have a hydric rating meet the all hydric criteria as determined by SSURGO.

[i] Areas identified as Prime Farmland are identified as lands that meet the All Prime Farmland or Farmland of Statewide Importance criteria as determined by SSURGO.

TABLE 4.2.3-2
Soil Limitations (in acres) for Additional Temporary Workspaces for the Constitution Pipeline Project

County	Potential Water Erosion[a]	Potential Wind Erosion[b]	Stony/ Rocky Soils[c]	Shallow Depth to Bedrock[d]	Soil Compaction Potential[e]	Poor Revegetation Potential[f]	Poor Drainage Potential[g]	Hydric Soils[h]	Prime Farmlands[i]
Pennsylvania									
Susquehanna	2.8	0.0	0.0	3.8	0.0	0.0	0.6	0.6	9.1
New York									
Broome	0.1	0.0	0.0	1.8	1.6	2.7	1.0	0.0	8.6
Chenango	0.0	0.0	0.0	0.6	0.1	0.0	0.5	0.0	6.3
Delaware	0.5	0.0	0.0	8.7	0.0	0.0	0.5	0.0	25.1
Schoharie	1.5	0.0	0.0	8.3	0.0	0.0	1.2	0.7	11.0
Project Total	**4.8**	**0.0**	**0.0**	**23.2**	**1.7**	**2.7**	**3.8**	**1.4**	**60.1**

Source: NCRS 2013a

Table includes temporary and permanent access roads.

Totals may not sum correctly due to rounding.

[a] Areas identified as Highly Water Erodible Soils are ranked as “Very Severe” or “Severe” by SSURGO Erosion Hazard (Off-Road, Off-Trail) criteria.

[b] Areas identified as Highly Wind Erodible Soils have a Wind Erodibility Index of 134 or greater as determined by SSURGO.

[c] Areas identified to have shallow depth to bedrock are described as having bedrock less than 5 feet from the surface as determined by SSURGO.

[d] Areas identified to have Stony/Rocky Soils are lands that are composed of 20% or more of rock fragments larger than 3 inches in the surface layer as determined by SSURGO.

[e] Areas identified to have a severe compaction potential are limited to agricultural and residential lands that contain soils with a mean high water table of 1.5 feet or less below the surface elevation and have a surface texture of sandy clay loam, or finer as determined by SSURGO.

[f] Areas identified to have poor revegetation potential are lands that contain a Capability Class 3 or greater, a low available water capacity, and slopes greater than 8% as determined by SSURGO.

[g] Areas identified to have poor drainage potential are ranked as “poor” or “very poor” as determined by SSURGO.

[h] Areas identified to have a hydric rating meet the all hydric criteria as determined by SSURGO.

[i] Areas identified as Prime Farmland are identified as lands that meet the All Prime Farmland or Farmland of Statewide Importance criteria as determined by SSURGO.

Potential impacts on compaction prone soils would be mitigated by utilizing methods described in Constitution's *Soil Protection and Subsoil Decompaction Plan* contained within the state-specific ECPs. Soils with moderate moisture content would typically be more prone to compaction associated with construction activities than dry soils. Potential impacts on compaction prone soils would be mitigated through the use of timber or board mats through wetland areas. In agricultural areas Constitution would employ topsoil segregation techniques and prevent the mixing of topsoil with subsoil and/or rock. Soil identified as being compacted would be mitigated in two phases. In the first phase the contractor would deep rip and rock pick the subsoil with a deep tillage device. Stones that are larger than 4 inches would be removed from the subsoil area being ripped. The second phase following topsoil replacement would employ a paratill to loosen the soil to a depth of 20 to 22 inches. Additionally, Constitution would conduct compaction tests and till compacted subsurface soils in agricultural and residential areas through the use of paratills or similar equipment as identified in the ECPs. Constitution has also adopted two guidance documents prepared by NYSDAM: *Special Crop Productivity Monitoring Procedures* and *Seeding, Fertilizing, and Lime Recommendations for Gas Pipeline Right-of-way Restoration in Farmland.* The implementation of these guidance documents, as well as Constitution's Organic Farm Protection Plan (section 4.8), all would assist with the prevention, minimization, or mitigation of potential impacts on soils and associated resources such as farms.

In order to minimize and mitigate potential impacts on areas with poor revegetation potential, Constitution would follow several procedures during construction, such as:

- restoration of the right-of-way with lime, fertilizer, seed, and mulch;
- selection of the proper seed mix using guidance from appropriate agencies and sources;
- preparation of the seedbed to ensure effective seed application;
- broadcast seeding (where completed by hand) in two separate perpendicular passes at one half rate to ensure proper coverage;
- use of netting or matting made of jute, wood excelsior, or similar materials to anchor mulch where needed; and
- restoration and seeding of the right-of-way within 20 working days after final grading has been completed, with reseeding taking place within 6 working days after final grading.

Soils with moderate moisture content may be more prone to compaction associated with construction activities than dry soils. Potential impacts on compaction prone soils would be mitigated through the use of timber or board mats to cross areas that are compaction prone. Additionally, Constitution would conduct compaction tests and till compacted subsurface soils in agricultural and residential areas through the use of paratill or similar equipment as identified in the ECPs. Constitution would use a combination of BMPs to remove excess water from the trench, known as dewatering, including:

- sump pits located at the lowest depth of the trench;
- sediment filter bags to remove sediment greater than 150 microns;
- sediment filter bags placed in vegetated areas to provide additional filtration;
- discharge locations in approved well vegetated upland areas; and
- employment of BMPs if the discharge from filter bags appears milky or excessively cloudy.

In areas of shallow depth to bedrock Constitution would employ subsoil protection techniques. These techniques may include separately stockpiling the "B" soil horizon up to a depth of 12 inches or to the top of the bedrock layer or from the full top width of the trench and spoil pile area. Excavated bedrock would be removed from the site at the time of excavation and using imported subsoil material to backfill the trench. The use of the techniques would be decided on a site-specific basis.

Hydric soils are most often associated with wetlands. Constitution plans to employ the following BMPs and techniques when crossing wetlands. Additional information and details can be found in the state-specific project ECPs. To protect and minimize impacts on wetlands, Constitution would:

- educate construction personnel on wetland construction techniques and wetland locations;
- limit the typical workspace to 75 feet where possible through wetlands;
- accelerate construction activities in and adjacent to wetlands where possible;
- limit equipment operation to those necessary for construction of the pipeline;
- stabilize upland areas; and
- inspect the right-of-way periodically both during and after construction as well as make repairs to erosion control devices and restoration features.

When constructing in saturated wetlands Constitution would employ the following techniques:

- minimize the clearing of vegetation and removal of stumps;
- install sediment barriers across the right-of-way at the edge of the wetland following ground disturbance;
- if vegetation clearing is required, vegetation would be cut at ground level by hand, or by equipment that does not cause rutting, or by using equipment on equipment mats;
- if possible a maximum of two equipment mat layers would be used;
- no topsoil segregation would be conducted in inundated wetlands; and
- in areas with standing water equipment would be supported by floats, pontoons, or equipment mats.

Potential impacts on agriculture and prime farmlands would be minimized by implementing the BMPs that are provided in Constitution's ECPs. ECPs for agricultural lands and prime farmlands were developed from the FERC Plan as well as NYSDAM's *Pipeline Right-of-Way Construction Projects Agricultural Mitigation, through the Stages of Planning, Construction/Restoration and Follow-up Monitoring* guidance.

Mitigation methods include replacement of segregated topsoil, stone removal, and compliance with re-seeding recommendations. Pasture land would be protected by use of alternative grazing locations and alternate locations where livestock can cross the construction corridor. Potential grazing deferment plans may be negotiated with the landowner. Reimbursement of any damage or loss of product due to construction activities would be negotiated with the landowner/producers. Impacts on agricultural lands would be mitigated by use of the following measures including:

- employment of AIs / Drainage Specialists for monitoring specific to each part of project construction;

- implementation of grazing deferment programs, creation of trench fencing and crossings, as well as site-specific organic farm protection plans;
- installation of construction entrances that would be constructed of stone placed on geotextile fabric located at paved road intersections;
- repair of any impacts on subsurface drains;
- segregation of topsoil, removal of rock greater than 4 inches, and subsoil decompaction; and
- monitoring that would be conducted for 2 years after the initial in-service date or restoration.

Agricultural soils identified as having fragipans (which can be related to water boils) would be mitigated by follow-up monitoring and installation of interceptor drain tiles. There are 5.4 miles of soils that are considered to be highly erodible land, vulnerable due to wetness, shallow depth to bedrock, or unavoidable organic mucklands in Pennsylvania; 17.2 such miles are in New York. Additional details on these farmlands can be found in Constitution's ECPs. Subsurface flow issues within the pipeline trench would be avoided by implementation of a planned system of sandbag trench breakers.

In agricultural areas where soils become saturated before topsoil segregation occurs, the AI would either halt work or allow construction to proceed as long as rutting does not exceed pre-determined depths. Constitution has proposed to determine the allowable depth of rutting by subtracting 6 inches from the topsoil depth as determined by the AI. For example, if the topsoil depth is 14 inches, the maximum depth of rutting would be 8 inches. However, the NYSDAM recommends a maximum allowable rutting depth of 4 inches in all agricultural fields regardless of topsoil depth. Because these areas contain vulnerable highly productive soils, **we recommend that:**

- **Constitution should adhere to a maximum allowable construction equipment rutting depth of 4 inches in saturated agricultural areas, where Constitution has not segregated topsoil across the full right-of-way width.**

Additionally, according to the NYSDAM, restoration of agricultural areas is generally not possible between October 1 through May 15 due to excessive soil moisture which can result in loss and/or mixing of topsoil during replacement. The NYSDAM has requested that the soil workability be determined prior to conducting any agricultural restoration during this timeframe in consultation with the FERC, the NYSDAM, and the AI. We agree restoration during these timeframes may result in loss of productive soils and therefore **we recommend that**:

- **<u>Prior to conducting any agricultural restoration between October 1 and May 15,</u> Constitution should determine soil workability in consultation with the FERC, the NYSDAM, and the AI for all New York agricultural parcels.**

Revegetation of agricultural lands and crops would be considered to be complete if the yields of crops on impacts lands are similar to yields in other un-impacted sections of the same field. Monitoring of impacted agricultural lands would continue for at least two growing seasons following restoration. Constitution would provide agricultural inspectors to make sure contractors use and maintain the proper erosion and sediment control BMPs during construction. Attachment 4 to the state-specific ECPs specifies the criteria for agricultural monitoring, which includes plant populations, general appearance, and yields.

Constitution would monitor for problems related to topsoil replacement, soil-profile, compaction, rocks, drainage, and irrigation stems that are the result of pipeline construction in agricultural areas and would continue to correct problems until an AI declares restoration to be complete.

4.2.5 Topsoil Segregation

Topsoil is the uppermost layer of soil, typically has the highest concentration of organic materials, and generally has greater biological productivity than subsurface soils. The micro-organisms and other biological material typically found in topsoil provide necessary nutrients to vegetation. Topsoil also has the highest concentration of plant root and seeds. Topsoil preservation is important especially for restoration of natural vegetation and cropland, especially in areas where topsoil is limited in extent or depth. Topsoil would be segregated across the width of the construction workspace in agricultural areas including improved pastures and residential areas, and in areas where requested by the landowner and in accordance with Constitution's state-specific ECPs. In unsaturated wetlands, up to 12 inches of topsoil would be segregated over the pipeline trench. Topsoil segregation would not be possible in wetlands with saturated soils or standing water.

Topsoil would be removed to a minimum depth of 12 inches in accordance with Constitution's state-specific ECPs. Topsoil would be stockpiled in a manner that prevents mixing with subsurface soil. Silt fences and other barriers would be installed to prevent erosion and siltation from the stockpiles from migrating into nearby wetlands and waterbodies.

Iroquois would segregate suitable topsoil from the compressor station area. The segregated topsoil would then be utilized in final site grading. If Iroquois is unable to stockpile a sufficient amount of topsoil, topsoil may be imported from off-site sources. Silt fences and other barriers would be installed to prevent erosion and siltation from the stockpiles into nearby wetlands and waterbodies.

Construction associated with the compressor station would be within or directly adjacent to soils that have been previously disturbed by Iroquois' existing Wright Compressor Station. To minimize general construction-related effects to soils, Iroquois would implement measures described in its Plan and Procedures. These measures would include inspection during construction, installation and maintenance of erosion control devices, spill prevention measures, topsoil segregation, soil compaction mitigation in restored areas, and revegetation.

Impacts of Constitution's project during post-construction operations are expected to be minimal. Permanent impacts from the projects would include aboveground facilities, which include the proposed Westfall Road M&R station, Turnpike Road M&R station, MLVs, and the proposed compressor station. However, as no additional ground would be excavated during operation of Constitution's aboveground facilities and Iroquois' project, no impacts are expected during operations. Based on the overall soil conditions present in the projects' area, Constitution and Iroquois' proposed construction and operation methods, we conclude that construction of the projects would not significantly alter the soils of the region.

4.3 WATER RESOURCES

4.3.1 Groundwater Resources

4.3.1.1 Existing Groundwater Resources

Pennsylvania

Groundwater resources in Pennsylvania originate from Devonian-aged sedimentary rock consisting of sandstones, shales, and limestones. Shale and sandstone bedrock aquifers are not considered principal aquifers as their yields are lower than sand and gravel aquifers. Shale aquifer wells yield 5 to 20 gallons per minute (gpm) of groundwater while sandstone aquifer wells yield 5 to 60 gpm of groundwater. Yields can be increased to 200 gpm by drilling wells in fractured rock. Bedrock within Pennsylvania is covered by a layer of ground moraine deposits of loamy till (Trapp and Horn 1997).

Surficial aquifers in Pennsylvania tend to be along major streams and consist of unconsolidated sand and gravel deposits. Surficial aquifer yields range from 400 to 750 gpm near the Lehigh and Delaware Rivers, but could be as high as 1,300 gpm in other areas of northeastern Pennsylvania, and a few wells along the Susquehanna River have yields as high as 3,000 gpm (Trapp and Horn 1997). Pennsylvania residents rely on private water wells as a primary source of drinking water. Seventy-five percent of the total water used in Susquehanna County comes from groundwater (Fleeger 1999). The majority of the pipeline route in Pennsylvania crosses unconfined aquifers, in which the water table is exposed to the atmosphere (USGS 2002). Aquifers underlying the proposed pipeline are described in table 4.3.1-1.

TABLE 4.3.1-1
Aquifers Crossed by the Proposed Projects

State/Aquifer Type	Start Milepost	End Milepost	Approximate Depth (feet)	Average Yield (gpm)	New York Principal Aquifer
Pennsylvania					
Other Rock (Devonian-aged)	0.0	25.2	18-250, average 91	5-200	No
Surficial	19.8	22.0	6-30	400-3,000	No
New York					
Other Rock (Devonian-aged)	25.2	110.5	18-250, average 91	5-200	No
Surficial	28.6	29.0	<10	10-100	Yes
Surficial	32.7	34.4	<10	10-100	Yes
Surficial	35.4	36.8	<10	10-100	Yes
Surficial	44.9	46.5	<10	10-100	Yes
Surficial	47.1	47.3	Unknown	Unknown	Yes
Surficial	47.3	47.8	>10	>100	Yes
Surficial	47.8	48.4	Unknown	Unknown	Yes
Surficial	56.5	56.7	Unknown	Unknown	Yes
Surficial	56.7	56.9	>10	>100	Yes
Surficial	56.9	57.1	Unknown	Unknown	Yes

TABLE 4.3.1-1 Aquifers Crossed by the Proposed Projects					
State/Aquifer Type	**Start Milepost**	**End Milepost**	**Approximate Depth (feet)**	**Average Yield (gpm)**	**New York Principal Aquifer**
Surficial	57.8	59.1	<10	10-100	Yes
Surficial	60.7	61.1	>10	>100	Yes
Surficial	61.1	61.3	Unknown	Unknown	Yes
Surficial	87.9	88.1	>10	>100	Yes
Surficial	113.8	114.2	>10	>100	Yes
Surficial	119.7	120.1	>10	>100	Yes
Surficial	120.1	120.5	Unknown	<10	Yes
Surficial	124.3	124.3	>10	>100	Yes
New York and New England Carbonate-rock	110.5	117.9	20-500, might exceed 800	10-30, might exceed 1,400	No
Other Rock (Devonian-aged)	117.9	123.2	2-300, average 79	5-200	No
New York and New England Carbonate-rock	123.2	124.4	20-500, might exceed 800	10-30, might exceed 1,400	Yes

Sources: Trapp and Horn 1997, Olcott 1995, USGS 2012d, NYSDEC 2008a, Braun and Sevon 1997, Braun 2006.

New York

The majority of the groundwater resources in New York also originate from Devonian-aged sedimentary rock consisting of sandstones, shales, and limestones. However, a portion of the proposed route in New York (MPs 111 to 118 and MP 123 to 124) crosses New York and New England carbonate bedrock aquifers consisting of limestone, dolomite, and marble. Carbonate rock aquifers in New York typically yield 10 to 30 gpm. However, yields may be as high as 1,000 gpm in areas with a number of dissolution features and fractures in the rock (Olcott 1995). The majority of the pipeline in New York would cross unconfined aquifers.

Surficial aquifers in New York are generally glacial deposits of till and gravel. The proposed pipeline area in New York generally has a layer of till over bedrock. Water well yields in areas of till are generally around 1 gpm but could be as high as 20 gpm. Glacial valley aquifers generally have water well yields of 10 to 1,000 gpm and could be as high as 3,000 gpm (Olcott 1995). Approximately 16 percent of the residents of Broome County, 57 percent of Chenango County residents, 51 percent of Delaware County residents, and 68 percent of Schoharie County residents rely on private water wells for drinking water (USGS 2005).

4.3.1.2 Sole Source Aquifers

The EPA defines a sole source aquifer (SSA) or principal source aquifer area as one that supplies at least 50 percent of the drinking water consumed in the area overlying the aquifer. The EPA guidelines also stipulate that these areas can have no alternative drinking water source(s) that could physically, legally, and economically supply all those who depend upon the aquifer for drinking water (EPA 2010a).

Based on a review of the EPA's designated SSA mapping, the pipeline would not cross a designated SSA in Pennsylvania. The pipeline would cross about 4 miles of the Clinton Street Ballpark SSA in Broome County, New York at two locations (MP 25.2 and MP 40.0). Additionally, the pipeline would cross surface waters within the stream flow source area, which may recharge the Clinton Street Ballpark SSA. The Clinton Street Ballpark SSA is within the Susquehanna River Basin and consists of glacial deposits. The glacial outwash is thicker than 200 feet along the river valley and decreases in thickness towards the valley walls (EPA 1985).

4.3.1.3 State Designated Aquifers

In addition to the EPA designated SSA program, individual states may enact regulations protecting significant aquifer recharge areas, critical areas where excessive use of groundwater poses a threat to the long-term integrity of a water-supply source, or preservation areas to protect natural resources including public water supply sources. There are no state-designated aquifers in the area of the proposed pipeline in Pennsylvania.

The NYSDEC designates highly productive aquifers that are utilized as municipal water supply sources as Primary Water Supply Aquifers (Primary Aquifers). Principal Aquifers are aquifers that are not Primary Aquifers, but are known to be highly productive or have geologic conditions that suggest an abundant water supply (NYSDEC 1990). The proposed projects in New York would not cross any Primary Aquifers. However, the projects would cross 19 Principal Aquifers in New York, as listed in table 4.3.1-1, for a total length of 12 miles.

4.3.1.4 Wellhead and Aquifer Protection Areas

Under the Safe Drinking Water Act, as amended, each state is required to develop and implement a Wellhead Protection Program in order to identify the land and recharge areas contributing to public supply wells, and prevent the contamination of drinking water supplies. The Act also requires the development of a broader-based Source Water Assessment Program, which includes the assessment of potential contamination to both groundwater and surface water through a watershed approach.

Pennsylvania

The proposed pipeline route in Pennsylvania would not cross any WHPAs.

New York

The Wellhead Protection Program in New York is administered by the New York State Department of Health (NYSDOH) as part of the Source Water Assessment Program. The Assessment Program provides information on the potential threat of contamination to both groundwater and surface water sources that supply New York's public drinking water systems. The pipeline would cross three WHPAs in Delaware and Schoharie Counties (NYSDOH 2012). Two additional WHPAs in Delaware County would be within 100 feet of the pipeline. Constitution's access roads and contractor yards would cross five WHPAs. One WHPA would be within 300 feet of a contractor yard in Schoharie County.

4.3.1.5 Water Supply Wells and Springs

According to information provided by the NYSDOH, no public water supply wells are within 150 feet of the proposed pipeline. In addition, Constitution consulted with landowners regarding the locations of private wells and springs on their properties. Based on these consultations, no public water supply wells or springs are within 150 feet of the projects. The projects would be within 150 feet of 2

monitoring wells, 4 private water wells used for drinking water (approximately MP 29 through MP 36), and 20 private water supply wells or springs that are not used for drinking water (table 4.3.1-2). However, Constitution has not completed identifying water wells and springs within 150 feet of construction workspaces in Pennsylvania and New York due to numerous changes in Constitution's proposed route and lack of survey access. Therefore, **we recommend that:**

- **<u>Prior to construction</u>, Constitution should file with the Secretary the location of all water wells and springs within 150 feet of the pipeline and aboveground facilities.**

The Delaware County Soil and Water Conservation District identified several important drinking water springs (2 to 5 gpm) in the project area. While the pipeline project would not impact the springs, it would cross several springs recharge areas. The recharge areas are characterized by having fractured sandstone bedrock, which may require blasting. Therefore, blasting and contamination are the primary concerns of construction in the proximity of springs.

TABLE 4.3.1-2
Private Water Supply and Monitoring Wells and Springs Within 150 feet of the Proposed Projects

State/Well/Spring	Approximate Milepost	Distance from Centerline (feet)	Distance from Construction Work Area (feet)	Direction from Construction	Drinking Water (Yes or No)
Pennsylvania					
Monitoring Well	4.5	96	46	West	No
Monitoring Well	4.6	41	0	West	No
Water Well	5.4	213	98	East	Yes
Water Well	9.8	71	21	West	No
Water Well	10.0	225	150	East	No
Water Well	10.8	180	105	South	No
Spring Well	14.4	53	3	North	No
Water Well	21.7	141	106	South	No
Water Well	21.7	185	150	North	No
New York					
Water Well	29.0	154	79	East	Yes
Water Well	29.0	173	98	East	Yes
Water Well	36.4	150	100	West	Yes
Water Well	60.6	264	139	East	No
Water Well	60.6	186	136	West	No
Water Well	90.3	114	64	South	No
Water Well	96.5	68	0	North	No
Water Well	102.6	196	121	East	No
Water Well[a]	106.8	N/A	N/A	N/A	No
Water Well	119.6	34	0	South	No
Water Well	119.6	81	0	North	No
Water Well	119.7	114	0	North	No
Water Well	119.7	228	103	South	No

TABLE 4.3.1-2 (continued) Private Water Supply and Monitoring Wells and Springs Within 150 feet of the Proposed Projects					
State/Well/Spring	Approximate Milepost	Distance from Centerline (feet)	Distance from Construction Work Area (feet)	Direction from Construction	Drinking Water (Yes or No)
Water Well	119.7	73	8	North	No
Water Well	119.7	73	23	North	No

Sources: Landowners, Constitution field surveys, PADEP 2013c, NYSDEC 2013c

[a] Within the boundary of Spread 5 contractor yard.

N/A = Not applicable

Consultation with the Broome County Health Department and the Chenango County Department of Public Health identified a recharge area and natural springs that provide drinking water to the Village of Afton. Constitution incorporated a re-route (alternative route B) that moved the route 1.5 miles away from the natural springs. Additional information regarding this re-route is presented in section 3.4.2.

4.3.1.6 Contaminated Groundwater

As discussed in sections 2.3.1 and 4.8, no areas of contaminated groundwater (or soils or sediments) were identified within the area of the proposed projects (EDR 2012). Constitution has developed a Contamination Plan, which it would use in the event that unanticipated contamination is encountered during the construction process.

4.3.2 Aboveground Facilities and Contractor Yards

As discussed in section 2.0, Constitution would construct the Turnpike Road M&R Station, associated pig launcher, and a communication tower at MP 0 in Susquehanna County, Pennsylvania. This meter station would be within Devonian-aged sandstone and shale aquifers. The Westfall Road M&R Station, its associated pig receiver, and Iroquois' compression transfer station would be at MP 124.4 in Schoharie County, New York, within the New York and New England carbonate-rock aquifers. Groundwater impacts from construction of these facilities would be similar to that described above for the pipeline facilities.

Constitution would install its MLVs and other communication towers within the pipeline's permanent right-of-way. Because construction of the MLVs and communication towers facilities would involve shallow excavation and allow infiltration at the sites potential impacts on groundwater resources would be the same as those discussed for the pipeline. Cathodic protection systems would be installed in uplands along 11 permanent access roads as listed in table 2.1.2-2.

Constitution has proposed to use six contractor yards. As of issuance of this final EIS, Constitution has provided survey results for three of the six contractor yards for water wells. Because the surveys for all proposed contractor yards have not been provided, **we recommend that:**

- **<u>Prior to construction</u>, Constitution should file with the Secretary the results of surveys for all proposed contractor yards not previously filed concerning water wells, waterbodies, and wetlands, as well as the status of any required agency consultations.**

4.3.2.1 Groundwater General Impact and Mitigation

Construction activities are not likely to significantly impact groundwater resources because the majority of construction would involve shallow, temporary, and localized excavation. However, shallow aquifers could sustain minor, indirect impacts from changes in overland water flow and recharge caused by clearing, grading, and trenching of the right-of-way.

In addition, near-surface soil compaction caused by heavy construction vehicles could reduce the soil's ability to absorb water in these isolated areas. During construction, local water table elevations could be affected by trenching and backfilling. The pipeline trench would be excavated to a depth of 6 to 8 feet in most cases. In areas where groundwater is near the surface, trench excavation may intersect the water table. Shallow aquifers may also be contacted by drilling associated with Direct Pipe operations. These minor, direct, and indirect impacts would be temporary and would not significantly affect groundwater resources. Constitution would avoid or further minimize these impacts by using construction techniques described in its site-specific ECPs, such as using temporary and permanent trench plugs and interceptor dikes. After installation of the proposed pipeline, Constitution would restore the ground surface as closely as practicable to original contours and revegetate any exposed soils to ensure restoration of pre-construction overland flow and recharge patterns. Constitution also incorporated several re-routes (such as alternative routes B, Q, and R) to avoid impacts on reservoirs, springs, and sinks used for drinking water. Additional information regarding re-routes can be found in section 3.4.2.

Accidental Spills of Hazardous Materials

Pipeline construction necessitates the use of heavy equipment and associated fuels, lubricants, and other potentially hazardous substances that, if spilled, could affect shallow groundwater and/or unconsolidated aquifers. The majority of the pipeline route would cross unconfined aquifers. A spill could reach different aquifer layers in these areas. Accidental spills or leaks of hazardous materials associated with vehicle fueling, vehicle maintenance, and construction materials storage would present the greatest potential contamination threat to groundwater resources. Soil contamination resulting from these spills or leaks could continue to add pollutants to the groundwater long after a spill occurs. Implementation of proper storage, containment, and handling procedures would minimize the chance of such releases. Constitution's Spill Plan and Iroquois' SPCC Plan addresses the preventative and mitigative measures that would be implemented to avoid or minimize the potential impacts of hazardous material spills during construction. Measures outlined in Constitution's Spill Plan and Iroquois' SPCC Plan and in Constitution's and Iroquois' Plan and Procedures include, but are not limited to:

- regular inspection of containers and tanks for leaks;
- prohibition of fueling, lubricating activities, and hazardous material storage in or adjacent to sensitive areas;
- use of secondary containment for storage of fuels, oils, hazardous materials, and equipment;
- implementation of emergency response procedures, including spill reporting procedures; and
- use of standard procedures for excavation and off-site disposal of any soils contaminated by spillage.

We have reviewed Constitution's Plan, Procedures, and Spill Plan as well as Iroquois' SPCC Plan (Iroquois has adopted our Plan and Procedures) and find that these protocols adequately address the storage and transfer of hazardous materials and the response to be implemented in the event of a spill.

As discussed in section 2.5.2, Constitution and Iroquois would employ EIs to ensure compliance with the state-specific ECPs, Constitution's Spill Plan, Iroquois' SPCC Plan, and other specifications during construction and restoration. The EIs would have the authority to stop work and order corrective actions for activities that violate the environmental conditions of our Certificate and other permit authorizations.

Blasting

Constitution identified several portions of the proposed pipeline right-of-way where blasting may be required for pipeline installation (section 4.1.3.7 and appendix I). Blasting could affect groundwater quality by temporarily changing groundwater levels and increasing groundwater turbidity near the construction right-of-way; however, rock particles and sedimentation would be expected to settle out quickly. Constitution would attempt to utilize specialized excavation methods, including ripping or the use of hydraulic hammers or rock saws. However, blasting may be necessary to achieve the required trench depth if these methods prove to be ineffective or inefficient. Constitution has developed a Blasting Plan to minimize potential adverse impacts on the environment, nearby water sources, structures, or utilities. As stated in the Blasting Plan, licensed blasting contractors would conduct the blasting activities in accordance with all applicable federal, state, and local regulations. Constitution would obtain all necessary permits if blasting is required.

We anticipate that impacts on nearby wells and springs (such as increases in turbidity) from blasting would be temporary and would likely dissipate shortly after blasting or after a well has been flushed several times. Constitution has committed to contacting affected landowners again regarding the location of any wells or springs just prior to the start of construction so that a comprehensive list of these features can be compiled. Additionally, Constitution has agreed to test all water wells within 150 feet of the proposed construction workspace for water quality and quantity parameters prior to and after construction, and provide an alternative water source or a mutually agreeable solution in the event of construction-related impacts. We find this acceptable.

Water Use and Quality

As stated above, Constitution has agreed to perform pre- and post-construction monitoring for well yield and water quality for private wells within 150 feet of the proposed construction workspace. The closest water supply wells are approximately 240 feet from Iroquois' proposed project. Constitution would monitor water quantity parameters including water column height, flow rate of existing equipment, water column drawdown, rebound time, volatile organic compounds, total petroleum hydrocarbons, and compounds used in blasting (if blasting has occurred nearby). Constitution's water supply well testing plans would comply with NYSDOH recommendations (2006). Should the integrity of any water supply well be impacted during construction, either water quantity or quality, Constitution would provide an alternative water source or compensate the landowner for a new, comparable well. Constitution has also agreed to file with the Secretary, within 30 days after completion of construction, a report describing landowner complaints received regarding well quality and yield and how those complaints were resolved.

In addition, Constitution would conduct additional pre-and post-construction monitoring for water quality and yield for wells and springs within karst areas (see section 4.1.3.6). This additional monitoring would apply to the three springs that supply water to the Village of Schoharie (Young, Dugan, and Westfall Springs) and three private drinking water wells between MP 115 and MP 124. Constitution would collect measurements before construction activities to establish baseline data and monitor twice per day when construction activities occur within 2,000 feet of wells, springs, or the groundwater flow to springs.

Constitution has also agreed to provide expert field assessment of seeps and springs within 150 feet of construction workspaces. The expert would determine if construction activities could have an impact on the seeps and/or springs. The expert would then provide recommended construction alternatives to avoid impacts as applicable.

Constitution would route around septic systems and the associated leach fields, if possible. If impacts cannot be avoided, Constitution would work with the landowners to relocate the existing septic system and would compensate the landowner for associated costs and for loss of usable land.

We asked Constitution to consult with the applicable agencies and describe any avoidance, minimization, and/or mitigation measures recommended by the agencies for the proposed crossing of the Clinton Street Ballpark SSA. Additionally, we contacted the EPA to discuss potential impacts regarding the proposed crossing of the Clinton Street Ballpark SSA. The EPA indicated that they would not require a detailed review of potential impacts on the Clinton Street Ballpark SSA for the projects because no federal funding would be involved. No additional avoidance, minimization, or mitigation measures were recommended by the EPA for construction within the Clinton Street Ballpark SSA (Gould 2014). The best management practices, blasting procedures, and spill prevention/response measures described above would be used to minimize impacts on the Clinton Street Ballpark SSA, Principal Aquifers of New York, and WHPAs, which we determined would reduce risk to the aquifer to an acceptable level. Any impacts would be temporary and would not significantly affect groundwater resources.

Aboveground Facilities

The aboveground facilities, proposed compressor facility, access roads, and contractor yards would be in the same general vicinity as the proposed pipeline discussed above. The measures Constitution and Iroquois have proposed to minimize the potential impacts of the pipeline on groundwater (e.g., adherence to the measures included in Constitution's ECPs, our Plan and Procedures, Constitution's Spill Plan, and Iroquois' SPCC Plan) would apply to these areas as well. Additionally, although some clearing and grading activities may be associated with the contractor yards and access roads, trenching and drilling would not take place in these areas, thereby reducing the potential for impact. In addition, excavation associated with the compressor facility is expected to be less than 6 feet deep (i.e., the depth to groundwater at the parcel) and therefore impacts on groundwater would be minimal. According to Iroquois, blasting is not expected to be required for installation of the compressor station. If blasting were required, it would be conducted by licensed blasting contractors in accordance with all applicable federal, state, and local regulations and permits. For these reasons, we do not expect the construction or use of the aboveground facilities, access roads, and contractor yards to impact groundwater resources.

Operation Impacts

The proposed pipeline would be a fixed belowground structure, coated in accordance with the DOT standards, and hydrostatically tested prior to the commencement of operation in order to avoid initial leaks. Constitution and Iroquois would conduct monitoring in accordance with the DOT requirements during operations to minimize potential impacts of corrosion and leaks. None of the proposed aboveground facilities involve operation of activities belowground. In accordance with Iroquois' SPCC Plan, all containers of 55 gallons or more, as well as fuel tanks would be stored within secondary containment. Therefore, no impacts on groundwater resources would occur during operation of the projects.

Conclusion

No long-term impacts on groundwater are anticipated from construction or operation of the projects because disturbances would be temporary, erosion controls would be implemented, natural ground contours would be restored, and the right-of-way revegetated. Implementation of Constitution's ECPs and Iroquois' Plan and Procedures would limit impacts from construction on groundwater resources. Temporary, minor, and localized impacts could result during trenching activities in areas with shallow groundwater (depth less than 10 feet below the ground surface) crossed by the pipeline. The greatest threat posed to groundwater resources would be a hazardous material spill or leak into groundwater supplies. We have reviewed Constitution's Spill Plan and Iroquois' SPCC Plan and conclude that these plans adequately address strategies and methods to prevent or limit such contamination should a spill occur. We do not anticipate any significant impacts on aquifers by the proposed projects given their depth and the relatively shallow nature of construction.

4.3.3 Surface Water Resources

4.3.3.1 Existing Surface Water Resources

Constitution and Iroquois identified surface water resources in the majority of the project area during field surveys conducted from 2012 through 2014. Environmental information was obtained for areas where access permission has not been granted from USGS topographic mapping, aerial photography, and other available GIS-based information.

The projects would cross three watershed basins. Watershed descriptions and approximate locations are provided in table 4.3.3-1.

TABLE 4.3.3-1
Watersheds Crossed by the Proposed Projects

Watershed	Approximate Milepost Range[a]	Drainage Area	Description
Susquehanna River	0 – 27 40 – 101	27,500 square miles	The Susquehanna River watershed spans portions of Pennsylvania, New York, and Maryland (NYSDEC 2013d). The Susquehanna River watershed is divided into six sub basins: Lower Susquehanna, Juniata River, West Branch Susquehanna River, Middle Susquehanna, Chemung River, and Upper Susquehanna River.
Delaware River	27 – 40	12,800 square miles	The Delaware River watershed covers portions of New York, Pennsylvania, New Jersey, and Delaware. The headwaters of this watershed begin in the Catskill Mountains and eventually flow into the Delaware Bay and Atlantic Ocean (NYSDEC 2013d).
Mohawk River	101 – 124 and Iroquois' project	3,460 square miles	The Mohawk River watershed is entirely within the state of New York. This watershed begins in the valley between the Adirondacks and Tug Hill Plateau and ends 140 miles east at the Hudson River (NYSDEC 2013d).

[a] Mileposts have been rounded up for purposes of this table and do not reflect exact locations.

Appendix K lists the 289 waterbodies that Constitution would cross, and includes waterbody name, location, crossing width, flow type, fishery type, FERC classification, state water quality classification, and proposed crossing method. These include 116 perennial waterbody crossings, 109 intermittent waterbody crossings, and 64 ephemeral waterbody crossings. In addition to the 289

waterbodies crossed by the pipeline trench, another 46 waterbodies would be within construction the construction right-of-way (but not crossed by the pipeline).

Pipeline Facilities

Pennsylvania

The Pennsylvania portion of the pipeline would require 45 minor waterbody crossings and 24 intermediate waterbody crossings. In addition to these 69 waterbodies another 16 would be within the construction right-of-way, but not crossed by the trenchline directly.

New York

Constitution would cross 135 minor waterbodies, 84 intermediate waterbodies, and one major waterbody (greater than 100 feet wide at the crossing) in New York (Schoharie Creek at MP 119.7). In addition to these 220 waterbodies, another 30 are within the construction right-of-way, but not crossed by the trenchline directly.

Constitution has provided a site-specific crossing plan for the major waterbody that would be crossed by the proposed pipeline, Schoharie Creek. Constitution would cross Bennettsville Creek, Middle Brook, and Schoharie Creek using the Direct Pipe method.

Aboveground Facilities and Contractor Yards

No waterbodies are present within the proposed workspace at any of the aboveground facility sites, including Iroquois' proposed facilities. As of issuance of this final EIS, Constitution has provided survey results for three of the six contractor yards. Field surveys identified waterbodies within the boundaries of contractor yards Spread 1 and Spread 5. We recommended above that Constitution complete all required surveys and provide us with the updated status of agency permitting for all of the proposed contractor yards prior to construction.

Access Roads and Cathodic Protection Systems

Proposed access roads associated with the pipeline would require four minor waterbody crossings in Pennsylvania and would require three minor and three intermediate waterbody crossings in New York. Of these, one waterbody is ephemeral, seven are intermittent, and two are perennial. In addition, one waterbody would be present within the proposed access road construction right-of-way, but not intersected by the trenchline directly. Cathodic protection systems would be installed in uplands along 11 permanent access roads, as listed in table 2.1.2-2.

Constitution's access roads would temporarily cross four waterbodies and permanently cross five waterbodies by culverts or equipment bridges. Constitution would remove the temporary culvert or equipment bridge after construction and restore the stream bed and banks. The size and installation methods for the permanent culverts would vary based upon waterbody classification.

Constitution proposed to stabilize and permanently fill (with culverts) five waterbodies, use minor fill at one waterbody, and permanently fill six wetlands (appendix K). As part of the draft EIS, we recommended Constitution provide site-specific plans for the proposed permanent access road crossings of waterbodies as well as more details and justifications. This information was provided by Constitution in April 2014. However, based on our experience with similar projects in similar terrain, we conclude

that the use of permanent fill is not justified for access to the permanent right-of-way. Therefore, **we recommend that:**

- **Constitution should not permanently fill any waterbodies or wetlands for the use of access roads.**

4.3.3.2 Public Watersheds

Pennsylvania

Constitution contacted the EPA and the PADEP regarding public watersheds within the area of the proposed pipeline. Agency consultation indicated there are no public water supply watersheds, public water supply well sources, or springs within 300 feet of the proposed pipeline and that no potable water supply surface water intakes would be within 0.25 mile of the pipeline.

New York

According to Constitution, NYSDOH did not identify any potable water intakes within 3 miles downstream of proposed waterbody crossings in New York. However, a public reservoir is downstream of a proposed crossing of Collar Brook (DE-1H-S013). Constitution was unable to determine the location of the intake associated with this reservoir. In the draft EIS, we reported that Constitution proposed to cross waterbody DE-1H-S013 via HDD to avoid impacts on the waterbody and potential potable water intakes. However, in August 2014 (after the issuance of the draft EIS), Constitution changed its proposed crossing method from an HDD to a dry open-cut due to the results of a geotechnical survey. The geotechnical survey indicated a risk of an inadvertent release of drilling fluids from the HDD, which is particularly relevant given that such an incident could impact wetlands associated with the public reservoir. Crossing Collar Brook via a dry crossing method would eliminate trenching directly within flowing water and narrow the time of downstream sedimentation and turbidity to the installation and removal of the dam structures. There are three public drinking water supply watersheds and one water supply watershed overlay within the construction area of the pipeline in New York (table 4.3.3-2).

TABLE 4.3.3-2
Public Water Supply Watersheds Crossed by the Proposed Pipeline

State/County	Surface Water Supply	Crossing Length (miles)	Water Supply's Approximate Distance/Direction from the Pipeline (miles)
Pennsylvania			
		None Identified	
New York			
Delaware	Pine Hill Reservoir	0.8	0.6 mile North of MP 54.3
Delaware	Carr's Creek Watershed	2.7	Crosses from MPs 54.9 to 57.6
Schoharie	Cobleskill Reservoirs	0.8	1.2 miles Northwest of MP 111.7
Schoharie	Barton Hill Natural Resource Protection Overlay[a]	2.6	0.8 mile Southeast of MP 119.1 (closest spring)

[a] Iroquois' compressor station would also be within the watershed for the Barton Hill Natural Resource Protection Overlay.

The pipeline would cross 0.8 mile of the Pine Hill Reservoir watershed system, including a crossing of a tributary to the reservoir (waterbody DE-1H-S013). The reservoir is 0.6 mile north of the

proposed pipeline. According to the Village of Sidney Annual Drinking Water Quality Report for 2012, the Village of Sidney uses the Pine Hill Reservoir as a backup water supply (The Tri-Town News 2012).

The pipeline would cross 2.7 miles of the Carr's Creek Watershed, for which we received several comments regarding increased risk of flooding. Severe flooding events in 2006 prompted the Sidney Center Improvement Group to develop a watershed management plan for the Carr's Creek Watershed. The Carr's Creek Watershed is approximately 19,009 acres in size and drains into the Susquehanna River. The headwaters of the watershed are near Merrickville, New York.

The Cobleskill Reservoirs provide drinking water to the Village of Cobleskill and the State University of New York at Cobleskill. The Cobleskill Reservoir includes three reservoirs: Dow Reservoir, Smith Reservoir, and the Holding Pond. The pipeline would cross 0.8 mile of the reservoir system watershed. The Town of Cobleskill requested Constitution move the pipeline as far away from the reservoirs as possible. In response, Constitution adopted alternative route R, which moved the pipeline 0.9 mile from the Cobleskill Reservoirs. See section 3.4.2 for additional details regarding alternative route R.

The pipeline would cross the Barton Hill Natural Resource Protection Overlay for 2.8 miles. The pipeline would be 0.8 mile from the closest spring. This overlay zone includes the Young, Dugan, and Westfall Springs and associated aquifer, which provide groundwater to the Village of Schoharie. The pipeline would be 1.6 miles from the Young Spring, 1.1 miles from Dugan Spring, and 1.5 miles from the Westfall Spring. Iroquois' project would also be within the Barton Hill Natural Resource Protection Overlay.

4.3.3.3 Water Classifications

CWA Section 303(d) requires that each state review, establish, and revise water quality standards for all surface waters within each state. State classification systems develop monitoring and mitigation programs to ensure that water standards are attained as designated. Waters that fail to meet their designated beneficial use are considered as impaired and are listed under a state's 303(d) list of impaired waters.

Pennsylvania

Pennsylvania Code Title 25, Chapter 93 establishes water quality standards for each waterbody based on their use. Waterbody uses include: aquatic life, water supply, recreation, fish consumption, special protection, and navigation. Surface waters of Pennsylvania are classified as: coldwater fisheries (CWF), warmwater fisheries, migratory fisheries, and trout stocked. Selected waterbodies are further classified as High-Quality (HQ) or Exceptional Value (EV) and given special protection.

In order to be classified as a HQ surface water, the waterbody must have at least 1 year of water quality data which exceed parameters outlined in Pennsylvania Code Title 25 Chapter 93.4b, support a high quality aquatic community with a benthic macroinvertebrate score of 83 percent or more, or is classified as Class A wild trout stream.

In order to be classified as an EV surface water, the waterbody must meet the criteria for a HQ waterbody and at least one of the following:

- is a surface water of exceptional recreational significance;
- is designated as a wilderness trout stream;

- is a surface water of exceptional ecological significance;
- is located in an outstanding national, state, regional or local resource water; or
- is located in a national wildlife refuge or state game propagation and protection area; designated state park natural area, state forest natural area, national natural landmark, federal or state wild river, federal wilderness area, or national recreational area. (Pennsylvania Code 2012)

New York

Fresh waterbodies in New York are classified as either coldwater or warmwater and given letter classifications under regulation 6 New York Code of Rules and Regulations Part 701 which denote their best use: AA, A, B, C, and D (NYSDEC 2012c).

As stated in New York Code Part 701, the best uses for each class are:

- Class AA waters are a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. These waters require only disinfection treatment.
- Class A waters are a source of water supply for drinking, culinary or food processing purposes; primary and secondary contact recreation; and fishing. These waters require coagulation, sedimentation, filtration, and disinfection treatment.
- Class B waters are primary and secondary contact recreation and fishing.
- Class C and D waters are fishing. (NYSDEC 2012c)

4.3.3.4 Sensitive Waterbodies

Waterbodies that may be considered sensitive to pipeline construction, include, but are not limited to:

- waters that do not meet the water quality standards associated with the state's designated beneficial uses;
- surface waters that have been designated for intensified water quality management and improvement;
- waterbodies that contain threatened or endangered species or critical habitat;
- waters that support fisheries of special concern (e.g., trout streams);
- waterbodies that are designated as an outstanding resource water; and
- waterbodies on or designated to be added to the Nationwide Rivers Inventory or a state river inventory.

Other factors that can provide a basis for sensitivity include waterbodies in sensitive and protected watershed areas; waterbodies and intermittent drainages that have steep banks, potentially unstable soils, high volume flows, and actively eroding banks; and surface waters that have important riparian areas. Table 4.3.3-3 lists sensitive waterbodies that would be crossed by Constitution's project based on water quality parameters. Section 4.6.2.2 discusses waterbodies containing fisheries of special concern. The projects would not cross any Nationwide Rivers Inventory-designated rivers, state-designated rivers, or national Wild and Scenic Rivers.

TABLE 4.3.3-3
Water Quality Sensitive Surface Waters Crossed by the Constitution's Project

State/ Waterbody ID	Waterbody Name[a]	Milepost	Basis for Sensitivity[b]	Proposed Crossing Method[c]
Pipeline				
Pennsylvania				
SU-1B-S137	Meylert Creek	6.7	HQ-CWF	Dry crossing
SU-1B-S141	UNT to Wellmans Creek	8.3	HQ-CWF	Dry crossing
SU-1F-S148	UNT to Wellmans Creek	8.7	HQ-CWF	Dry crossing
SU-1F-S142	UNT to Wellmans Creek	8.7	HQ-CWF	Dry crossing
SU-1F-S142	UNT to Wellmans Creek	8.7	HQ-CWF	Dry crossing
SU-1B-S144	Wellmans Creek	8.9	HQ-CWF	Dry crossing
SU-1B-S145	UNT to Wellmans Creek	8.9	HQ-CWF	Dry crossing
SU-1D-S230	UNT to Wellmans Creek	9.2	HQ-CWF	Conventional bore
SU-1C-S029G	Road Ditch	9.9	HQ-CWF	Dry crossing
SU-1X-S231	Salt Lick Creek	10.0	HQ-CWF	Dry crossing
SU-1D-S235	Agricultural Ditch	10.5	HQ-CWF	Dry crossing
SU-1D-S237	UNT to Salt Lick Creek	10.7	HQ-CWF	Dry crossing
SU-1B-S031	UNT to East Lake Creek	11.0	HQ-CWF	Dry crossing
SU-1B-S033	UNT to East Lake Creek	11.3	HQ-CWF	Dry crossing
SU-1B-S035	UNT to East Lake Creek	11.3	HQ-CWF	Dry crossing
SU-1B-S036	UNT to East Lake Creek	11.4	HQ-CWF	Dry crossing
SU-1B-S038	UNT to East Lake Creek	11.4	HQ-CWF	Dry crossing
SU-1E-S039	UNT to East Lake Creek	11.6	HQ-CWF	Dry crossing
SU-1E-S043A	UNT to East Lake Creek	12.0	HQ-CWF	Dry crossing
SU-1C-S253	UNT to Salt Lick Creek	12.8	HQ-CWF	Dry crossing
New York				
DE-1H-S013	UNT to Susquehanna River	54.6	AA	Dry crossing
DE-1H-S013	UNT to Susquehanna River	54.6	AA	Dry crossing
Access Roads				
Pennsylvania				
SU-1D-S234 TAR8	UNT to Salt Lick Creek	10.1	HQ-CWF	Temporary Culvert

[a] UNT = unnamed tributary
[b] HQ = high quality
CWF = coldwater fishery
AA = a source of water supply for drinking, culinary or food processing purposes
[c] Dry crossing = dry open-cut (if not flowing during construction), flume, dam and pump, cofferdam

The sensitive waterbodies identified in Pennsylvania are listed due to their HQ designation. According to Pennsylvania regulations, HQ waterbodies are treated as specially protected waters. Constitution would cross all HQ waterbodies using a dry crossing or conventional bore method. Two sensitive waterbodies in New York would be crossed by the pipeline via dry crossing methods due to the infeasibility of the HDD method as determined by geotechnical investigations. Both of these waterbodies are classified as AA, indicating that they function as public water supplies.

We asked Constitution to evaluate the feasibility of using a trenchless crossing method for all sensitive or high quality waterbodies. According to Constitution, trenchless crossing methods are not practical for waterbody crossings less than 30 feet in width, unless they were adjacent to a larger wetland, waterbody complex, road, or railroad. Constitution indicated that such crossings would be impractical due to minimum length requirements, depth of pipeline considerations, and workspace requirements.

According to Constitution, conventional boring typically requires a crossing length of about 50 feet (minimum) to 400 feet (maximum) and two staging areas, typically 50 feet by 100 feet. HDD crossings typically require larger staging areas (typically 200 feet by 250 feet) on either side of the feature(s) crossed and a crossing distance not longer than 7,000 feet (for a 30-inch-diameter pipe). Direct Pipe crossings for a 30-inch-diameter pipe are typically less than 900 feet long. Because each HDD would generally require approximately 2.5 acres of workspace in order to complete the technique, it is rarely used to cross minor waterbodies, as dry crossings can often be implemented with less long-term impacts from staging workspaces. Additionally, shorter HDDs must be located closer to the ground surface (and resource) which may increase the risk of inadvertent releases of drilling fluid.

Technical constraints and engineering requirements eliminated all but three of the sensitive waterbodies listed in table 4.3.3-3 from consideration for a trenchless crossing. Constitution proposed to cross one of the three waterbodies (SU-1D-S230) using a trenchless crossing method (conventional bore). One waterbody (SU-1X-S231) would be crossed via a dry crossing method. Constitution reviewed the proposed dry crossing method for SU-1X-S231 in the field with the NYSDEC during the summer of 2013, and the proposed crossing method is consistent with the guidance provided by the NYSDEC. The last waterbody (SU-1C-S029G) was previously proposed as a conventional bore crossing. However, since the draft EIS, Constitution has changed this crossing to a dry crossing. Waterbodies are not typically crossed via conventional bore due to the deep bore pits required and the extensive pumping needed to remove groundwater from high water tables from these pits.

Waterbodies that Support Fisheries of Special Concern

Consultations with the PFBC and the NYSDEC determined that 118 waterbodies classified as fisheries of special concern would be crossed by the pipeline. Additional information regarding fisheries of special concern is discussed in more detail in section 4.6.2.2.

Contaminated Sediments

According to federal and state hazardous waste site databases, there are no contaminated sediments along the proposed pipeline route, aboveground facilities, and two of the six contractor yards (Spread 1 and 5 contractor yards). Constitution has not provided this information for the other three contractor yards (Spread 3a, 4a, 4d, 5-overflow parking).

Impaired Streams

According to the EPA's NEPAssist online database, the Susquehanna River in Pennsylvania is an impaired stream due to mercury levels (EPA 2013c). However, the pipeline would not cross the impaired

portions of the Susquehanna River or any other impaired streams in Pennsylvania or New York. Therefore, we do not expect any impacts on impaired streams.

Flood Hazard Zones

The pipeline project would cross 14 Federal Emergency Management Agency (FEMA) identified flood hazard zones (table 4.3.3-4). None of the proposed aboveground facilities, including Iroquois' project, would be within a FEMA flood hazard zone. According to FEMA, Zone A and AE[2] areas have a 1 percent annual chance of a flood event. These areas are known as the base flood or 100-year-flood. Zone X areas, also known as the 500-year-flood, have a 0.2 percent annual chance of a flood event (FEMA 2013a).

TABLE 4.3.3-4
FEMA Flood Hazard Zones Crossed by the Proposed Pipeline Facilities

State/ Waterbody ID	Waterbody Name	Milepost	FEMA Flood Zone[a]
Pennsylvania			
SU-1M-S220	Hop Bottom Creek	1.1	Zone A SFHA
SU-1B-S228	Martin's Creek	3.0	Zone A SFHA
SU-1B-S137	Meylert Creek	6.7	Zone A SFHA
SU-1B-S144	Wellman's Creek	8.9	Zone A SFHA
SU-1G-S298	Canawacta Creek	18.8	Zone A SFHA
SU-1C-S180	Starrucca Creek	21.8	Zone AE Floodway, Zone AE SFHA
SU-1X-284A	Roaring Run	22.5	Zone A SFHA
SU-1C-S283	Little Roaring Brook	23.3	Zone A SFHA
New York			
CH-1A-S048	Lander's Creek	45.4	Zone A SFHA
DE-1P-S129	Ouleout Creek	60.9	Zone AE Floodway, Zone AE SFHA, Zone X Flood Area
SC-1Q-S289	Schoharie Creek	119.7	Zone AE Floodway, Zone AE SFHA, Zone X Flood Area

Source: FEMA 2004, 2010, 2012, and 2013b, c, d, e, f, g
[a] SFHA = Special Flood Hazard Area

4.3.3.5 Waterbody Construction Procedures

As described above, construction of the proposed pipeline would require 289 waterbody crossings. Regulatory agencies (the COE, the NYSDEC, and the PADEP) have not yet provided feedback on Constitution's proposed waterbody crossing methods. Constitution would cross all waterbodies according to state-designated timing windows as discussed in section 4.6.2.1.

[2] According to FEMA (2013g), the Zone AE Floodway is the channel of a stream plus any adjacent floodplain areas that must be kept free of encroachment so that the 1 percent annual chance flood can be carried without substantial increases in flood heights.

Dry Crossing Method

Constitution would use a dry crossing method (i.e., dry open-cut, flume, dam and pump, or cofferdam crossing method) at 268 waterbodies. Dry open-cut crossing methods are described in section 2.3.2.2.

Trenchless Crossing Methods

Constitution would use a trenchless crossing method (i.e., conventional bore or Direct Pipe) method at 21 waterbody crossings. Constitution has proposed 14 conventional bore crossings and 7 Direct Pipe crossings (five Direct Pipe crossings would be associated with multiple channels of Bennettsville Creek). The location of all trenchless crossings can be found in table 2.3.2-1 the methods are described in section 2.3.2.2.

Waterbodies Within Workspaces

As discussed previously, waterbodies in 45 locations along the proposed pipeline route would be within the construction workspaces, but not crossed by the pipeline (appendix K). In addition, waterbodies in two locations would be within access road workspaces but not crossed by the access road. Constitution would avoid impacts on waterbodies within the proposed construction right-of-way to the extent possible. If Constitution cannot avoid impacting a waterbody, it would limit impacts to the installation of temporary equipment crossings (such as matting) and/or clearing of adjacent vegetation. Constitution would maintain a 15-foot vegetation buffer between the waterbody and the workspace. Constitution would also install sediment and erosion control devices along these waterbodies. As part of the draft EIS, we recommended that Constitution quantify, on a waterbody-specific basis, impacts on those waterbodies that would not be directly crossed by the trenchline. This information was provided by Constitution in April 2014. Constitution has adjusted its proposed route, and extra workspaces in numerous locations to better avoid waterbodies; these workspaces are identified in appendix H. We have reviewed Constitution's proposed mitigation measures and find them acceptable.

Public Watersheds and Reservoirs

Constitution would cross portions of three surface water reservoir watersheds and one watershed overlay within the project area in New York (table 4.3.3-2). The pipeline would be more than 0.5 mile from each resource and Constitution would implement protective measures such as its Procedures , HDD Contingency Plan (which would be also be applicable to Direct Pipe installations), Karst Mitigation Plan, and Blasting Plan to avoid impacts on drinking water sources. In addition, the existing TGP and Iroquois pipeline systems have been in operation for over 20 years with no impacts on the Barton Hill Natural Resource Protection Overlay. Therefore, we do not anticipate any impacts on public watersheds and reservoirs due to the proposed projects.

Hydrostatic Testing and Dust Control

Constitution would verify the integrity of the pipeline before placing it into service by conducting hydrostatic testing. These tests would be conducted in accordance with DOT regulations to ensure that the system is capable of withstanding 125 percent of the MAOP. This testing involves filling the pipeline with water, pressurizing it, and then checking for pressure losses due to pipeline leakage. Constitution proposed to withdraw about 22.5 million gallons of test water from five local surface waters between December 2014 and March 2015 (table 4.3.3-5); however, we acknowledge these dates are no longer feasible and the testing would be likely to occur in the fourth quarter of 2015. The testing would occur at 11 test segments (table 4.3.3-6). Hydrostatic test water would be held for a maximum of 14 days and

transferred between test segments to minimize the total volume of test water needed. Following testing, hydrostatic test water would be discharged into well vegetated upland locations within the same watershed as the source water, thereby preventing inter-basin transfers.

TABLE 4.3.3-5
Proposed Hydrostatic Test Water Sources and Discharge Locations for the Proposed Projects

Component/State	Source	Milepost	Hydrostatic Testing Volume (gallons)
PIPELINE			
Pennsylvania			
	Starrucca Creek	21.8	5,948,429
New York			
	Oquaga Creek	34.0	2,629,575
	Ouleout Creek	60.9	6,233,571
	Kortright Creek	81.6	2,040,627
	Schoharie Creek	119.7	5,688,747
	Pipeline Subtotal		**22,540,949**
ABOVEGROUND FACILITIES			
Pennsylvania			
Turnpike Road M&R Station	Municipal	0.0	4,000
New York			
Westfall Road M&R Station	Municipal	124.4	4,000
Iroquois' Facilities	Municipal	N/A	160,000
Aboveground Facilities Subtotal			**168,000**
Projects Total			**22,708,949**

N/A = not applicable

TABLE 4.3.3-6
Proposed Hydrostatic Test Water Segments for the Pipeline Facilities

Test Segment No.	Begin Milepost	End Milepost	Potential Water Source
1	0.0	10.1	Starrucca Creek
2	10.1	21.6	Starrucca Creek
3	21.6	32.8	Starrucca Creek
4	32.8	47.3	Oquaga Creek
5	47.3	60.7	Ouleout Creek
6	60.7	71.7	Ouleout Creek
7	71.7	81.8	Ouleout Creek
8	81.8	93.0	Kortright Creek
9	93.0	107.0	Schoharie Creek
10	107.0	119.8	Schoharie Creek
11	119.8	124.4	Schoharie Creek

Constitution would ensure that base flows are maintained in the source streams during the water withdrawal process. Constitution intends to submit water withdrawal permit applications to the Susquehanna River Basin Commission, Delaware River Basin Commission, and NYSDEC in the third or fourth quarter of 2014. As such, regulatory agencies have not provided feedback on Constitution's proposed water withdrawal plans, including the use of waterbodies containing fisheries of special concern. Constitution would require an additional 8,000 gallons of water for hydrostatic testing of the meter stations, MLVs, and pig launcher and receiver sites. Water for testing of these aboveground facilities would be obtained from municipal sources. Iroquois anticipates using a combination of nitrogen and water for hydrostatic testing the compressor transfer station. About 160,000 gallons of water from municipal sources would be needed for hydrostatic testing of Iroquois' project.

Constitution and Iroquois would also use municipal water sources for dust control activities. The Applicants would obtain all appropriate permits and authorizations required prior to conducting any dust control activities. Given the length of the proposed pipeline and that weather conditions would play a large role, it is impossible to predict precisely how much water would be needed for dust suppression.

Water for Direct Pipe Operations

As discussed in section 2.3.2.2 Constitution would use the Direct Pipe method at three locations (7 total waterbody crossings) along the proposed pipeline route. Throughout the process of drilling and enlarging the hole, a slurry made of non-toxic/non-hazardous bentonite clay and water, referred to as drilling mud, would be circulated through the drilling tools to lubricate the drill bit, remove drill cuttings, and hold the hole open. Constitution has proposed to use water from Bennettsville Creek, Middle Brook, and Schoharie Creek to create the slurry. Constitution may also use municipal water to create a slurry or purchase drilling mud from another contractor. In addition, Constitution would require additional water for hydrostatic testing of the individual Direct Pipe segments prior to pullback into the reamed hole and has proposed to use the same three water sources identified above for the slurry (or municipal water sources). Following testing, the hydrostatic test water would be discharged into well vegetated upland locations near the Direct Pipe crossing. We estimate that Constitution would require approximately 286,000 gallons of water to test each Direct Pipe segment.

During the Direct Pipe installation, the drilling mud returns would be circulated through mud pits to remove the drill cuttings, and the bentonite would be recycled for use as the drilling operation continues. After completion of the Direct Pipe operations, the recovered drilling mud would be recycled or disposed of at an approved upland location or disposal facility. No recovered drilling mud would be disposed of in streams or storm drains.

4.3.3.6 General Impacts and Mitigation

Pipeline construction could impact surface waters in several ways. Clearing and grading of streambanks, in-stream trenching, trench dewatering, and backfilling could result in modification of aquatic habitat, increased sedimentation, turbidity, decreased dissolved oxygen concentrations, releases of chemical and nutrient pollutants from sediments, and introduction of chemical contaminants such as fuel and lubricants.

One potential impact on surface waters could result from the temporary increase in sediments mobilized downstream during in-stream construction. The extent of the impact would depend on sediment loads, stream velocity, turbidity, bank composition, and sediment particle size. These factors would determine the density and downstream extent of sediment migration. In-stream construction could cause the dislodging and transport of channel bed sediments and the alteration of stream contours. Changes in the stream bottom contours could alter stream dynamics and increase downstream erosion or

deposition. Turbidity resulting from resuspension of sediments from in-stream construction and erosion of cleared right-of-way areas could reduce light penetration and photosynthetic oxygen production. In-stream disturbance could also introduce chemical and nutrient pollutants from sediments. Resuspension of deposited organic material and inorganic sediments could cause an increase in biological and chemical use of oxygen, potentially resulting in a decrease of dissolved oxygen concentrations in the affected area. Lower dissolved oxygen concentrations could cause temporary displacement of motile organisms, such as fish, and may kill non-motile organisms within the affected area.

The clearing and grading of streambanks could expose soil to erosional forces and would reduce riparian vegetation along the cleared section of the waterbody. The use of heavy equipment for construction could cause compaction of near-surface soils, an effect that could result in increased runoff into surface waters in the immediate vicinity of the proposed construction right-of-way. Increased surface runoff could transport sediment into surface waters, resulting in increased turbidity levels and increased sedimentation rates in the receiving waterbody. Disturbances to stream channels and streambanks could also increase the likelihood of scour after construction.

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

Blasting may be required along the pipeline route and within streams. In-stream blasting has the potential to injure or kill aquatic organisms, displace organisms during blast-hole drilling operations, and temporarily increase stream turbidity. Chemical by-products from the blasting materials could also be released and could potentially contaminate the water. Constitution developed a Blasting Plan to minimize potential adverse impacts on the environment, nearby water sources, structures, and utilities. As stated in the Blasting Plan, licensed blasting contractors would conduct blasting activities in accordance with all applicable federal, state, and local regulations. Constitute would obtain all necessary permits if blasting were required within streams.

Seasonal and flash flooding hazards are a potential concern where the proposed pipeline would cross or be near major streams and small watersheds. Additional discussion regarding flooding and flash floods is also provided in section 4.1.3. Although flooding itself does not generally present a risk to pipeline facilities, bank erosion and/or scour could expose the pipeline or cause sections of pipe to become unsupported. All pipeline facilities are required to be designed and constructed in accordance with 49 CFR 192. These regulations include specifications for installing the pipeline at a sufficient depth to avoid possible scour at waterbody crossings. Typically, the trench would be sufficiently deep to provide for a minimum of 5 feet of cover over the pipeline at waterbodies.

In addition, Constitution would implement several mitigation measures within floodplains to minimize potential impacts from flood events. These measures include:

- clearing only the vegetation needed for safe construction of the pipeline;
- installing and maintaining erosion and sediment control structures;
- installing concrete pipe coating or concrete weights on pipe within waterbodies and/or floodplains to prevent possible floating of the pipe;
- restoring floodplain contours and waterbody banks to their pre-construction condition; and
- conducting post-construction monitoring to ensure successful revegetation.

Dry Crossings

Constitution would cross all waterbodies using either a dry crossing or trenchless crossing method. Section 2.3.2.2 provides a description of waterbody crossing methods. Temporary construction-related impacts associated with the use of dry crossing methods would be limited primarily to short periods of increased turbidity before installation of the pipeline during the assembly of the upstream and downstream dams and following installation of the pipeline when the dams are removed and flow across the restored work area is re-established. Constitution would minimize impacts on waterbodies, watersheds, and nearby reservoirs during construction by implementing the construction and mitigation procedures contained in its Procedures, which include:

- limiting clearing of vegetation between temporary extra workspaces and the edge of the waterbody to preserve riparian vegetation;
- constructing the crossing as close to perpendicular to the waterbody as site conditions allow;
- maintaining adequate flow rates throughout construction to protect aquatic life and prevent the interruption of existing downstream uses;
- locating equipment parking areas, equipment refueling areas, concrete coating activities, and hazardous material storage to areas at least 100 feet from surface waters;
- requiring construction across waterbodies to be completed as quickly as possible;
- requiring temporary erosion and sediment control measures to be installed across the entire width of the construction right-of-way after clearing and before ground disturbance;
- requiring maintenance of temporary erosion and sediment control measures throughout construction until streambanks and adjacent upland areas are stabilized;
- requiring bank stabilization and reestablishment of bed and bank contours and riparian vegetation after construction;
- limiting post-construction maintenance of vegetated buffer strips adjacent to streams; and
- implementing Constitution's Spill Plan if a spill or leak occurred during construction.

Long-term impacts associated with pipeline operations and maintenance would be relatively minor. Constitution would stabilize streambanks within 24-hours of completion of construction and revegetate following installation of the pipeline and post-construction vegetation maintenance would be limited to the permanent right-of-way pursuant to the Constitution's ECPs.

During construction, the open trench may accumulate water, either from the seepage of groundwater or from precipitation. Where dewatering is necessary, Constitution would pump the trench water into well-vegetated uplands and/or filter bags, as described in the Constitution's ECPs. This process would prevent heavily silt-laden water from flowing into any adjacent waterbodies or wetlands.

Trenchless Crossings

The potential impacts on waterbodies associated with the use of conventional bore or Direct Pipe trenchless crossing methods are considered minimal when compared to other crossing methods. The waterbody and its banks, and typically the entire immediate riparian zone, would not be disturbed by clearing or trenching; rather, the pipe would be installed below the feature. The risk of an inadvertent

release of drilling fluids is reduced for conventional bore or Direct Pipe methods compared to HDDs. The use of HDD was proposed for some waterbody crossings at the time of issuance of the draft EIS, but Constitution subsequently modified its proposed methods based on the results of geotechnical analyses no HDDs are currently planned. Workspaces required to accommodate the conventional bore or Direct Pipe equipment would be on both sides of the waterbody and would include appropriate erosion and sedimentation control devices designed to prevent the migration of any soil towards the adjacent waterbody.

Access Roads

The temporary and permanent access roads required for construction of the pipeline would require either new construction or improvements to existing roads, such as widening and the addition of gravel to accommodate the movement of equipment and materials. The proposed access roads may require grading, addition of gravel, replacement/installation of culverts, and removal of overhanging vegetation. Constitution would minimize impacts by installing and maintaining erosion control devices and removing mud from paved road surfaces. As noted above, in order to protect waterbodies and wetlands, we have recommended that Constitution not use permanent fill in these locations.

Hydrostatic Testing and Dust Control

As discussed in section 4.3.3.5, Constitution and Iroquois estimate that approximately 23 million gallons of water would be needed for hydrostatic testing of the proposed pipeline and aboveground facilities.

The withdrawal of large volumes of water from surface water sources could temporarily affect the recreational and biological uses of the resource if the diversions constitute a large percentage of the source's total flow or volume. Water withdrawals could also result in temporary loss of habitat, change in water temperature and dissolved oxygen levels, and entrainment or impingement of fish or other aquatic organisms. Constitution would minimize the potential effects of water withdrawals from surface water and groundwater sources by adhering to the measures in its ECPs. Constitution would maintain base flows during all withdrawals, screen intake hoses, regulate the rate of withdrawal of test water to prevent the entrainment of fish and other aquatic organisms, and discharge test waters to well vegetated, upland areas. Therefore, we conclude that impacts on surface waters from withdrawal of test and dust control water would be minimized and not significant. Section 4.6 further discusses the potential impacts from water withdrawal on aquatic species. Additionally, Constitution would acquire the necessary permits and approvals from state and federal agencies. Iroquois would obtain its test water from municipal sources, so no impacts on surface waterbodies would occur.

Hazardous Material Spills

Accidental spills and leaks of hazardous materials associated with equipment trailers; the refueling or maintenance of vehicles; and the storage of fuel, oil, and other fluids can have immediate effects on aquatic resources and could contaminate a waterbody downstream of the release point. Constitution and Iroquois would implement their respective Procedures which avoid or minimize impacts associated with spills or leaks of hazardous liquids by restricting the location of refueling (at least 100 feet from a wetland or waterbody) and storage facilities and by requiring containment and cleanup in the event of a spill or leak.

Additionally, implementation of the measures in Constitution's Spill Plan and Iroquois' SPCC Plan would minimize the potential for surface water impacts associated with an inadvertent spill of hazardous materials. These plans include the use of secondary containment structures for petroleum

products, daily equipment inspection for leaks, and restrictions on the transport of potentially hazardous materials to the construction work area. Constitution's Spill Plan and Iroquois' SPCC Plan also specify measures to contain and clean up a spill. Implementation of Constitution's Procedures and Spill Plan and Iroquois' Procedures and SPCC Plan would adequately address the storage and transfer of hazardous materials and petroleum products, and the appropriate response in the event of a spill.

4.3.3.7 Extra Workspaces within 50 Feet of Waterbodies

As discussed in section 2.3, our Procedures stipulate that all extra workspaces should be at least 50 feet from waterbodies. Constitution has identified certain areas where site-specific conditions do not allow for a 50-foot setback. Appendix D identifies these locations and the reasons why Constitution stated the extra workspaces are justified. Based on our review, we concur that all of Constitution's requests are justified. Section 2.3 provides additional discussion on this topic.

4.3.4 Conclusion

No long-term impacts on surface waters are anticipated as a result of the proposed projects because Constitution would not permanently affect the designated water uses, it would bury the pipeline beneath the bed of all waterbodies, it would implement erosion controls, and it would restore the streambanks and streambed contours as close as practical to pre-construction conditions.

Operation of the projects would not cause impacts on any surface waters, unless maintenance activities involving pipe excavation and repair in or near streams are required in the future. For maintenance activities if needed, Constitution and Iroquois would employ protective measures similar to those proposed for use during construction. As a result, we conclude that any impacts derived from maintenance would be short-term and similar to those discussed above for the initial pipeline construction.

4.4 WETLANDS

Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal circumstances do support, a prevalence of vegetation adapted for life in saturated soil conditions (Environmental Laboratory 1987). Examples of wetlands include swamps, marshes, and bogs. Wetlands serve important biological, physical, and chemical functions, including providing wildlife food, habitat, recreation opportunities, flood control, and water quality improvement.

In the project area, wetlands are regulated at both federal (COE) and state (PADEP and NYSDEC) levels. Under Section 404 of the CWA, the COE is authorized to issue permits for activities that would result in the discharge of dredge or fill material, or the dredging of, waters of the United States such as wetlands. Under Section 401 of the CWA, states are required to certify that proposed dredging or filling of waters of the United States meets state water quality standards.

4.4.1 Existing Wetland Resources

Constitution identified and delineated wetlands along the proposed pipeline route during field surveys in 2012, 2013, and 2014. Wetland boundaries were delineated using the methods described in the Interim Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Northcentral and Northeast Region (Environmental Laboratory 2012). For areas where Constitution was denied survey access, publicly available National Wetlands Inventory (NWI) and state wetlands maps (as applicable) were used to approximate the locations and boundaries of wetlands within the project area. Constitution

utilized a 600-foot-wide survey corridor for wetland surveys conducted from June through December 2012. Surveys conducted in 2013 and 2014 used a 300-foot-wide survey corridor. As part of its application for a Department of the Army Nationwide Permit Number 12, Constitution submitted a wetland delineation report to the COE on August 26, 2013, requesting jurisdictional determination of the waterbodies and wetlands identified within the proposed project work areas. Supplemental filings were made to the COE and PADEP on June 2, 2014 and also to the COE and NYSDEC on August 13, 2014. A total of 95.3 acres of wetlands would be either crossed by Constitution's project (crossings include the pipeline and proposed access roads), affected by temporary extra workspace, or within the construction right-of-way but not affected. Appendix L identifies the location, NWI classification, crossing length, and acreage of each wetland that Constitution would affect. Iroquois' project would not impact any wetlands.

4.4.1.1 Pipeline Facilities

The pipeline and extra workspaces would affect a total of 94.8 acres of wetlands, including 14.4 acres in Pennsylvania and 80.4 acres are in New York. Of those impacts, 75.7 acres (10.4 acres in Pennsylvania and 65.3 acres in New York) would be temporary and associated with construction of the project. Constitution was unable to survey all parcels; therefore, the total acreages were determined through a combination of field survey data and a review of the NWI maps.

4.4.1.2 Aboveground Facilities

No wetlands were identified at any of Constitution's proposed aboveground facility locations.

4.4.1.3 Contractor Yards

Constitution conducted wetland surveys for all six of the proposed contractor yards in 2013 or 2014, but has not yet provided the results to us nor has it completed agency consultations for three of the sites. Given the current status of reporting and consultations for the contractor yards, we recommended in section 4.3.2 that Constitution file the pending information prior to the start of construction. Wetlands were not identified within the boundaries of the three proposed contractor yards where surveys results have been reported. Constitution states it would avoid any wetlands within or adjacent to the contractor yards and use BMPs to prevent sediments from being transported to wetlands. Constitution would fence wetlands with erosion controls at a buffer of 10 feet or greater to avoid disturbance or sedimentation of the wetland during construction where applicable.

4.4.1.4 Access Roads

Temporary and permanent access roads to support pipeline construction would cross a total of 0.2 acre of wetlands in Pennsylvania and 0.4 acre in New York. Appendix L identifies the location, NWI classification, crossing length, and acreage of each wetland that Constitution would affect by access roads. Of the 0.6 total acres of wetlands affected by access roads, 0.4 acres of impacts would be temporary. Constitution would use equipment mats in wetlands affected by temporary access roads; once construction is complete, Constitution would remove the mats and restore the wetlands as described in its ECPs.

Constitution has proposed to permanently fill 0.1 acre of wetlands associated with permanent access roads. In section 4.3 we recommended that permanent fill of wetlands and waterbodies for the construction and operation of access roads not be used. A full list of access roads and their impacts is provided in appendix E.

4.4.1.5 Wetland Types

Wetland types were assigned based on the NWI classification hierarchy described by Cowardin et al. (1979). Wetlands crossed by the project are classified as palustrine (freshwater wetland) and are defined by their dominant vegetation layer (emergent, scrub-shrub, or forested), as described below.

4.4.1.6 Palustrine Forested Wetlands

Palustrine forested wetlands in the project area are dominated by trees and shrubs at least 20 feet tall with a tolerance to a seasonally high water table (Cowardin et al. 1979). Forested wetlands typically have a mature tree canopy with a diverse range of understory and herbaceous community structure and species. Wetland tree species identified in in the area of the proposed pipeline include coniferous species (e.g., eastern hemlock and white pine) and hardwoods (e.g., yellow birch, ash, and maple).

4.4.1.7 Palustrine Scrub-Shrub Wetlands

Palustrine scrub-shrub wetlands identified in the area of Constitution's project are typically shrub swamps at the transition between herbaceous (emergent) and forested habitats. Palustrine scrub-shrub wetlands are dominated by shrubs and saplings less than 20 feet tall (Cowardin et al. 1979). Shrub species identified in the proposed pipeline area include willows, dogwoods, speckled alder, and southern arrowwood.

4.4.1.8 Palustrine Emergent Wetlands

Palustrine emergent wetlands are characterized by erect, rooted, herbaceous plants suited to growing in wet conditions (Cowardin et al. 1979). Vegetation may also include mosses and lichens. In the area of Constitution's project, these wetlands include wet meadows (including agricultural fields). Emergent wetland species identified in the proposed pipeline area include common rush, smartweeds, goldenrods, sedges, and reed canary grass (an invasive species).

4.4.1.9 State Wetland Classifications

Pennsylvania

Exceptional value wetlands are given special protection in the state of Pennsylvania by the PADEP under Pennsylvania Code Title 25 (Pennsylvania Code 1991) and include those wetlands that:

- serve as habitat for threatened and endangered species (or are hydrologically connected to or within 0.5 mile of such type wetlands);
- are adjacent to a wild trout stream or EV water;
- are along a designated drinking water supply; and
- are within natural or wild areas (e.g., federal and state lands).

Three of the wetlands crossed by the proposed pipeline in Pennsylvania are forested and classified as exceptional value (appendix L).

New York

In accordance with the Environmental Conservation Article 24, New York Code (Freshwater Wetlands), the state of New York identifies, classifies, and protects freshwater wetlands with an area of

12.4 acres or more, by establishing a 100-foot-wide regulated adjacent area around each protected wetland (New York Code 1997). The proposed pipeline would cross 6.2 acres of NYSDEC-regulated wetlands, all of which are Class II wetlands, as defined in 6 New York Codes, Rules and Regulations (NYCRR) Part 664 (appendix L) (NYCRR 2006). Class II wetlands meet any of the cover type, ecological associations, special features (such as habitat for listed, vulnerable or rare animal and plant species, archaeological significance, or association with an unusual geological feature), hydrological and pollution control features (such as sewage treatment capacity or hydrological connection to an aquifer designated as potentially useful water supply), or distribution and location characteristics (such as location within an urbanized area or publically owned recreation area) defined in 6 NYCRR Part 664. Class II wetlands include emergent marshes with less than two-thirds cover of invasive purple loosestrife or common reed, wetlands with two or more structural groups, or wetlands associated with permanent waterbodies. Class II wetlands may also be important migrant or resident habitat for threatened, endangered, vulnerable or rare species, demonstrate paleontological significance, or be associated with unusual geological features. Class II wetlands can include connection with potentially useful water supply aquifers, provide flood abatement services, and be within an urbanized area or publicly owned recreation area. Constitution has requested field review with the NYSDEC to confirm the boundaries of these wetlands, and would incorporate additional protection measures for NYSDEC-regulated wetlands, including setback of all extra workspace outside of a 100-foot area adjacent to each wetland.

4.4.2 Wetland Construction Procedures

Constitution would impact a total of 94.8 acres of wetland by the proposed pipeline and extra workspaces. Construction would be conducted in accordance with Constitution's state-specific ECPs and as described in section 2.3.2.1. In wetlands, the construction right-of-way would be generally limited to a width of 75 feet, except in areas where Constitution requested additional right-of-way width as discussed in section 4.4.4. Because surveys could not be obtained for all parcels crossed by the pipeline, the acreages were determined through a combination of field survey data and a review of the NWI maps.

Constitution would determine the method of pipeline construction within each wetland by soil stability and saturation at the time of construction. Where soils are stable and are not saturated at the time of crossing, the pipeline would be installed using methods similar to those in uplands. Additional protection methods in these wetlands include limiting the use of equipment operating in wetlands, limiting the time that the trench would remain open, and installing trench breakers on the upland boundary of each wetland. Constitution would use equipment mats in wetlands where rutting could occur.

Where wetland soils are saturated or are not stable enough to support construction equipment at the time of crossing, conventional wetland crossing methods would be used. Using the conventional wetland crossing method, Constitution would string and weld the pipe in an upland staging area. Vegetation and stump removal would be limited to the trench line, and topsoil would not be segregated if soils are saturated or inundated.

Where wetland soils are inundated, the pipeline may be installed using the push-pull technique. This technique involves stringing and welding the pipeline outside of the wetland and excavating the trench through the wetland using a backhoe supported by equipment mats. The water that seeps into the trench would be used to "float" the pipeline into place together with a winch and flotation devices that would be attached to the pipe. After the pipeline is floated into place, Constitution would remove the floats, and the pipeline would sink into place.

Pipe installed in saturated wetlands is typically coated with concrete or equipped with set-on weights to provide negative buoyancy. After the pipeline sinks to the bottom of the trench, a trackhoe

working on equipment mats would backfill the trench and complete any additional cleanup that is required.

4.4.3 General Impacts and Mitigation

Table 4.4.3-1 summarizes the impacts of the proposed pipeline on wetlands. Construction would impact a total of 95.3 acres of wetland, including 33.8 acres of forested wetlands, 26.1 acres of scrub-shrub wetlands and 35.4 acres of emergent wetlands. The majority of the project's wetland impacts would occur from construction within temporary workspaces (76.1 acres); these wetlands affected temporarily would return to pre-construction conditions following construction. Constitution would maintain a 30-foot-wide corridor in wetlands, with selective removal of trees within 15 feet of the pipeline, impacting a total of 14.5 acres in forested wetlands through the operational life of Constitution's project. Additionally, Constitution would maintain a 10-foot-wide corridor as herbaceous within scrub-shrub wetlands, impacting a total of 4.6 acres during operation.

TABLE 4.4.3-1
Wetland Acreages Affected by the Construction[a] and Operation[b] of the Proposed Pipeline Project

	Wetland Type						Total Wetland Area Affected (Construction, acres)	Total Wetland Area Affected (Operation, acres)
	Forested Wetland		Scrub-Shrub Wetland		Emergent Wetland			
State/Facility	**Constr**	**Oper**	**Constr**	**Oper**	**Constr**	**Oper**		
Pennsylvania								
Pipeline Facilities	4.4	2.9	1.9	1.1	8.1	0.0[c]	14.4	4.0
Access Roads	<0.1	<0.1	0.1	<0.1	0.1	0.1	0.2	<0.1
State Total	**4.4**	**2.9**	**2.0**	**1.1**	**8.2**	**0.1**	**14.6**	**4.2**
New York								
Pipeline Facilities	29.4	11.6	24.1	3.5	26.9	0.0	80.4	15.1
Access Roads	<0.1	<0.1	<0.1	<0.1	0.3	0.1	0.4	0.1
State Total	**29.4**	**11.6**	**24.1**	**3.5**	**27.2**	**<0.1**	**80.7**	**15.1**
Project Total	**33.8**	**14.5**	**26.1**	**4.6**	**35.4**	**0.1**	**95.3**	**19.2**

Note: Columns may not sum correctly due to rounding.

[a] Construction impacts include the right-of-way width and all workspace and extra workspace.

[b] Operational impacts include the 10-foot-wide corridor of vegetation maintenance within the pipeline right-of-way of scrub-shrub wetlands and a 30-foot-wide corridor permanently maintained through forested wetlands.

[c] There will be no permanent impacts of PEM wetlands during operation. However, the COE requested that the permit application in Pennsylvania state 5.5 acres due to maintenance of the operational right-of-way.

The primary impacts of Constitution's construction on wetland vegetation would be the temporary and permanent alteration of forested wetland vegetation. Other impacts on wetlands could include temporary changes in hydrology and water quality during construction. Temporary removal of wetland vegetation during construction could alter the capacity of wetlands to function as habitat and flood and erosion control buffers.

Mixing of topsoil with subsoil could alter nutrient availability and soil chemistry, thereby inhibiting recruitment of native wetland vegetation. Blasting may be required for trench excavation across an estimated 1.6 miles of wetlands along the pipeline route due to the presence of shallow bedrock.

Blasting could result in changes in wetland hydrology due to disturbance of impermeable layers of soil or shallow bedrock. Blasting is described further in sections 2.3.1 and 4.1. Heavy equipment operating during construction could result in soil compaction or rutting that would alter natural hydrologic and soil conditions, potentially inhibiting germination of native seeds and the ability of plants to establish healthy root systems. Additionally, discharges from stormwater, dewatering structures, or hydrostatic testing could transport sediments and pollutants into wetlands, affecting water quality.

The majority of the impacts on wetlands from the proposed pipeline would be temporary and short-term. Constitution would restore all wetlands to pre-project contours and hydrology, including the 0.1 acre of palustrine emergent, palustrine scrub-shrub, and forested wetlands associated with permanent access roads that Constitution has proposed to permanently fill, based on our recommendation in section 4.3. Herbaceous wetland vegetation would regenerate quickly, typically within 1 to 3 years, and emergent wetlands would not be subject to vegetation maintenance. Temporary impacts on forested and scrub-shrub wetlands would be long-term, because woody vegetation would take several years to regenerate.

Constitution would also avoid wetland impacts by using trenchless (conventional bore or Direct Pipe) construction methods at five locations in Pennsylvania and at eight locations in New York. Constitution initially proposed to use the HDD method to cross some wetlands, but has since replaced all HDDs with either Direct Pipe crossings or reroutes; no HDDs are currently planned. Use of the conventional bore and Direct Pipe crossing methods would eliminate the need for trenching and operation of heavy construction equipment within the wetland, and Constitution would limit activities between the Direct Pipe entry and exit points to foot traffic required to place guide wires for the drill alignment. Constitution originally proposed to clear vegetation within a 10-foot-wide corridor between the trenchless crossing entry and exit location along the centerline for the purposes of accessing water to support drilling operations at three locations. However, we conclude that for the construction of the Direct Pipe crossings, the installation of guide wires and acquisition of water can be completed without clearing trees along the alignment. Therefore, to avoid unnecessary impacts and limit disturbance to the minimum area needed to construct the trenchless crossings, **we recommend that:**

- **<u>During construction of the project</u>, Constitution should not clear any trees between the workspaces for Direct Pipe (or HDD, if subsequently proposed) entry and exit sites. Minor brush clearing, less than 3 feet wide, using hand tools only would be allowed to facilitate the use of the Direct Pipe (or HDD) tracking system or acquisition of water for makeup of the Direct Pipe (or HDD) slurry. During operation Constitution should not conduct any routine vegetation maintenance in these areas.**

As discussed in section 3.0, Constitution also incorporated several route modifications during project design to avoid wetlands.

Constitution would limit permanent impacts on forested and scrub-shrub wetlands to a 10-foot-wide maintained corridor along the pipeline centerline. Additionally, Constitution would selectively clear forested wetland vegetation within 15 feet of the centerline. The remainder of forested and scrub-shrub wetlands in those habitats would be allowed to return to pre-project vegetation conditions. Constitution would mitigate for unavoidable wetland impacts by implementing the procedures specified in its state-specific ECPs, and by complying with the conditions of its pending Section 404 and 401 permits. Constitution received its Section 401 permit for Pennsylvania from the PADEP in September 2014. Specific measures Constitution would implement include:

- limiting the construction right-of-way width to 75 feet, except in areas where site-specific conditions require additional space (FERC approval required);
- locating extra workspaces at least 50 feet from wetland boundaries, except where site-specific conditions warrant otherwise (FERC approval required);
- cutting vegetation just above ground level, leaving existing root systems in place, and limiting the pulling of stumps and grading activities to directly over the trenchline except where the Chief Inspector and EI determine that these activities are required for safety reasons;
- using low ground weight equipment or operating equipment on timber mats in saturated soils to prevent rutting;
- installing sediment barriers immediately after initial ground disturbance at the edge of the boundary between wetlands and uplands, immediately upslope of the wetland boundary, and along the edge of the right-of-way as necessary to contain spoil and to protect adjacent wetland areas;
- segregating the top 12 inches of topsoil from the trenchline, except in areas where standing water is present or soils are saturated or frozen;
- decompacting compacted wetland soils by plowing or similar methods;
- prohibiting the use of rock, soil imported from outside the wetland, tree stumps, or brush riprap to stabilize the right-of-way;
- installing trench plugs as necessary to maintain the original wetland hydrology;
- restoring pre-construction contours to maintain the original wetland hydrology;
- prohibiting the use of lime or fertilizer within wetlands;
- seeding restored wetlands with annual ryegrass or an agency approved wetland seed mix, unless standing water is present;
- limiting vegetation maintenance in wetlands to a 10-foot-wide herbaceous corridor centered over the pipeline and the cutting and removal of trees within 15 feet of the pipeline centerline; and
- prohibiting the use of herbicides or pesticides within 100 feet of wetlands or waterbodies except as specified by the appropriate land management or state agency.

In accordance with its ECPs (and our standard Procedures) Constitution would conduct routine wetland monitoring for a minimum of 3 years and submit quarterly reports to the FERC on the status of wetland restoration and vegetation growth. Based upon the status of restoration we could require additional restoration activity, monitoring, or mitigation to be carried out until wetland restoration is deemed satisfactory.

4.4.4 Alternative Measures

The FERC Procedures and Constitution's state-specific ECPs specify that the construction right-of-way in wetlands should be limited to 75 feet wide. However, in certain circumstances, Constitution has requested that the construction right-of-way width be expanded beyond 75 feet, as listed in table 4.4.4-1.

TABLE 4.4.4-1 Areas Where Constitution Requested a Right-of-Way Greater than 75-feet-wide in Wetlands				
State/Wetland ID	**Milepost**	**Size[a] (acres)**	**Justification**	**FERC Review Status**
Pennsylvania				
SU-1C-W189	2.4	<0.1	Extra right-of-way width is required to cross a waterbody and road.	We have reviewed and find acceptable.
SU-1C-W190	2.4	<0.1	Extra right-of-way width is required to cross a waterbody and road.	We have reviewed and find acceptable.
SU-1B-W138	8.4	<0.1	Extra right-of-way width is required to cross a road due to the proximity of the road crossing to an existing pipeline.	We have reviewed and find acceptable.
SU-1X-W299	22.6	<0.1	Extra right-of-way width is required to cross a road.	We have reviewed and find acceptable.
New York				
CH-1A-W047	50.2	0.4	Extra right-of-way width is required for spoil storage to cross a waterbody, wetland, and road.	We have reviewed and find acceptable.
DE-1P-W128	90.3	0.3	Extra right-of-way width is required in two locations for spoil storage associated with a road crossing, an existing pipeline right-of-way, and nearby residences.	We have reviewed and find acceptable.
SC-1E-W100	101.7	0.2	Extra right-of-way width is required for spoil storage to cross a waterbody, wetland, and road.	We have reviewed and find acceptable.
SC-1L-W303	105.8	<0.1	Extra right-of-way width is required for adjacent slope, road crossing, waterbody crossing, and multiple wetland crossings.	We have reviewed and find acceptable.
Project Total		**0.9**		

[a] Column may not sum correctly due to rounding

The FERC Procedures and Constitution's state-specific ECPs specify that extra workspace should not be within 50 feet of wetlands except where an alternative measure has been requested by Constitution and approved by the FERC. Areas where Constitution has requested extra workspace and stated that a 50-foot setback from wetlands is infeasible (including its justification) are identified in appendix D. We have reviewed these and deem them acceptable, as discussed in section 2.3.

Additionally, Constitution has requested extra workspaces within wetlands. Constitution identified five such areas at MPs 50.2, 90.3 (two locations), 101.7, and 105.8 required for spoil storage, associated waterbody and/or wetland crossings, and adjacent road crossings. We have reviewed Constitution's proposed extra workspaces within wetlands and find them acceptable.

Finally, Constitution's ECPs state that Constitution would consult with appropriate federal or state agencies to develop a project-specific wetland restoration plan. Revegetation and noxious weed control plans are included in Constitution's state-specific ECPs. We included a recommendation in section 4.5.4 that Constitution continue monitoring for 3 years following successful revegetation (as determined by the FERC staff) and to clean maintenance equipment during operations before moving to a new location if the equipment is used in an area containing invasive plant species. Constitution proposes to restore wetlands with seed and mulch based upon specifications of the PADEP, the NYSDEC, the COE, and/or other applicable agencies. Annual ryegrass may be used for stabilization in wetlands unless standing water is present. Constitution has incorporated these specifications into its ECPs. Following construction, Constitution would ensure that all disturbed areas successfully revegetated. Revegetation would not be considered successful until: the affected wetland satisfies the current federal definition for a wetland; vegetation is at least 80 percent of either the cover documented for the wetland prior to construction, or at least 80 percent of the cover in adjacent wetland areas that were not disturbed by construction; the plant species composition is consistent with early successional wetland plant communities in the affected ecoregion; and invasive species and noxious weeds are absent, unless they are abundant in adjacent areas that were not disturbed by construction. Constitution's mitigation measures to control invasive species during construction are described in section 4.5.4. Three years after construction, Constitution must file a report with the Secretary identifying the status of wetland revegetation efforts and documenting success, as defined above. Where revegetation is not successful at the end of three years, Constitution would develop and implement remedial revegetation plans, in consultation with a professional wetland ecologist, to actively revegetate any wetland and continue revegetation efforts and file annual reports until wetland revegetation is successful.

4.4.5 Compensatory Mitigation

Constitution provided a conceptual wetland mitigation plan as part of its applications for Section 404 Nationwide Permit Number 12 Permits to the COE, the PADEP, and the NYSDEC in August 2013.

Subsequently, the COE requested that Constitution provide a compensatory mitigation plan in accordance with the 2008 Final Rule for Compensatory Mitigation for Losses of Aquatic Resources (33 CFR 332). Constitution submitted detailed mitigation plans in December 2013, proposing the use of an in-lieu fee arrangement and permittee responsible mitigation in New York; and permittee responsible mitigation in Pennsylvania. The plans are based on an assessment of wetland impacts using remote-sensing techniques for portions of the pipeline corridor which could not be assessed due to the lack of landowner permission. Wetland impacts were also assessed using ground surveys where landowner permission was granted. These plans are currently under review to ensure appropriate compensation for impacts on aquatic resources.

Pennsylvania

Constitution's draft mitigation plan for wetland impacts in Pennsylvania identifies a tiered approach, which includes minimization of impacts as described in the Pennsylvania ECP sections 7 and 9.3, conducting mitigation for temporary and short-term impacts using onsite restoration, and conducting mitigation for permanent and long-term impacts using a variety of offsite mitigation methods. Constitution is proposing onsite native tree plantings at high quality palustrine forested wetlands that would be impacted in areas outside of the maintained permanent right-of-way. Constitution also attempted to identify in lieu fee programs, but none were identified for the project area in Pennsylvania. Constitution has preliminarily identified an offsite wetland mitigation opportunity that would provide "in-kind" mitigation for unavoidable impacts caused by the pipeline project and resulting in no net loss of wetland function or area.

In an effort to distribute mitigation equally along the length of the pipeline project, as regulatory agencies and stakeholders typically prefer, Constitution sought mitigation opportunities in both HUC-8 watersheds that would be crossed in Pennsylvania: the Upper Susquehanna and the Upper Susquehanna-Tunkhannock. No appropriate mitigation sites were identified in either Upper Susquehanna HUC-8 watershed, but an appropriate opportunity was found in the broader HUC-6 watershed, where the proposed project also would be located. The mitigation site would be in Bradford County, Pennsylvania, and the COE and the PADEP approval of the site is pending. The site is currently cleared and has been used for agriculture and livestock grazing for decades, but Constitution would restore it to a forested wetland condition. However, Constitution anticipates that the opportunity could be approved prior to the start of pipeline construction, thereby making it available to serve as mitigation for the project. Wetland mitigation sites are placed in restrictive covenants, thereby ensuring their long-term preservation and maintenance.

Constitution proposed that temporal impacts for emergent and scrub-shrub wetlands be mitigated solely by onsite restoration. Mitigation ratios for temporal impacts on forested wetlands, permanent conversion of scrub-shrub or forested wetland to another wetland type (such as emergent), or permanent fill (such as with installation of a permanent access road) would be negotiated by Constitution with the COE and the PADEP and would generally be higher for impacts on forested wetlands and for permanent impacts.

The COE's Baltimore District and the PADEP are still reviewing Constitution's wetland mitigation plan for Pennsylvania and will continue to work with Constitution to determine the appropriate type and amount of mitigation needed for the pipeline project's wetland impacts in Pennsylvania.

New York

Constitution's mitigation plan for wetland impacts in New York also identifies a tiered approach, as described above for Pennsylvania. Constitution would minimize impacts on wetlands by implementing the procedures as described in section 4.4.3. Temporary, short-term impacts on palustrine emergent and palustrine scrub-shrub wetlands would be restored to pre-project contours and revegetated according to the ECP. Therefore, Constitution is not proposing additional mitigation for those wetlands. Because temporary impacts on palustrine forested wetlands affected by construction of the project would be long-term, Constitution is proposing onsite native tree plantings at impacted NYSDEC-mapped and identified high quality palustrine forested wetlands in areas outside of the maintained permanent right-of-way as well as offsite mitigation. Offsite mitigation would be conducted for:

- permanent fill of wetlands associated with access road construction;
- conversion of palustrine forested to palustrine scrub-shrub or palustrine emergent wetlands within a 30-foot-wide vegetation maintenance corridor along the centerline; and
- conversion of palustrine scrub-shrub to palustrine emergent wetland within a 10-foot vegetation maintenance corridor along the centerline.

Constitution assessed potential offsite mitigation separately for each watershed crossed by the project so that mitigation would be conducted where impacts would occur. Mitigation techniques typically include: mitigation banks, in-lieu fee programs, and permittee-responsible mitigation. Although mitigation banks do operate in New York, none were available within the project area; therefore, Constitution is proposing a combination of in-lieu fee programs and permittee-responsible mitigation. In-lieu fee programs would require Constitution to provide funds to a project sponsor (e.g., a natural resource management agency) for development or maintenance of a mitigation site. In watersheds where an in-lieu fee program is not available, Constitution would conduct permittee-responsible mitigation.

Permittee-responsible mitigation would require Constitution to restore existing wetlands, enhance the quality of existing wetlands, create (establish) wetlands, or preserve existing wetlands. Additionally, Constitution could conduct permittee-responsible mitigation by establishing or preserving a buffer separating wetlands from adjacent agricultural or developed land.

Constitution proposes to use an in-lieu fee program for impacts in the Upper Susquehanna Watershed along with restoration of one additional permittee-responsible mitigation site. In the Upper Delaware Watershed, Constitution proposes to use permittee-responsible mitigation at one site (a NYSDEC-regulated wetland) for mitigation. Constitution proposes to use permittee-responsible mitigation at two sites in the Schoharie Watershed.

Constitution identified a ratio of mitigation acres to impact acres for each type of impact and mitigation. Constitution assumed degraded wetlands (such as those impacted by agriculture) required less mitigation and therefore had lower mitigation ratios.

Approval of Constitution's mitigation plan is pending review of its application for an Individual Permit under Section 404 of the CWA to the COE and the NYSDEC.

4.4.6 Conclusion

With adherence to the ECPs, Procedures, the PADEP/NYSDEC, and the COE permit requirements, and our recommendations, impacts on wetlands would be minor. While adverse and long-term impacts on wetlands would occur, with Constitution's implementation of its mitigation we conclude the impacts would be reduced to less than significant levels.

4.5 VEGETATION

4.5.1 Existing Vegetation Conditions

The projects would be entirely within the Laurentian Mixed Forest Province of the Eastern United States, which is characterized by mixed stands of coniferous and deciduous species with coniferous forests predominant in areas with poor soil quality and deciduous stands dominant in habitats with good quality soils (USDA 2005). There are four major cover types along the proposed pipeline route, characterized by dominant vegetation and habitat value: agricultural and open lands; upland forest; and wetlands. Developed land, which is not discussed in this section, includes residential, commercial, and industrial lands; roadways; and mining operations, all of which are generally devoid of native vegetation and provide little habitat value (instead see our discussion in section 4.8). Agricultural land includes areas used for livestock grazing and crop production that provide minor to moderate habitat value. Commercial crops common to the project area and include hay, alfalfa, corn, and soybeans. Open land consists of non-forested vegetated areas not encompassed by developed or agricultural lands and includes grass and shrub lands, successional fields, and maintained rights-of-way.

In Pennsylvania, upland forest communities are predominantly deciduous hardwood forests with smaller coverage of mixed conifer-deciduous hardwood and conifer forests (PADCNR 2010). In New York, upland forest communities are comprised of hemlock northern hardwood, Appalachian oak-pine, and beech-maple mesic forests (Edinger 2002). Wetlands are discussed in section 4.4.

Pipeline Facilities and Extra Workspaces

The majority of vegetation that the pipeline project and associated extra workspaces would impact during construction is upland forest (983.0 acres). Additional vegetation impact types include

agricultural lands (387.0 acres), open lands (179.7 acres), and wetlands (94.9 acres, of which 33.8 acres are forested).

Aboveground Facilities

Construction of the aboveground facilities would impact 8.2 acres of upland forest and 7.1 acres of open land. Constitution would construct the mainline valves, pig launcher/receivers, and two tie-ins within the permanent pipeline easement or M&R station boundaries.

Contractor Yards

Constitution proposes to use six contractor yards on a temporary basis to support construction activities. These contractor yards would impact 40.2 acres of agricultural and 37.9 acres of open vegetation types.

Access Roads

Constitution would use 10 temporary access roads during construction activities and an additional 68 permanent access roads during construction and operation. The temporary access roads would impact 7.0 acres of land. Of the permanent access roads, 43 would be existing roads that may require some improvements (e.g., grading and widening), resulting in impacts on a total of 49.5 acres of upland forest, agricultural land, open land, and wetlands. The construction of 16 new permanent access roads would result in impacts on a total of 7.8 acres of vegetation. The remaining nine roads would be a combination of new and modified existing roads, which would result in 16.4 acres of impact on vegetation, some of which would be new disturbance. Impacts of access roads on wetlands are discussed in section 4.4. As discussed in section 4.3, we are recommending that Constitution not conduct any permanent fill of wetlands or waterbodies for the construction and operation of access roads.

The Turnpike Road M&R station would be accessed by two permanent access roads and the Westfall Road M&R station would be accessed by one new permanent access road. Based on information provided by Constitution in response to a recommendation in the draft EIS, the construction of these three permanent access roads would result in impacts on a total of 3.1 acres of vegetation, of which 2.9 acres is upland forest. These acreages are included in the information presented above. A list and description of access roads is provided in appendix E.

4.5.2 Vegetation Communities of Special Concern or Value

Constitution consulted with federal and state resource agencies to identify sensitive or protected vegetation types, natural areas, and unique plant communities in the project area. The discussion below summarizes these consultations. Information regarding federally or state-listed plant species (including species of special concern) is included in section 4.7.

Pennsylvania

The Pennsylvania Natural Heritage Program, a component of the PADCNR, has inventoried, by county, the locations of plant species and natural communities of special concern (PADCNR 2012). “Natural communities of special concern” are natural communities identified as vulnerable, imperiled or critically imperiled by the Pennsylvania Natural Heritage Program while “natural areas” are defined by the Pennsylvania Code as areas of unique scenic, historic, geologic, or ecological value that have been maintained in their natural condition (Zimmerman 2012, Pennsylvania Code 2013). Neither natural communities nor natural areas are regulated under the Pennsylvania Code. Based on the PADCNR

Pennsylvania Natural Diversity Index, 2 natural communities of concern and 10 rare plant species were identified in the vicinity of the proposed pipeline project (PADCNR 2012). Constitution identified three additional natural communities of concern and one natural area through supplemental literature review (Zimmerman et al. 2012).

Constitution used qualified botanists to conduct biological surveys for the natural communities and natural areas identified during agency consultation and literature research, as well as the rare plants that may be present within them. Surveys have been completed for those areas within a 600-foot-wide survey corridor in areas identified as suitable habitat, with the exception of one area (approximately 57 acres) for which landowner access has not been obtained. Two natural communities, both hemlock palustrine forested wetlands, were encountered during surveys. Constitution would avoid one of these wetlands by a route modification and avoid the other by a reduction in workspace. The PADCNR indicated in a June 7, 2013 letter that no impacts on plants or natural communities are anticipated along the project route (PADCNR 2013a). Therefore, we conclude that no impacts on Pennsylvania natural communities or natural areas of special concern would occur.

New York

The NYSDEC, in a letter dated February 13, 2013, identified one natural community, a dwarf shrub bog, as potentially present within the project area (NYSDEC 2013e). In addition to agency consultation, Constitution identified potentially suitable habitat for significant natural communities within the 600-foot-wide survey corridor during additional data reviews (Edinger et al. 2002).

Areas identified as suitable habitat for significant natural communities were surveyed by qualified botanists in September 2012, and three natural community types were identified in the pipeline project area: a Spruce Fir Swamp between MP 85.8 and MP 85.9, a Limestone Woodland Community between MP 118.5 and MP 119.0, and a Calcareous Talus Slope Woodland between MP 119.0 and MP 119.1 (see table 4.5.2-1). These natural community types are rare in the state or represent high quality examples of a common ecological community, but are not protected by any state or federal regulations. The dwarf shrub bog community type identified by the NYSDEC was not encountered during surveys. Constitution would avoid impacts on the Spruce Fir Swamp community by use of a Direct Pipe crossing and minor route variation. Constitution has not proposed specific mitigation for the Limestone Woodland Community or the adjacent Calcareous Talus Slope Woodland, but would reduce the construction right-of-way width from 110 feet to 100 feet within these interior forested crossings, and would adhere to the measures described in its New York ECP to minimize impacts. We have reviewed these measures and conclude they would minimize impacts on these areas to the extent practicable.

TABLE 4.5.2-1
Special Vegetation Communities Crossed by the Proposed Pipeline

State/County	Special Community	Crossing Length (miles)	Milepost	Additional Mitigation
Pennsylvania				
		None Crossed		
New York				
Delaware	Spruce Fir Swamp	0.4	85.8 – 85.9	Direct Pipe and minor route variation
Schoharie	Limestone Wooded Community	0.5	118.5 – 119.0	Right-of-way reduction
Schoharie	Calcareous Talus Slope Woodland	0.1	119.0 – 119.1	Right-of-way reduction

No special-status natural communities are present at Iroquois' proposed compressor station transfer facility site.

4.5.3 Interior Forest Habitat

Interior forest habitat is not managed as a federal or state-regulated sensitive area, but does provide habitat for a variety of wildlife species. We are defining interior forests as forested areas greater than 300 feet from the influence of forest edges or open habitat (Jones et al. 2001). These habitats provide protection from disturbance and predation, food resources, and brooding habitat for wildlife. Clearing or fragmentation of interior forests creates more edge habitat and smaller forested tracts which can impact availability and quality of feeding and nesting habitat for certain species as well as isolate species populations (Rosenberg et al. 1999). Interior forest has a higher habitat value for some wildlife species, may takes decades to establish, and is generally considered more rare in the environment compared to edge forest which has a lower habitat value for many species and can be created immediately with disturbance (Landowner Resource Center 2000; Sprague et al. 2006).

Constitution would cross 36 miles of interior forest habitat, which includes upland and wetland vegetation communities (appendix M). Although breeding habitat for interior forest birds varies significantly, ranging in size from 3 to 6,200 forested acres, Constitution identified 35 acres as the minimum size of interior forest habitat that would support most interior forest bird species (Robbins et al. 1989). Constitution would bisect 129 interior forest blocks greater than 35 acres, creating 55 forested blocks less than 35 acres in size. In order to reduce impacts on sensitive habitat, Constitution reduced its proposed construction right-of-way width from 110 feet, as originally proposed, to 100 feet within interior forested areas where practicable. Constitution would not reduce the right-of-way width in areas where steep slopes or other constraints exist for safety reasons. Where the right-of-way would not be reduced, the impact beyond the 100-foot right-of-way represents 12.2 acres of interior forest habitat. Construction activities for the pipeline would impact 439.7 acres of interior forest habitat with operation of the pipeline facilities permanently eliminating 217.7 acres of interior forest. By minimizing the right-of-way width through these areas, Constitution would avoid the clearing of 51.8 acres of interior forest relative to the original proposal.

In addition to direct impacts on interior forest tracts by the proposed clearing during construction and maintenance operations, indirect impacts also would occur on interior forest tracts. Newly created edge habitats would be established by maintenance of the permanent right-of-way and the indirect impacts could extend for 300 feet on each side (600 feet total) of the new corridor into remaining interior forest blocks. Assuming that 36 miles of interior forest habitat would be impacted, there could be indirect impacts on approximately 2,618 acres of interior forest. The actual indirect impacts could be less or more depending upon the size, shape, and post-construction status of the remaining, adjacent forested areas in relation to the permanent right-of-way. These adjacent areas could remain classified as forest interior blocks with some indirect impacts or their classification as forest interior could be changed altogether based on a reduction in block size below 35 acres. Construction would change the classification of 55 of the 129 interior forest blocks to non-interior forest blocks as their unfragmented size would no longer be above 35 acres. While the indirectly affected lands adjacent to the right-of-way would remain forested, they would have reduced habitat value compared to pre-construction conditions. The creation of edge habitat could increase the risk of establishment of invasive species and other impacts on wildlife species. In section 4.5.4 we discuss measures to control invasive species, and section 4.6.1.4 describes potential impacts of edge habitat on wildlife.

Although Constitution has attempted to route its project adjacent to existing disturbance and outside of forested areas, and has decreased workspaces within interior forest areas relative to its original proposal, impacts on the habitat and the migratory birds and other wildlife that use this habitat still

account for 42.9 percent of the total forest impacts and 23.6 percent of the total project impacts. In sections 4.6.1 and 4.7, we discuss Constitution's potential impacts on migratory birds and their interior forest habitats in relation to the Migratory Bird Treaty Act (MBTA) and Bald and Golden Eagle Protection Act (BGEPA), including proposed clearing outside of agency-recommended timeframes. In addition, the permanent clearing of a 30- to 50-foot-wide right-of-way may result in effectively disconnected forested tracts (Jones et al. 2001). Based on our experience with other projects, there are several measures that could be used to further mitigate impacts on interior forests such as support of conservation programs, planting of trees, reduction of the width of the permanent right-of-way, and limitation of maintenance of the area directly over or immediately adjacent to the pipeline. In response to a recommendation in the draft EIS, Constitution developed an upland forest mitigation plan, which also included impacts on and mitigation for migratory birds in coordination with federal and state agencies. This plan is summarized below.

4.5.3.1 Preliminary Migratory Bird and Upland Forest Plan

On May 6, 2014, Constitution filed a preliminary Migratory Bird and Upland Forest Plan which details impacts on upland forest habitat, Constitution's valuation of these habitat impacts, and measures proposed to reduce impacts and offset temporary and permanent impacts through conservation. Estimated direct impact on high quality interior forest habitat is 150.6 total acres (table 4.5.3-1). Constitution classified designated Important Bird Areas, cerulean warbler habitat, and areas where the pipeline project would eliminate designation as forest interior blocks by reducing their size to below 35 acres as high value interior forest habitats. Moderate value habitats included all other forest interiors and forest edge associated with forest interiors and large forest blocks. Direct impacts on moderate quality interior forests is estimated at 289.1 acres. Estimated direct impacts on moderate quality edge forest totaled 386.2 acres. Existing edge forest was considered to be low quality habitat; direct impacts totaled 195.4 acres. An additional 723.6 acres (9.95 miles crossed multiplied by 600 feet) of high value interior forest habitat would be indirectly impacted by the pipeline project according to the preliminary Migratory Bird and Upland Forest Plan. Constitution did not include moderate or low value habitats in its assessment of indirect impacts on interior forest.

TABLE 4.5.3-1.
Forest Habitat Values Reported in the Preliminary Migratory Bird and Upland Forest Plan

Habitat Type	Direct Construction Impact (acres) [a]	Direct Operation Impact (acres) [b]	Direct Total Impact (acres)
Interior Forest			
High Value for Migratory Birds	74.9	75.7	150.6
Moderate Value for Migratory Birds	147.1	142.0	289.1
Interior Forest Sub-total	222.0	217.7	439.7
Forest Edge			
Moderate Value for Migratory Birds (forest edge associated with forest interior blocks)	223.9	162.3	386.2
Low Value for Migratory Birds (existing forest edge)	106.4	89.2	195.4
Edge Forest Sub-total	330.3	251.5	581.6

[a] Construction impact includes only temporary workspace, not the permanent easement.
[b] Operation impact includes only the permanent easement.

The level of mitigation would be specific to the value of the habitat and/or the impact type. Constitution proposed funding for preservation or restoration efforts based on habitat quality: 150.6 acres of high value habitat directly affected, 675.3 acres of moderate value habitat directly affected, and 723.6 acres of high value habitat that would be indirectly affected. To offset impacts on the total of 1,549.5 acres of high and moderate value upland forest habitat, Constitution would deposit funds in an account(s) for use in the conservation of migratory bird habitat by one or more potential measures including, but not limited to:

- acquisition of lands for forest management and migratory bird conservation;
- restoration of upland forest, riparian corridors, and migratory bird habitat on acquired land;
- grants for projects designed to conserve these habitats; and
- long-term management of lands for migratory bird conservation.

The amount of funds deposited would be based on the total value of habitat lost and the cost of desired conservation efforts and would be determined in coordination with the FWS, NYSDEC, PADCNR and PGC. Agency coordination is ongoing regarding upland forest and migratory bird conservation measures and finalization of the Migratory Bird and Upland Forest Plan; therefore, **we recommend that:**

- **<u>Prior to construction</u>, Constitution should file with the Secretary for review and written approval of the Director of OEP a final Migratory Bird and Upland Forest Plan developed in consultation with the FWS, the NYSDEC, the PADCNR, and the PGC. The final plan should include a discussion of compliance with the MBTA and BGEPA, measures to avoid, reduce, or minimize unavoidable impacts on forests and migratory birds, and establishment of mitigation plans for conservation of migratory bird habitat.**

Based on Constitution's implementation of its general avoidance and impact minimization measures and upland forest conservation measures as described in its Preliminary Migratory Bird and Upland Forest Plan and our recommendation to finalize the plan in coordination with the applicable agencies prior to construction, we conclude that the direct and indirect adverse impacts on upland forest and migratory bird habitat would be effectively minimized to the extent practical. It is typically inevitable that there would be forest impacts for any construction project of this scale. Through acquisition of lands and grants in coordination with appropriate state and federal agencies, we conclude unavoidable adverse impacts would be adequately mitigated.

4.5.4 Noxious Weeds and Other Invasive Plant Species

Invasive species are those that display rapid growth and spread, becoming established over large areas (USDA 2013a). Most commonly they are exotic species that have been introduced from another part of the United States, another region, or another continent, although some native species that exhibit rapid growth and spread are also considered invasive. Invasive plant species can change or degrade natural vegetation communities, which can reduce the quality of habitat for wildlife and native plant species. Similar to invasive species, noxious weeds are frequently introduced but occasionally are native. Noxious weeds are defined as those that are injurious to commercial crops, livestock, or natural habitats and typically grow aggressively in the absence of natural controls (USDA 2013b).

Constitution's removal of existing vegetation and disturbance of soils during construction of the proposed facilities could create conditions conducive to the establishment of invasive weeds, particularly where new corridors are established in previously forested areas. To minimize the potential spread of invasive species, Constitution has developed state-specific Invasive Species Management Plans in consultation with the applicable state regulatory agencies (the PADCNR, the NYSDEC, and the NYSDAM). The Management Plans contain measures designed to control invasive plant species during project construction and operation through limited use of herbicides, installation of wash stations, and rapid restoration and reseeding following installation of the pipeline, which would promote the establishment of desirable plant species and deter the spread of unwanted plant species. Constitution's weed washing station protocols would include:

- inspection of vehicles, equipment, and materials before being brought on the right-of-way or moved to a different location;
- power-washing of equipment without the use of detergent or chemicals;
- use of brushes or compressed air if conditions preclude use of water;
- discharge of wash water greater than 100 feet from wetlands, waterbodies and stormwater drainages;
- use of elevated wash racks on equipment working in areas known to contain invasive species prior to moving to areas free of invasive species; and
- disposal of soil and plant material collected at wash stations at an incinerator or state-approved off-site facility.

Constitution would control the potential transport of invasive terrestrial and aquatic species, such as the emerald ash borer and didymo, through adherence to federal and state-specific regulations for preventing the land transport of such species, and by discharging hydrostatic test waters within the source watershed. We have received comments concerning the potential spread of invasive species throughout the project area due to the extent of forest clearing that would occur and agree that there is an increased potential for encroachment of invasive species in areas cleared during construction. Constitution has committed to rapid restoration and reseeding of construction areas which would promote establishment of native species within disturbed areas, which would tend to limit colonization by invasive plants. Invasive species could also spread during operation due to transmission of seeds or viable plant fragments from infested areas via mowing equipment. Constitution also committed to monitoring for invasive species for three years following construction; however, we believe that additional post-construction invasive species monitoring is needed. The risk of invasive species introduction decreases once revegetation of native species is successful and complete, although mowing could introduce invasive species during operation of the project. Therefore, **we recommend that:**

- **Constitution should conduct invasive species monitoring within the maintained right-of-way <u>for 3 years</u> following successful completion of revegetation as determined by the FERC staff based on the FERC's post-construction monitoring inspections. Constitution should not move mowing and maintenance equipment from an area where invasive species have been encountered during operation of the project unless it is cleaned prior to moving.**

Pennsylvania has 14 state-listed noxious or invasive weeds (USDA 2013c). Constitution conducted invasive plant surveys to identify the presence of non-native invasive plant species within the 600-foot-wide survey corridor (where survey permission was granted). Baseline surveys documented the location, size, and percent cover of invasive plants present within the proposed project area. Invasive

species identified include reed canary grass, multiflora rose, narrow-leaved cattail, Japanese stilt grass, Japanese barberry, European privet, black locust, Japanese knotweed, and common buckthorn. Only the multiflora rose is listed as noxious by the state of Pennsylvania and none are on the List of Federal Noxious Weeds (USDA 2013b).

New York does not have legislation adopting a state noxious or invasive weeds list; however, the NYSDEC lists invasive plant species potentially present in New York (NYSDEC 2013f). As in Pennsylvania, Constitution conducted invasive plant surveys to identify the presence of non-native invasive plant species within the 600-foot-wide survey corridor (where survey permission was granted) and documented the location, size, and percent cover of invasive plants present. Abundant invasive species include reed canary grass, multiflora rose, and tartarian honeysuckle. None of these species are listed on the List of Federal Noxious Weeds (USDA 2013b). No noxious weeds were identified at Iroquois' proposed compressor station transfer site.

Constitution would finalize invasive plant surveys upon receipt of survey permission and would subsequently determine the locations of wash stations. Because surveys are not complete and the locations of weed wash stations have not yet been provided, **we recommend that:**

- **<u>Prior to construction</u>, Constitution should file with the Secretary the final, complete results of invasive plant surveys and the planned locations of weed wash stations for review and written approval of the Director of OEP.**

Based on Constitution's implementation of its Invasive Species Management Plans and our recommendation to finalize surveys and the locations of weed wash stations before construction, we conclude that the potential spread of noxious or invasive weeds would be effectively minimized or mitigated.

4.5.5 General Impacts and Mitigation

Construction of the proposed projects, including the construction right-of-way, extra workspace, aboveground facilities, contractor yards, and access roads would result in impacts on 1,800.9 acres of vegetated lands. This total includes 1,033.9 acres of upland forest and 95.5 acres of wetland habitat (including 32.7 acres of forested wetland). Operation of the projects would result in impacts on 730.9 acres of vegetated lands, including 477.4 acres of upland forest and 19.1 acres of wetlands (of which 14.5 acres would be forested). Table 4.5.5-1 summarizes the approximate acreage that would be affected during project construction and operation.

Construction impacts on vegetation resources are classified based on the duration and significance of impacts. Temporary impacts generally occur during construction with vegetation returning to pre-construction conditions almost immediately after construction, whereas short-term impacts are those which require up to 3 years to return to pre-construction conditions. Long-term impacts require more than 3 years to revegetate but conditions would return to their pre-construction state during the life of the project. Permanent impacts are those that modify vegetation resources to the extent that they would not return to pre-construction conditions during the life of the project. Additional information on land use impacts is presented in section 4.8. Impacts on wetland vegetation are further discussed in section 4.4.

TABLE 4.5.5-1
Vegetation Types and Acres Impacted by Construction and Operation of the Projects

Facilities[a]	Agricultural		Open Land[b]		Wetland[c]		Upland Forest		Project Total	
	Constr[d]	Oper[e]	Constr	Oper	Constr	Oper	Constr	Oper	Constr	Oper
PIPELINE RIGHT-OF-WAY AND EXTRA WORKSPACE										
Pennsylvania	70.5	28.9	27.3	10.8	14.4	4.0	217.5	100.2	329.7	143.9
New York	316.5	120.2	152.4	65.6	80.5	15.0	765.5	352.4	1,314.9	553.2
PIPELINE TOTAL	**387.0**	**149.1**	**179.7**	**76.4**	**94.9**	**19.0**	**983.0**	**452.6**	**1,644.6**	**697.1**
ABOVEGROUND FACILITIES										
Pennsylvania (Constitution)	0.0	0.0	0.0	0.0	0.0	0.0	4.9	3.1	4.9	3.1
New York (Constitution)	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	<0.1	<0.1	<0.1
Wright Interconnect Project (Iroquois)	0.0	0.0	7.1	0.5	0.0	0.0	3.3	1.9	10.4	2.4
New York Aboveground Subtotal	**0.0**	**0.0**	**7.1**	**0.5**	**0.0**	**0.0**	**3.3**	**1.9**	**10.4**	**2.4**
ABOVEGROUND FACILITIES TOTAL	**0.0**	**0.0**	**7.1**	**0.5**	**0.0**	**0.0**	**8.2**	**5.0**	**15.3**	**5.5**
CONTRACTOR YARDS										
Pennsylvania	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0
New York	40.2	0.0	17.9	0.0	0.0	0.0	0.0	0.0	58.1	0.0
CONTRACTOR YARDS TOTAL	**40.2**	**0.0**	**37.9**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**78.1**	**0.0**
ACCESS ROADS										
Pennsylvania	4.0	1.5	3.0	1.0	0.2	<0.1	21.6	10.1	28.8	12.6
New York	5.6	2.5	7.0	3.4	0.4	0.1	21.1	9.7	34.2	15.7
ACCESS ROADS TOTAL	**9.6**	**4.0**	**10.0**	**4.4**	**0.6**	**0.1**	**42.7**	**19.8**	**62.9**	**28.3**
Pennsylvania Subtotal	**74.5**	**30.4**	**50.3**	**11.8**	**14.6**	**4.0**	**244.0**	**113.4**	**383.4**	**159.6**
New York Subtotal	**362.3**	**122.7**	**184.4**	**69.5**	**80.9**	**15.1**	**789.9**	**364**	**1,417.5**	**571.3**
PROJECTS TOTAL	**436.8**	**153.1**	**234.7**	**81.3**	**95.5**	**19.1**	**1,033.9**	**477.4**	**1,800.9**	**730.9**

[a] Impacts associated with MLVs are included in the pipeline facility impacts. Impacts associated with the pig launcher and pig receiver are included in the aboveground facility impacts.
[b] Maintained utility easement (pipeline, electric transmission, railroad, etc.) crossings and other open lands.
[c] Forested, palustrine scrub-shrub, and palustrine emergent wetlands crossed by the pipeline.
[d] Land affected during construction for pipeline facilities is comprised of the 50-foot-wide permanent right-of-way, 60 feet of temporary workspace; and extra workspace where applicable.
[e] Land affected during operation of the pipeline includes only the new 50-foot-wide permanent right-of-way, except for the permanent right-of-way in wetlands as detailed in section 4.4.
Note: Column totals may not sum correctly due to rounding.

Pipeline Facilities

The degree of impact on vegetation would depend on the type of vegetation affected, the rate at which the vegetation would regenerate after construction, and the area and frequency of vegetation maintenance conducted during operation. The primary impact of pipeline construction would be the cutting, clearing, and/or removal of 1,644.6 acres of existing vegetation, of which 983.0 acres is upland forest. The remaining vegetation would include 387.0 acres of agricultural land, 179.7 acres of open land, and 94.9 acres of wetlands (including 33.8 acres of forested wetlands). Specific mitigation for impacts on wetlands is discussed in section 4.4.

Impacts associated with disturbances to vegetation could include increased soil compaction and erosion, increased potential for the introduction and establishment of non-native and invasive species, and a local reduction in available wildlife habitat (see section 4.6.1). Constitution would implement erosion control measures as described in their ECPs and mitigate the introduction of non-native and invasive species by adhering to the Invasive Species Management Plans.

During clearing activities, Constitution would mow non-woody vegetation to ground level and cut and remove woody vegetation and stumps, as necessary. Constitution would fell trees and other woody material into the right-of-way, then chip and remove the debris. At the request of individual landowners, Constitution would stack the tree length cut timber on the landowner property for landowner use. Following construction, Constitution would seed all of the previously vegetated workspaces disturbed by construction in accordance with its ECPs, Plan, and Procedures. Constitution developed the proposed seed mixes using PADEP, NYSDAM, and NYDEC guidance (PADEP 2012, NYSDAM 2005, and NYSDEC 2005). In addition, Constitution is coordinating with the National Wild Turkey Federation to determine areas along the right-of-way where Federation-recommended seed mixes would best be used to benefit wildlife. Use of these seed mixes would be approved by the applicable regulatory agencies prior to use.

Most impacts on agricultural lands would be temporary to short-term, as these areas are disturbed annually to produce crops and would typically return to their previous condition shortly following construction, cleanup, and restoration. Constitution would maintain topsoil segregation throughout all construction activities in agricultural lands in order to mitigate impacts on subsequent crop production and maintain a minimum cover depth of 48 inches. Lands currently dominated by herbaceous growth would revegetate quickly, often within one growing season after seeding and otherwise typically within 3 years, depending on a number of factors. Cleared scrub-shrub vegetation would likely require 3 to 5 years to regain their woody composition.

The greatest impact would be in forested areas. Construction in forested lands would remove the tree canopy over the entire width of the construction right-of-way, which would change the structure and environment of the underlying area. Constitution would reduce the proposed construction workspace and right-of-way to 100 feet within interior forests, except where extra workspace is necessary. This neck-down would prevent clearing of 51.8 acres of interior forest during construction. Forested lands within the maintained right-of-way would be permanently converted to an herbaceous cover type. The regrowth of shrubs and trees within the temporary workspaces would reduce the edge effect and provide connectivity between adjacent forested tracts to some extent (Tewksbury et al. 2002), but it may take decades before these areas resemble the forest vegetation that was present before construction. As indicated above, we have recommended that Constitution finalize its Migratory Bird and Upland Forest Plan in consultation with the relevant agencies prior to construction to mitigate impacts from forest clearing.

In addition, soils that were previously shaded by the tree canopy would receive increased amounts of light, which could lead to drier soils and higher soil temperatures. Trees on the edge of the right-of-way might be subject to mechanical damage to trunks and branches and root impacts from soil disturbance and compaction, all of which could result in the decreased health and viability of some trees and root systems. Some edge trees that were previously within dense forested stands may also lack stability following removal of adjacent supporting trees, which could result in increased susceptibility to wind damage.

Following construction, if Constitution's operational site monitoring identifies unsuccessful revegetation or potential invasive species colonization, it would conduct additional vegetation management, such as herbicide application, manual removal of non-native vegetation, and consultation with qualified botanists. We have included a recommendation that invasive species monitoring be extended until 3 years after the FERC's inspections conclude that the right-of-way has been successfully revegetated and that invasive species are controlled. If deemed necessary, Constitution would use foliar herbicides along the right-of-way in accordance with agency regulations and manufacturer's recommendations to control potential invasive vegetation. Constitution would not apply herbicides, fertilizer, or lime within 100 feet of a wetland.

During operations, Constitution would mow up to a 50-foot-wide permanent right-of-way no more than once every three years; however, a 10-foot-wide swath may be mowed more frequently to facilitate routine patrols and emergency access. Within wetlands, Constitution would permanently maintain only a 10-foot-wide swath and selectively remove trees within 15 feet of the pipeline. These maintenance activities and other permanent impacts would result in impacts on 697.1 acres of land, of which 452.6 acres of upland forest and 19.0 acres of wetlands (including 14.5 acres of forested wetlands) would permanently convert to an herbaceous state. Due to the predominantly rural nature, the project would cross many forested areas. However, Constitution routed the pipeline to minimize vegetation impacts where feasible, and Constitution would further minimize impacts on vegetation by adherence to its state-specific ECP and Plan and Procedures. Specific measures that would reduce the impacts include:

- minimizing the footprint of the proposed work activities and the duration of disturbances to the extent practicable;
- minimizing disturbances to wetlands;
- protecting topsoil and mitigation of subsoil compaction within agricultural and residential areas which could impact root systems of existing vegetation;
- adhering to the Invasive Species Management Plans;
- collocating with existing rights-of-way to the extent practicable;
- minimizing the right-of-way width to 100 feet in interior forests, to the extent practicable;
- installing erosion controls to prevent the loss of soils, and reseeding in all disturbed areas that are not actively be used for cultivated crops, to stabilize the soils and speed revegetation; and
- monitoring the success of revegetation efforts and taking appropriate action to correct any poor revegetation that is observed.

Aboveground Facilities

The impact of Constitution's two M&R Stations and the Iroquois project on each vegetation type is provided in table 4.5.5-1. The projects would disturb a total of 8.2 acres of upland forest and 7.1 acres

of open land for construction of the new aboveground facilities. Temporary impacts on vegetation within the construction work area would be similar to those described for the pipeline facilities. Constitution would stabilize, seed, and allow the temporary workspace areas used during construction to revegetate. Permanent vegetation impacts would include the conversion of a total of 5.0 acres of upland forest and 0.5 acre of open land to developed land. The majority of permanent upland forest impacts (3.1 acres) would occur at the Turnpike Road M&R Receipt Station and Iroquois' proposed compressor transfer station (1.9 acres). The remaining acreage (less than 0.1 acre) would be impacted at the Westfall Road M&R Delivery Station. Constitution would position the MLVs within the existing permanent right-of-way in order to avoid additional impacts on vegetation. Similarly, Constitution's proposed communication towers would be within the M&R Stations and MLV sites, and would not result in additional impacts on vegetation.

Pipe Storage and Contractor Yards

The six contractor yards would temporarily impact 37.9 acres of open and 40.2 acres of agricultural vegetation types. Following construction, Constitution would re-seed the open land and allow it to revegetate. No seeding would occur in actively cultivated cropland without landowner approval.

Access Roads

The proposed access roads for the pipeline would impact 42.7 acres of upland forest, 9.6 acres of agricultural land, 10.0 acres of open land, and 0.6 acre of wetlands (including 0.1 acre of forested wetlands) during construction. Construction impacts on vegetation would be comparable to those described for the proposed pipeline, including the potential for soil compaction and erosion, establishment of invasive species, and fragmentation of interior forested tracts. Following construction, Constitution would restore and seed any previously vegetated areas affected by construction of the 10 temporary access roads (totaling 7.0 acres) according to its ECPs and Plan. During operations, the 68 permanent access roads would permanently convert 28.3 acres to developed lands. As previously indicated, we recommended in section 4.3.3.1 that Constitution provide site-specific plans and further justification for permanent impacts of access roads on wetlands and waterbodies. We also recommended above that Constitution fully describe the access roads that would service the two proposed meter stations.

4.5.6 Conclusion

Based on our review of the potential impacts on vegetation as described above, we conclude that the primary impact from construction and operation would be on forested lands. However, due to the prevalence of forested habitats within the project area, Constitution's commitment to necking down of the right-of-way through interior forests to 100 feet where possible to minimize impacts at levels below those originally proposed, eventual regrowth of prior forested areas outside of the permanent right-of-way, and implementation of our recommendation to finalize mitigation plans for upland forest impacts, we conclude that the permanent conversion of forested lands would not result in a significant impact on the vegetative resources within the proposed project area. In addition, impacts on forested and non-forested vegetation types would be further mitigated through adherence to the measures described in Constitution's ECPs, Plan, and Invasive Species Management Plans.

4.6 WILDLIFE AND AQUATIC RESOURCES

4.6.1 Wildlife

4.6.1.1 Existing Wildlife Resources

The proposed pipeline project would traverse terrestrial and wetland habitats that support a diversity of wildlife species. Wildlife habitats along the proposed route are representative of the local vegetation communities (upland forest, open land, agricultural land, developed land, and wetlands).

Upland forest is characterized by hardwood forests which provide food resources, nesting habitat, and cover for a variety of reptiles, amphibians, mammals, birds, and invertebrates. Open land is characterized by grasslands, fields, and scrub-shrub areas which provide cover as well as foraging and nesting habitat for a variety of species. Agricultural land, though limited in cover, provides forage and nesting habitat for a variety of songbirds. Developed land includes residential, commercial, and industrial land; roadways; and mining operations, and is generally devoid of native vegetation and often provides little wildlife habitat. Wetlands provide cover, forage, and nesting habitat for a variety of reptiles, amphibians, mammals, and birds. Representative wildlife species that could use be found in the project area include the American bullfrog, red salamander, gray squirrels, white-tailed deer, American robins, and wood ducks.

Project Facilities

The projects would impact a total of 1,033.9 acres of upland forest, 436.8 acres of agricultural land, 234.7 acres of open land, 95.5 acres of wetlands (of which 33.8 acres would be forested wetlands), and 64.0 acres of developed land. Impacts of individual project components (the pipeline, aboveground facilities, contractor yards, and access roads) upon vegetation types are provided in section 4.5.

4.6.1.2 Sensitive or Managed Wildlife Habitats

Constitution and Iroquois consulted the FWS, PADCNR, PGC, PFBC, and NYSDEC to identify significant sensitive wildlife habitats in the vicinity of the project (PADCNR 2013b, 2013c, PFBC 2012, PGC 2012, FWS 2012a, 2012b). The areas identified by these agencies are provided in table 4.6.1-1 and discussed below. Constitution would not cross any National Wildlife Refuges, National Park Service Wilderness Areas, or Pennsylvania or New York Wildlife Management Areas (National Park Service 2012, NYSDEC 2008b, FWS 2012c, USGS 2012e). Specific information regarding threatened and endangered wildlife species and their habitats is included in section 4.7.

TABLE 4.6.1-1
Sensitive Wildlife Habitats Crossed by the Constitution Pipeline Project

Start Milepost	End Milepost	Sensitive Habitat Name	Administering Agency	Length Crossed (feet)	Existing Habitat Type	Acreage Affected	
						Construction[a]	Operation [b]
18.8	21.8	Area Between Canawacta Creek and Starrucca Creek	PFBC	15,867	Upland Forest	33.2	15.7
					Open Land	2.1	0.8
					PFO Wetland	0.2	0.20
					Waterbodies	0.2	0.10
					Developed	2.9	1.1
			Total Canawacta/Starrucca Creek Area			**38.5**	**17.8**

TABLE 4.6.1-1 (continued)
Sensitive Wildlife Habitats Crossed by the Constitution Pipeline Project

Start Milepost	End Milepost	Sensitive Habitat Name	Administering Agency	Length Crossed (feet)	Existing Habitat Type	Acreage Affected	
						Construction[a]	Operation [b]
42.5	42.5	Melondy Hill State Forest	NYSDEC	307	Upland Forest	0.9	0.4
					Total Melondy Hill State Forest	**0.9**	**0.4**
43.6	45.1	Cannonsville/ Steam Mill Area-IBA-Crossing #1	National Audubon Society- New York Chapter	7,651	Upland Forest	16.1	7.7
					Open Land	0.1	0.1
					PFO Wetland	1.4	0.9
					Waterbodies	0.0	0.0
					Developed	0.0	0.0
					Total Cannonsville/Steam Mill Crossing #1	**17.7**	**8.7**
45.2	45.3	Cannonsville/ Steam Mill Area-IBA-Crossing #2	National Audubon Society- New York Chapter	386	Upland Forest	1.0	0.4
					Open Land	0.1	0.0
					PFO Wetland	0.0	0.0
					Waterbodies	0.0	0.0
					Developed	0.0	0.0
					Total Cannonsville/Steam Mill Crossing #2	**17.1**	**8.1**
46.4	47.2	Cannonsville/ Steam Mill Area-IBA-Crossing #3	National Audubon Society-New York Chapter	4,561	Upland Forest	11.0	5.0
					PFO Wetland	0.2	0.1
					Waterbodies	0.0	0.0
					Total Cannonsville/Steam Mill Crossing #3	**11.2**	**5.2**
97.0	97.1	Clapper Hollow State Forest	NYSDEC	333	Upland Forest	1.0	0.2
					Open Land	0.0	0.0
					PFO Wetland	0.4	0.2
					PEM Wetland	0.0	0.0
					Total Clapper Hollow State Forest	**1.4**	**0.5**

Source: USGS 2012e.

[a] Construction Acreage = workspace utilized during construction activities (temporary plus permanent).

[b] Operation Acreage = 50 foot width permanently maintained easement through upland areas; 30 foot width permanently maintained through forested wetlands, 10 foot width permanently maintained through scrub-shrub wetlands; there are no operation impacts on PEM wetlands as there is no change in the pre- and post-construction vegetation cover type.

IBA = Important Bird Area

PFO = palustrine forested

PEM = palustrine emergent

Pennsylvania

The PFBC, during early coordination, indicated that a privately owned area between Canawacta Creek and Starrucca Creek provides habitat for a variety of wildlife species, including the timber rattlesnake, which is a Pennsylvania state candidate species (PFBC 2013a, 2013b). Constitution initially adopted a route alternative due to potential landslide concerns in this area; however, the pipeline would still cross sensitive wildlife habitat between MP 18.8 and 21.8, for a total of 3.0 miles (table 4.6.1-1). Construction through this area would impact 38.5 acres of land, including 33.2 acres of upland forest. Operation of the pipeline would result in 17.8 acres of permanent impact, including 15.7 acres of upland forest. In addition to the Taylor Hill area, Pennsylvania State Game Lands No. 70 would be approximately 209 feet from the pipeline centerline at MP 25.3; however, these lands would not be directly impacted by project construction or operation.

New York

The pipeline route would cross two areas classified as sensitive wildlife habitat by the NYSDEC, the Melondy Hill State Forest and the Clapper Hollow State Forest (NYSDEC 2012d). In addition, Constitution would cross an Important Bird Area (IBA), the Cannonsville/Steam Mill IBA, identified by the National Audubon Society-New York Chapter (Liner 2012). This IBA would be crossed in three locations. These habitat areas, listed in table 4.6.1-1. Three additional conservation areas are within close proximity to the proposed pipeline route: Pine Hill State Forest near MP 52.4, the Emmons Pond Bog Preserve near MP 75.0, and the Petersburg State Forest near MP 110.4. However, these would not be crossed or impacted by the project. State forest lands are further discussed in section 4.8.

Melondy Hill State Forest

The Melondy Hill State Forest, in southeastern Chenango County, New York, is comprised of 5,417 acres of primarily upland forest. The forest is managed by the NYSDEC with the objective to maintain a variety of forest habitats including young and old growth as well as evergreen and deciduous forests (NYSDEC 2012e). The area contains both natural and planted forest stands, is used by the public for a variety of recreational activities, and provides habitat for a variety of wildlife including small mammals, birds, deer, and black bears (NYSDEC 2012e). Constitution would cross the Melondy Hill State Forest at MP 42.5 for a total crossing length of 307 feet. The project would impact 0.9 acre of upland forest during construction and 0.4 acre during operation. To minimize impacts on this sensitive wildlife habitat, the original route was modified to reduce the total crossing length and to collocate the pipeline with an existing roadway for approximately 40 percent of the segment in the forest to avoid further fragmentation. Constitution would not construct any project-related aboveground facilities or access roads in the Melondy Hill State Forest.

Cannonsville/Steam Mill Area IBA

Constitution consulted with the Audubon society to identify IBAs in the vicinity of the pipeline project. IBAs vary in size but are typically discrete habitats that provide habitat for bird species including sites for breeding, migrating, and overwintering. The Cannonsville/Steam Mill IBA comprises 26,306 acres of mostly upland forest surrounding the Cannonsville Reservoir and provides habitat for a variety of bird species including the bald eagle (National Audubon Society-New York Chapter 2013a). Based on consultation with the Audubon Society, the pipeline would cross the Cannonsville/Steam Mill IBA in three locations, including at MP 43.6 for 7,651 feet, at MP 45.2 for 386 feet, and at MP 46.4 for 4,561 feet (Liner 2012). Construction activities would impact 46.0 acres, of which 28.1 acres is upland forest. Operation of the pipeline would impact 22.0 acres, of which 13.1 acres is upland forest.

To minimize impacts on this sensitive wildlife habitat and reduce fragmentation of contiguous forested tracts, Constitution has sited two of the three crossings along or near the edges of the IBA. The third crossing (between MPs 46.4 and 47.2) would fragment a currently contiguous forest block into two new forested tracts of 300 acres and 125 acres. Constitution would reduce the construction right-of-way from 110 feet to 100 feet through the IBA, where practicable, and reseed disturbed areas with a specialty seed mix determined in consultation the regulatory agencies and appropriate non-governmental organizations. Constitution would construct a single permanent access road (PAR34) within the IBA to minimize crossings of wetlands and waterbodies and facilitate access to the pipeline. This access road would permanently impact 0.9 acre of predominantly upland forest. Although Constitution has minimized impacts within the IBA, the overall impact on wildlife, and specifically migratory birds, through clearing of interior forest is still a potentially significant impact; therefore, we have recommended in section 4.5 that Constitution develop an Upland Forest Mitigation Plan with the applicable agencies that would include additional mitigation for migratory birds.

Clapper Hollow State Forest

The Clapper Hollow State Forest is in Jefferson and Schoharie Counties, New York, and is comprised of 820 acres of primarily upland forest. It is managed as snowshoe hare habitat and a reforestation area by the NYSDEC, and also provides public recreation, including a cross-country ski trail system. The pipeline would cross the Clapper Hollow State Forest between MPs 97.0 and 97.1, for 333 feet. Construction would impact 1.0 acre of upland forest and 0.4 acre of forested wetlands; operation would impact 0.2 acre of upland forest and 0.2 acre of forested wetlands. Constitution has implemented route modifications to minimize the crossing length and follow the edge of the state forest, thereby avoiding impacts from fragmentation. No additional proposed facilities or access roads would impact the Clapper Hollow State Forest.

4.6.1.3 Migratory Birds

Migratory birds are species that nest in the United States and Canada during the summer, and then migrate south to 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 (16 U.S. Code 703-711). Executive Order 13186 (EO 13186) (66 Federal Register 3853) directs federal agencies to identify where unintentional take is likely to have a measurable negative effect on migratory bird populations and to avoid or minimize adverse impacts on migratory birds through enhanced collaboration with the FWS. EO 13186 states that emphasis should be placed on species of concern, priority habitats, and key risk factors, and that particular focus should be given to addressing population-level impacts. Additionally, bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 USC 668-668d).

In response to a 1998 amendment to the Fish and Wildlife Conservation Act, the FWS established a list of Birds of Conservation Concern (BCC) that, without conservation action, were expected to become candidate species for listing under the ESA (FWS 2008). The BCC lists species of concern at National, FWS Region, and Bird Conservation Region geographic scales. Table 4.6.1-2 lists BCCs for which the preferred habitat is known or expected within the project area or for which breeding has been documented in project counties.

TABLE 4.6.1-2 Birds of Conservation Concern with Potentially Suitable Habitat within the Project Area				
Common Name	**Scientific Name**	**Habitat Type**	**Habitat Present within Project Area**	**Confirmed Breeding in Project Counties[a]**
Pied-billed Grebe	*Podilymbus podiceps*	Freshwater to brackish seasonal and permanent ponds.	Yes - breeding	No
Horned Grebe	*Podiceps auritus*	Small to moderate-sized, shallow freshwater ponds and marshes.	Yes - migration	No
American Bittern	*Botaurus lentiginosus*	Interior freshwater wetlands and occasionally coastal salt marshes.	Yes – breeding	No
Least Bittern	*Ixobrychus exilis*	Freshwater and brackish marshes with tall, dense emergent vegetation	Yes – breeding	No
Snowy Egret	*Egretta thula*	Open edges of rivers, lakes, salt marshes, marine intertidal zones and maritime beaches	Yes – feeding	No
Bald Eagle	*Haliaeetus leucocephalus*	Undisturbed areas near large lakes and reservoirs, marshes and swamps, or stretches along rivers	Yes	Yes (all)
Peregrine Falcon	*Falco peregrinus*	Open country from tundra, savannah and sea coasts, to high mountains, as well as open forests and tall buildings.	Yes – Terrace Mountain only	No
Black-billed Cuckoo	*Coccyzus erythropthalmus*	Edges and clearings of young deciduous and mixed deciduous-coniferous woods	Yes – breeding	Yes (all)
Short-eared Owl	*Asio flammeus*	Open country including grasslands and marshlands.	Yes – migratory / wintering	No
Whip-poor-Will	*Caprimulgus vociferous*	Central Canada east to the Atlantic coast and south to Oklahoma and Georgia.	Yes	Schoharie (one survey block)
Red-headed Woodpecker	*Melanerpes erythrocephalus*	Dead trees for nest sites, snags for roosting, and open ground for foraging.	Yes	No
Loggerhead Shrike	*Lanius ludovicianus*	Agricultural areas that contain hedgerows, hayfields, pastures and scattered trees and shrubs, especially hawthorn.	Yes	No
Sedge Wren	*Cistothorus platensis*	Wet meadows or hayfields dominated by sedges and grasses.	Yes	No
Wood Thrush	*Hylocichla mustelina*	Interior and edges of mature deciduous or mixed forests	Yes – breeding	Yes (all)
Blue-winged Warbler	*Vermivora pinus*	Dense herbaceous growth and shrubs, scattered low trees, and wooded edges.	Yes – breeding	Yes (all)

TABLE 4.6.1-2 (continued)
Birds of Conservation Concern with Potentially Suitable Habitat within the Project Area

Common Name	Scientific Name	Habitat Type	Habitat Present within Project Area	Confirmed Breeding in Project Counties[a]
Golden-winged Warbler	*Vermivora chrysoptera*	Early successional fields with a combination of shrubby and open areas within the territory.	Yes – breeding	No
Prairie Warbler	*Dendroica discolor*	Shrubby habitats including those in southern pine forest, mangroves, pine and scrub oak barrens, and regenerating forest.	Yes	Yes (all)
Cerulean Warbler	*Dendroica cerulea*	Large forest tracts of tall, deciduous, broad-leafed tree species.	Yes – migration / breeding	Schoharie (one survey block)[b]
Worm-eating Warbler	*Helmitheros vermivorum*	Mature deciduous or mixed forests on steep hillsides or ravines with a dense, shrubby understory.	Yes	No
Canada Warbler	*Wilsonia canadensis*	Primarily coniferous and mixed northern hardwood forests with dense, often wet, undergrowth.	Yes - breeding	Yes (all)
Rusty Blackbird	*Euphagus carolinus*	Bogs, beaver ponds, swamps, and slow streams.	Yes - migration	No
Broad-winged Hawk	*Buteo platypterus*	Primarily forests, underneath the canopy; along coastlines and mountain ridges during migration	Yes - breeding	Broome, Delaware, and Schoharie
Downy Woodpecker	*Picoides pubescens*	Open woodlands, particularly among deciduous trees; orchards, parks, and lots	Yes	Yes (all)
Eastern Wood-pewee	*Contopus virens*	Deciduous forest and woodlands	Yes - breeding	Yes (all)
Acadian Flycatcher	*Empidonax virescens*	Deciduous forests along streams and swamps	Yes - breeding	No
Scarlet Tanager	*Piranga olivacea*	Deciduous and mixed forests; prefer undisturbed tracts	Yes - breeding	Yes (all)
Yellow-throated Vireo	*Vireo flavifrons*	Edge habitats in deciduous and mixed forests	Yes - breeding	Delaware
Louisiana Waterthrush	*Seiurus motacilla*	Breeds along gravel streams within deciduous forest	Yes - breeding	Schoharie (one survey block)
Black- and White Warbler	*Mniotilta varia*	Deciduous and mixed forest	Yes - breeding	Yes (all)
Hooded Warbler	*Wilsonia citrina*	Deciduous and mixed forest	Yes - breeding	No

Notes:

[a] Based on upon review of Wilson et al. 2012 and NYSDEC 2013g. Species were observed to breed in the counties listed. Data provided in these reports were collected between 2000 and 2009 in PA and 2000 and 2005 in NY.

[b] Constitution conducted habitat surveys (September 2013) and determined that potentially suitable habitat for the cerulean warbler is present between MP 107.5 and 108.0.

Sources: Cornell 2009, Cornell 2013, National Audubon Society 2013, National Audubon Society-New York Chapter 2013b, c, d, e, NYNHP 2013a, NYSDEC 2013g, Wilson et al. 2012

On March 30, 2011, the FWS and the Commission entered into a *Memorandum of Understanding Between the Federal Energy Regulatory Commission and the U.S. Department of the Interior United States Fish and Wildlife Service Regarding Implementation of Executive Order 13186, "Responsibilities of Federal Agencies to Protect Migratory Birds"* that focuses on migratory birds and strengthening migratory bird conservation through enhanced collaboration between the two agencies. This voluntary memorandum does not waive legal requirements under the Migratory Bird Treaty Act, Bald and Golden Eagle Protection Act, ESA, or any other statutes and does not authorize the take of migratory birds.

Noise and other construction activities during migratory bird courtship and breeding periods could result in reduced reproduction and nest abandonment. Migratory bird nesting within the project area spans from mid-April through mid-August and peaks between mid-May and early August (Meade 2008). Therefore Constitution proposes to conduct the majority of tree clearing between September 1 and March 31 in order to minimize impacts on breeding birds and comply with state and federal recommendations (FWS 2012a). Constitution would conduct limited clearing activities between April 1 and August 31 for access roads and sensitive waterbodies, as necessary, to access and construct through sensitive fisheries within state-designated construction windows (see section 4.6.2). To minimize the potential for impacts on migratory birds, we have recommended in section 4.5 that Constitution finalize its Migratory Bird and Upland Forest Plan in coordination with the regulatory agencies that would provide mitigation for the proposed limited tree clearing outside of the recommended window.

As part of its Preliminary Migratory Bird and Upland Forest Plan (section 4.5.3), Constitution proposed to provide a buffer around active nests (nests with eggs or young in them) to protect them from construction activities. However, Constitution subsequently clarified that it would not perform nest surveys prior to construction, resulting in no practical way to utilize nest buffers. The FWS has no permitting mechanism to allow for the taking of active migratory bird nests. FWS guidance states that "nest destruction that results in the unpermitted take of migratory birds or their eggs, is illegal and fully prosecutable under the MBTA." Therefore, to further minimize potential impacts on nesting migratory birds, **we recommend that:**

- **<u>Immediately prior to any vegetation clearing to be conducted between April 1 and August 31,</u> Constitution should conduct nest surveys for birds of conservation concern performed by qualified personnel within areas proposed for clearing. Constitution should provide a buffer around any active nests to avoid potential impacts until the young have fledged.**

Species that utilize the project area during the fall migration period or for overwintering would likely avoid construction operations, though temporary displacement to less suitable habitat may occur. The fragmentation of large forested tracts during construction and operation of the project could create long-term impacts on BCCs by reducing available breeding, nesting, and foraging habitat for interior nesting species, such as the wood thrush, cerulean warbler, and Canada warbler, which are present within the project area (NYSDEC 2013g). Large tracts of interior forest that the project would cross are listed in appendix M. Species that use edge habitat or grassland/scrub-shrub habitat for foraging, nesting, or breeding, such as the prairie warbler, could benefit from the creation of smaller contiguous forested blocks and maintained rights-of-way. In general, construction would temporarily displace birds to adjacent habitats which could increase the competition for food and other resources, increase stress, increase susceptibility to predation, and impact reproductive success.

Maintenance of the permanent right-of-way would create smaller contiguous tracts of forest habitat and might reduce available feeding and nesting habitat for certain migratory bird species. The loss of interior forest habitat could result in mobile species permanently populating adjacent habitats which could increase competition and stress on a long-term basis. However, the creation of additional edge

habitat could benefit certain species by providing travel corridors and additional forage habitat. Constitution has consulted with state and federal agencies regarding migratory bird impact avoidance and mitigation and filed a Preliminary Migratory Bird and Upland Forest Plan as described in section 4.5.3. Implementation of this plan when finalized in coordination with the regulatory agencies would mitigate for unavoidable impacts on interior forests, which provide habitats for numerous migratory bird species. Constitution has committed to implementing mitigation measures to reduce potential impacts on migratory birds and currently proposes to:

- conduct most clearing activities between September 1 and March 31 to minimize or avoid direct impacts on breeding birds;
- for construction activities that would commence during the migratory bird nesting season, such as crossing of sensitive fisheries, direct construction activities to begin in areas of reduced migratory bird activity to minimize potential impacts during nesting season;
- route the project along existing rights-of-way and roadways where practicable to minimize fragmentation of interior forest tracts, including high quality bird habitat such as the Cannonsville/Steam Mill Area IBA (see section 4.6.1.2);
- reduce the construction right-of-way width within interior forest tracts to 100 feet, where practicable (see appendix M);
- use seed mixes provided by the National Wild Turkey Foundation, or applicable regulatory agencies to help revegetate soils disturbed by project activities in a manner beneficial to wildlife and early successional species, where appropriate;
- conduct routine right-of-way vegetation maintenance (see section 4.5.5) from August 1 to April 15 to avoid potential impacts during the migratory bird nesting season; and
- deposit funds in an account(s) for use in the conservation of migratory bird habitat by one or more potential measures as part of the Migratory Bird and Upland Forest Plan (see section 4.5.3).

We conclude that these measures would help reduce impacts on migratory birds and are consistent with the goals of the MBTA Memorandum of Understanding discussed above. Further, based on Constitution's implementation of its general avoidance and impact minimization measures and upland forest conservation measures as described in its Preliminary Migratory Bird and Upland Forest Plan, our recommendation in section 4.5.3 to finalize the plan in coordination with the applicable agencies prior to construction, and our recommendation above to conduct nest surveys and establish nest buffer zones, we conclude that the direct and indirect impacts on migratory birds and this habitat would be minimized and mitigated to the extent practicable.

Constitution proposes to install 100-foot-tall, monopole, radio communication towers at 10 aboveground facility locations to support backup communications and data transmission. Communication towers could adversely impact migratory bird populations through bird collisions with the towers. The FWS guidelines for communication tower design (FWS 2013) were considered in the design of the proposed communication towers and the impact minimization measures that Constitution would implement to minimize bird strikes include:

- keeping the total height to less than 200 feet;
- designing the towers to eliminate light or sound emissions; and
- constructing without guy wires.

Based on the design of the proposed communication towers and Constitution's adherence to FWS guidelines, we conclude that construction and operation of the communication towers would not adversely impact migratory birds.

Overall construction impacts on migratory birds would be short-term as birds would move into adjacent undisturbed habitats. In addition, Constitution would conduct the majority of clearing activities outside of the sensitive timeframes. The operational impact would be long-term to permanent by reducing the size of unfragmented forest tracts and creation of open habitats. We have recommended that Constitution provide additional impact avoidance measures (e.g., buffers for active nests) for the limited clearing proposed for times during the breeding period. Additional potential impacts on IBAs in the vicinity of the proposed project are described in section 4.6.1.2.

4.6.1.4 General Impacts and Mitigation

Pipeline Facilities

In total, construction of the pipeline and extra workspace would impact 1,644.6 acres of vegetated habitat. Following construction, Constitution would re-seed the disturbed right-of-way to stabilize the soils and speed revegetation. During operations, 697.1 acres of vegetated habitat within the permanent right-of-way would convert to, and Constitution would maintain by mowing as, an early successional stage. This maintenance would result in the conversion of 452.7 acres of upland forest and 14.5 acres of forested wetlands to herbaceous and scrub/shrub habitat.

Wildlife could be impacted by clearing of vegetation; alteration of the landscape from grading the ground, soil disturbance, and recontouring; conflicts with vehicles; human presence; activities associated with trenching; increased predation; and edge effects and habitat fragmentation. During construction, more mobile species would be temporarily displaced from the construction right-of-way to similar habitats nearby due to human presence and increases in noise. Noise impacts would typically be temporary and intermittent, as pipeline construction typically occurs in a manner similar to a moving assembly line. Less mobile species, such as small mammals, reptiles, amphibians, and nesting birds, may experience direct mortality or permanent displacement. Displacement of species could lead to increased competition for some resources. Some wildlife displaced from the right-of-way would return to the newly disturbed area and adjacent, undisturbed habitats after completion of construction. Soil-dwelling invertebrates would be impacted directly through movement of soil from one place to another, resulting in some mortality and displacement. This could reduce the forage potential for insectivores and other small predators that inhabit the area. The overall impact of these effects, however, would be minor due to the temporary nature of the effects and limited area affected by construction.

The clearing of vegetation on the construction right-of-way and extra workspaces would reduce cover, foraging, breeding, and nesting habitat for some wildlife. The degree of impact would depend on the type of habitat affected, the timing of clearing and construction activities, and the rate at which the area recovers after disturbance from construction. Seasonal habitat use for migratory birds is discussed above. The effect on species that rely on open land habitats would be short-term, as Constitution would seed these areas and they would likely recover within 1 to 3 years after construction. Cleared scrub-shrub vegetation would likely require several years to regain their woody composition. The effect of workspace clearing on forest-dwelling wildlife species would be greater than open and scrub-shrub habitat wildlife as forested lands could take decades to return to pre-construction condition, and Constitution would prevent trees from reestablishing on the permanent right-of-way. Constitution minimized the potential for these long-term effects by collocating the proposed workspace with other existing rights-of-way in certain areas for approximately 9 percent of the proposed alignment, and by reducing the construction right-of-way to 100 feet in interior forest areas, where able.

Trash and debris could impact wildlife by animals eating contaminated or dangerous items and by encouraging certain species to move into areas where humans are working, resulting in potential wildlife-human interaction and conflict. To minimize the potential for wildlife attraction, Constitution would maintain construction debris in a neat and orderly manner, remove it from all work areas, and dispose it in a state approved off-site location.

A spill of hazardous materials during construction, such as diesel fuel or oil, or the excavation and exposure of contaminated soil or groundwater could impact wildlife. Constitution would minimize impacts from chemicals or contaminants by adhering to its state-specific ECPs (including its Spill Plan) and Plans and Procedures, such as storing hazardous materials in temporary containment capable of holding 110 percent of the total volume and refueling in designated areas at least 100 feet from wetlands and waterbodies, or in accordance with EI provisions. In addition, Constitution would use biodegradable, water-soluble, and environmentally safe dust suppressants. Thus, we conclude the risk of chemical exposure to individual animals would be low and there would be no risk of population-level impacts on any wildlife species.

Construction traffic on paved and unpaved roads could temporarily disturb birds and other wildlife near the roadways. There could also be an increase in direct mortality of certain wildlife resulting from animal/vehicle collisions. However, due to the use of existing roads when practicable, and the short timeframe of construction, we would expect the overall impacts on wildlife from increased vehicular traffic to be minor.

Trenching activities and the spoil piles generated during construction could create potential traps where wildlife could fall into trenches. In addition, spoil piles could create barriers to some less mobile species such as small reptiles and amphibians. Constitution would periodically inspect open trenches for wildlife and return any wildlife found to the appropriate suitable habitat. Constitution would also sequence construction to limit the amount and duration of open trench (and related spoil piles). Therefore, we conclude that trenching and spoil pile impacts on wildlife movement would be minimized to the extent practicable.

Increased predation could occur during construction and operation of the pipeline due to the removal of vegetation and the resulting increase in visibility. While individual mortality rates could increase, the project would not likely have any population-level impact due to these effects.

Impacts due to fragmentation of contiguous forested tracts are dependent on the size and orientation of remaining tracts. Constitution would cross a total of 36.0 miles of interior forest habitat in 539 different tracts. Large forested tracts in close proximity and connected by corridors can provide high quality wildlife habitat; however, the creation of additional edge habitat has the potential to cause changes in vegetation composition, species distributions, and available foraging and nesting habitat (Rosenberg et al. 1999). In addition to impacts on migratory birds as discussed in section 4.6.1.3, the fragmentation of contiguous forested tracts can impact mammals, reptiles, and amphibians such as the garter snake, painted turtle, and spotted salamander through loss of habitat, increased predation, and disruption of breeding (NYSDEC 2014a). Forest habitat (and interior forest habitat in particular) can takes decades to become established compared to forest edges and scrub or herbaceous habitats, which can be established much more rapidly and which are relatively common in the project area. However, the creation of additional edge habitat could benefit certain foraging mammal species, such as white-tailed deer and raccoons, by providing travel corridors and additional forage habitat. Following construction, Constitution would re-seed soils disturbed by project activities to facilitate revegetation which would act to reduce the edge effect and allow mammals to move between adjacent forested areas.

In response to a comment on systems of forest blocks and wildlife travel corridors within the Upper Susquehanna River Basin that would be crossed by the proposed pipeline, we contacted Chris Yearick, Data Manager at the Upper Susquehanna Coalition, to gather additional information. Mr. Yearick stated that there is interest in inventorying and mapping these features for conservation efforts, and small-scale, pilot studies have been conducted using historic aerial imagery to inventory forest blocks and mapping pipeline rights-of-way which serve as wildlife travel corridors. However, we were informed that, due to funding restrictions, a full inventory of forest blocks and wildlife travel corridors within the watershed has not been conducted and there are no immediate plans to complete a full inventory (Upper Susquehanna Coalition 2014).

Blasting may be necessary along the pipeline route, including sensitive wildlife areas with shallow depth to bedrock, such as the Cannonsville/Steam Mill IBA (MP 43.6), Clapper Hollow State Forest (MP 97.0), as well as numerous interior forest areas. Constitution would determine the need for blasting at the time of crossing, and state agencies would give approval prior to any necessary blasting. Constitution has developed a blasting plan which would limit potential impacts, as described in sections 2.3.1 and 4.1.

Riparian zones are adjacent to waterbodies and contain vegetation dependent on moist soils. These habitats are important for water quality and bank stabilization and provide shelter, foraging areas, and nesting habitat for species of birds, mammals, reptiles, amphibians, and invertebrates. Potential impacts on wildlife from the removal of riparian habitat include loss of habitat, reduced habitat quality, increased predation, temporary displacement of individuals, and alteration of migration and breeding habits. Constitution would allow riparian areas at least 25 feet wide to permanently revegetate across the pipeline right-of-way at each waterbody crossing (except for a 10 foot-wide corridor centered over the pipeline) to facilitate bank stabilization, stream shading, and to provide wildlife habitat.

Constitution has routed the pipeline to minimize impacts on sensitive wildlife habitat whenever feasible. Constitution would minimize impacts on wildlife habitat further by adhering to its state-specific ECPs, Plan, and Procedures, as well as additional proposed mitigation. Specific measures to reduce impacts include:

- maintaining a reduced permanent right-of-way width (10 foot-wide herbaceous and 30-foot-wide shrub-scrub) through wetlands as described in Constitution's Procedures (see section 4.4);
- monitoring restoration and revegetation of disturbed areas to develop a stratified vegetation cover;
- reducing the construction right-of-way width within interior forested habitat and wetlands; and
- conducting the majority of tree clearing activities from September 1 to March 31 for the protection of migratory birds.

Aboveground Facilities

Construction of the Turnpike Road M&R Receipt station, the Westfall Road M&R Delivery Station and Iroquois' proposed compressor transfer station would impact a total of 8.2 acres of upland forest, with a majority of the impacts (4.9 acres) at the Turnpike Road facility. Temporary impacts on wildlife occurring within or near construction workspaces would be similar to those described above for the pipeline facilities. Following construction, Constitution would stabilize, seed, and allow temporary workspace to revegetate, which would restore their use to most wildlife. Construction of the projects

would permanently convert a total of 5.0 acres of upland forest vegetation to developed land. Wildlife would likely be permanently displaced from these areas by habitat conversion to impervious cover (i.e., slab and gravel at the meter stations) or maintained vegetation (i.e., impervious surface and maintained lawn at Iroquois' site) and the erection of security fences at the aboveground facility sites. Construction of the communication towers would be limited to the footprint of the M&R Stations and the MLVs, so no additional impacts on wildlife habitat would occur. Iroquois is currently proposing to clear all trees outside of the FWS-recommended clearing window and is therefore working with the FWS to develop additional mitigation measures for the protection of migratory birds.

The increase in ambient noise in the immediate vicinity of these facilities during both construction and operation, especially for the proposed compressor station transfer facility, may also result in a decrease in wildlife use of adjacent habitat. Changes in ambient noise levels are further discussed in section 4.11.2 along with proposed measures to limit noise exposure during both construction and operations of the projects. The Applicants would minimize impacts on wildlife by collocating the Westfall Road M&R Station and the proposed compressor station adjacent to developed land that includes Iroquois' existing Wright Compressor Station. Wildlife in this area is likely already acclimated to the permanent noise environment associated with an existing natural gas compressor station. The proposed communication towers would not emit light or sound.

Contractor Yards

The proposed contractor yards would temporarily impact 37.9 acres of open land, 40.2 acres of agricultural land, and 23.4 acres of developed land. Following construction, Constitution and Iroquois would restore and reseed any previously vegetated areas that are affected, with the exception of actively cultivated croplands, unless approved in writing by the landowner. Use of these areas would temporarily displace wildlife species; however, displaced wildlife would return to these areas following restoration. Therefore, no permanent impacts on wildlife would result from the use of the contractor yards.

Access Roads

Constitution proposes to use 10 temporary access roads during construction and 68 permanent access roads during construction and operation of its project. Of the 68 permanent access roads, 43 are existing roads and would generally require improvements such as grading or widening, 16 would be newly constructed, and nine are existing roads that also would require new extensions. Construction of these roads would impact 42.7 acres of upland forest, 14.1 acres of developed land, 9.6 acres of agricultural land, 10.0 acres of open land, and 0.6 acre of wetlands (including less than 0.1 acre of forested wetlands). Construction impacts on these habitats would be comparable to those described for pipeline facilities and include soil compaction and erosion, the potential establishment of invasive species, and fragmentation of interior forested tracts. Constitution would restore and seed any previously vegetated areas affected by construction according to its ECPs and Plan after construction is completed. Operational use of the 68 permanent roads would result in the permanent conversion of 40.6 acres, including 19.8 acres of upland forest, to developed land. A full list of access roads and discussion of their impacts is provided in appendix E.

4.6.1.5 Conclusion

Overall, wildlife resources are not expected to be significantly impacted due to construction and operation of the projects based on the amount of similar adjacent habitat available for use, the proposed clearing window for avoidance of the migratory bird nesting season, and our recommendations for Constitution to finalize the Migratory Bird and Upland Forest Plan and to implement nest surveys and buffers for tree cutting outside the allowable clearing window (September 1 to March 31), which would

further minimize impacts on wildlife due to forest clearing. In addition, the Applicants would minimize impacts to the extent possible through adherence to their ECPs, Plan, Procedures, routing of the proposed pipeline to minimize impacts on sensitive areas, and reducing the construction right-of-way through wetlands and interior forests.

4.6.2 Aquatic Resources

4.6.2.1 Existing Aquatic Resources

The pipeline would cross a total of 289 waterbodies, 69 in Pennsylvania and 220 in New York. Waterbody crossings in Pennsylvania would include 45 minor, 24 intermediate, and no major crossings. Waterbody crossings in New York would include 135 minor, 84 intermediate, and 1 major, Schoharie Creek (MP 119.7). An additional 16 waterbodies in Pennsylvania and 30waterbodies in New York would be within the construction workspaces, but not crossed by the pipeline. Construction or improvements of two proposed access roads in Pennsylvania and six in New York would impact waterbodies; 11 additional access roads would cross waterbodies using existing infrastructure. A more detailed characterization of the waterbodies that Constitution would cross is provided in section 4.3. None of the aboveground facilities or contractor yards would impact any fisheries resources. Therefore, these facilities are not discussed further in this section.

Pennsylvania

As discussed in section 4.3.3.3, the PADEP classifies waterbodies according to water quality and aquatic communities. Under Pennsylvania Code Title 25, Chapter 93 waterbodies in the state are classified as: coldwater fisheries, warmwater fisheries, migratory fisheries, and trout stocked. Selected waterbodies are further classified as High-Quality or Exceptional Value and given special protection. Waterbodies that are classified as HQ exceed levels necessary to support fish, shellfish, wildlife, and recreation whereas waterbodies classified as EV are in significant natural areas, provide exceptional ecological significance, or are designated as a “wilderness trout stream” (Pennsylvania Code 2012). The PFBC further classifies waterbodies supporting trout populations or providing habitat as: Approved Trout Water, Class A Trout Waters, Special Regulation Areas, Stream Sections that Support Natural Reproduction of Trout, and Wilderness Trout Streams; trout streams and their applicable tributaries are the only streams with a PFBC-recommended crossing window. The pipeline would cross 20 waterbodies classified as HQ-CWF; the remaining 49 waterbodies are classified as CWF. Four of the 16 waterbodies within the construction right-of-way, but not crossed by the trenchline, are classified as HQ-CWF (see appendix K). In addition, one temporary access road would impact a waterbody classified as HQ-CWF, and three permanent access roads would impact three CWF-classified waterbody segments. Constitution would cross five waterbodies designated as supporting trout, seven additional tributaries to these streams that are afforded seasonal protection (appendix N).

New York

Fresh waterbodies in New York are classified as either coldwater or warmwater and given letter classifications under regulation 6, New York Code of Rules and Regulations, Part 701 which denote their best use: AA, A, B, C, and D (NYSDEC 2012c). Freshwater classes AA, A, B, and C are all suitable for fish, shellfish, and wildlife propagation and survival. All waterbodies crossed by the proposed project are classified as CWF with the exception of Schoharie Creek (warmwater). In addition, the pipeline would cross 79 waterbodies capable of supporting trout (NYSDEC 2012c, 2012f). Of the remaining 141 waterbodies, 103 are road ditches or are classified as D and are unsuitable for aquatic life propagation, 36 are classified as C, and two are classified as AA. Of the 30 waterbodies within construction workspaces, but not crossed by the pipeline, only 6 are capable of supporting trout. In addition, one permanent access

road and two temporary access roads would impact waterbodies capable of supporting trout. New York waterbody classifications are also discussed in detail in section 4.3.3.3.

4.6.2.2 Fisheries of Special Concern

Constitution consulted the National Marine Fisheries Service, the FWS, the PFBC, and the NYSDEC to identify waterbodies that may contain federally or state-listed threatened, endangered, or candidate species and their habitats, coldwater fisheries, and other fisheries resources that could be considered fisheries of special concern. The National Marine Fisheries Service did not identify any federally listed threatened, endangered, or candidate aquatic species under its jurisdiction or any designated essential fish habitat in the project vicinity (NOAA 2012, 2013b). Threatened and endangered species are discussed in section 4.7. Consultations with the PFBC and the NYSDEC determined that 118 waterbodies classified as fisheries of special concern would be impacted by the pipeline with 6 impacted by permanent access roads (appendix N). No commercial fisheries were identified in the vicinity of the project (NOAA 2012, 2013b); however, fisheries of significant recreational value (i.e., those that support stocking programs, natural populations, or spawning of native trout species) would be crossed. These recreational fisheries are considered sensitive and are described below. Although fisheries of special concern are given additional considerations based on the value of their resources, general impacts on each of them would be similar to those for general fisheries.

Pennsylvania

Constitution, in consultation with the PFBC, identified 25 waterbody crossings containing sensitive fisheries (PFBC 2013c). These waterbodies are classified as Approved Trout Water, Trout Stocked Water, or Supporting Natural Trout Reproduction, or are tributaries to waterbodies with these designations (appendix N). Constitution would cross all but one waterbody using a dry crossing method (i.e., dam and pump, flume, or cofferdam methods, as described in sections 2.3.2 and 4.3.3), which would allow construction under mostly dry conditions, minimizing the potential for downstream sedimentation and turbidity. The unnamed tributary to Starrucca Creek (MP 21.5) would be crossed using a conventional bore. Six waterbodies would be within the workspace but not crossed by the pipeline. Constitution would further minimize impacts on fisheries resources within these waterbodies by adhering to the PFBC's recommended construction windows, which allows in-stream work in Trout Stocked streams between June 16 and February 28 to avoid impacts on recreational angling, and between January 1 and September 30 for Streams that Support Natural Reproduction of Trout to avoid interference with spawning (PFBC 2013c) (table 4.6.2-1). Potential impacts on aquatic resources that could result from the use of dry crossing methods are discussed below. Potential impacts on surface waters from these methods are discussed in section 4.3.3. In addition, Constitution proposes to install a permanent culvert/bridge at one tributary to Canawacta Creek during the construction of a permanent access road (PAR15) and at one tributary to Martins Creek during construction of permanent access road PAR-2b. Constitution would also install a temporary culvert/bridge during construction of access road TAR 8. We have recommended in section 4.3 that permanent fill not be used at any waterbody or wetland.

TABLE 4.6.2-1
Construction Timing Restrictions for Waterbodies Containing Sensitive Fisheries Crossed by the Constitution Pipeline Project

State	Fishery Classification	Construction Restriction Window[a]	In-Stream Work Window	Applicable Regulations
Pennsylvania	Trout Stocked	March 1 through June 15	June 16 through February 28	PFBC Trout Designations
Pennsylvania	Natural Trout Reproduction	October 1 through December 31	January 1 through September 30	PFBC Trout Designations
New York	Trout and Trout[b] Spawning	October 1 through May 31	June 1 through September 30	NYSDEC
New York	Warmwater Fisheries	March 1 through July 15	July 16 through February 28	NYSDEC

[a] Timing restrictions determined based on agency consultation with the PFBC and the NYSDEC (PFBC 2013c, NYSDEC 2012g, NYSDEC 2013h, NYSDEC 2014b)

[b] Trout and trout spawning classifications are denoted by a "T" or "TS" in appendix N.

New York

The NYSDEC classifies all waterbodies with a rating of B or higher, or those rated C with suitable trout habitat, as protected streams. Schoharie Creek, rated C, is also considered a sensitive fishery as it may contain suitable habitat for sensitive species. The pipeline and associated work spaces would impact 80 waterbodies containing sensitive fisheries, with an additional 3 waterbodies impacted by temporary and permanent access roads. The pipeline would cross 1 warmwater fishery (Schoharie Creek), 34 waterbodies supporting trout populations, and 52 waterbodies supporting trout spawning. An additional, 7 waterbodies that would be impacted by the project do not carry a fishery classification; however, Constitution has indicated that waterbody-specific construction windows were determined based on coordination with the NYSDEC in the field (appendix N). Schoharie Creek, which Constitution would cross at MP 119.7, is classified by the NYSDEC as a warmwater fishery and serves as potential habitat for the state-listed yellow lampmussel. Constitution would use the Direct Pipe method to install the pipeline beneath the creek bed without affecting aquatic resources. Constitution would also adhere to the NYSDEC's allowable construction window of July 16 to February 28 for warmwater fisheries to avoid disruption to spawning (NYSDEC 2013h). Constitution would cross Bennettsville Creek (including an oxbow near MP 47.6) and Middle Brook (crossed at MP 87.9) via Direct Pipe instead of an HDD as originally proposed, facilitated at both locations by Constitution's adoption of a minor route variation. Potential impacts on aquatic resources that could result from the use of the Direct Pipe or HDD methods are discussed below.

Constitution would use dry crossing methods (flume, dam and pump, or cofferdam) at the remaining crossings in order to minimize potential sedimentation and turbidity impacts. Constitution has indicated that it would also adhere to the NYSDEC allowable construction window of June 1 through September 30 for protected coldwater streams designated for trout and trout spawning to avoid disruption of spawning and over-wintering of trout eggs (NYSDEC 2012g, 2013b, 2014) (table 4.6.2-1). In addition, Constitution proposed a contingency crossing window of May 15 through October 15 if the HDD originally proposed for Bennettsville Creek were unsuccessful. However, Constitution modified the proposed crossing method for Bennettsville Creek from HDD to Direct Pipe based on a construction feasibility analysis.

Methods for crossing sensitive fisheries by access roads would adhere to the ECPs, including installation of erosion and sedimentation controls and the use of equipment bridges. Construction of access roads and potential impacts on waterbodies are described in section 4.3.2.

4.6.2.3 General Impacts and Mitigation

This section describes general impacts and measures Constitution would implement to minimize impacts on fisheries and aquatic resources. A majority of waterbodies (268 of 289 crossings) would be crossed using a dry crossing method that would be determined by Constitution based on in-stream flow and conditions at the time of crossing. Constitution would cross all other waterbodies via trenchless methods, including conventional bore (14 crossings) and Direct Pipe (7 crossings). Details regarding waterbody crossings and alternative methods for proposed trenchless crossings are described herein and in section 4.3.3. The proposed crossing method for each waterbody potentially impacted by the pipeline project is provided in appendix K. Temporary impacts on fisheries and aquatic resources, such as macroinvertebrates, from dry crossings would be stream bank disturbance, increased sedimentation and waterbody turbidity upon the return of flow to the stream following restoration, reduction in shading and cover, and modification of flow. These temporary impacts could cause physical damage to the gills of fish, disrupt food sources and predator/prey interactions, impact fish passage, increase ambient water temperature, degrade spawning and nursery habitat smother demersal eggs, and temporarily reduce reproduction potential. Aquatic invertebrates and macroinvertebrates such as caddisflies, dragonflies, and damselflies, which are preyed upon by fishes, could be impacted by direct mortality from construction, increased sedimentation filling interstitial spaces of bottom substrates, and reduced reproduction potential. However, these impacts would be temporary as these macroinvertebrate species rapidly recolonize impacted areas (Matthaei et al. 1996, McCabe and Gotelli 2000). Trenchless methods generally do not result in direct impacts on the waterbody.

In Susquehanna County, Pennsylvania, Constitution would utilize two permanent access roads and one new temporary access road that would impact waterbodies capable of sustaining fisheries; as discussed above. In New York, one permanent access road and two temporary access roads would impact fisheries. Constitution would adhere to best management practices described in the ECPs to mitigate impacts on aquatic resources, including the use of erosion and sediment control measures, use of temporary equipment bridges to transport construction equipment; and limiting in-stream equipment to that required to construct the crossing. Constitution would design equipment bridges to minimize impacts on channel bottoms and banks, allow normal flow, and withstand maximum flows at each location. Constitution proposed to stabilize and permanently fill (with culverts) five waterbodies, use minor fill at one waterbody, and permanently fill six wetlands (appendix K). Since permanent fill of a waterbody would impact flow and habitat quality, we have recommended in section 4.3 that Constitution not use permanent fill at any waterbody. Constitution indicated that in cases where waterbodies would be within the construction right-of-way, but not directly crossed by the pipeline, impacts would be limited to installation of equipment crossings such as bridges or clearing of vegetation adjacent to the stream. Constitution committed to maintain a 15-foot-wide undisturbed vegetation buffer between construction activities and the waterbody where feasible.

Constitution would implement measures described in its state-specific ECPs to minimize impacts on fisheries resources. These measures include:

- completing waterbody crossings during appropriate in-stream construction windows and completing open-cut crossings within 24 hours and 48 hours for minor and intermediate crossings, respectively;
- completing major waterbody crossings using trenchless methods;

- installing temporary erosion controls and maintaining flow rates;
- dispersing any downstream discharges to minimize scour and downstream siltation;
- crossing waterbodies perpendicular to the channel or as close as practicable; and
- restoring stream channels to their original contour and flow rate and stabilizing banks.

Following construction, Constitution would allow a 25-foot-wide riparian strip along each waterbody bank to revegetate with native flora in order to stabilize banks, reduce erosion impacts, and provide shading and cover for fisheries resources; however, a 10-foot-wide corridor may be permanently maintained in an herbaceous state directly above the pipeline, except in areas crossed by trenchless methods such as Direct Pipe. While stream temperature changes are possible following clearing of riparian vegetation, the reduction in shading across the maintained corridor would not likely influence a temperature change (Beschta and Taylor 1988).

Where standing water is present within a channel, but flow is not discernible, Constitution would conduct a dry crossing (e.g., flume crossing, dam and pump or cofferdam) to allow for construction under dry conditions. The specific dry crossing method at waterbodies would be decided by Constitution at the time of construction based on site conditions. Dry crossing methods would allow waterbody flow to be maintained at all times and measures would be implemented to eliminate scour and minimize impacts on aquatic resources.

Dry Crossing Method

Dry crossing methods involve the installation of dams and flume pipes, a dam-and-pump system, or a cofferdam prior to trenching to isolate the stream flow from the construction area and allow trenching of the stream crossing in drier conditions. These methods typically result in lower sedimentation and associated turbidity impacts than open-cut crossings while maintaining stream flow. In addition to the impacts noted above, fish and other biota could be impinged or entrained during pump use; however, Constitution would screen dewatering pumps at all dry crossings to minimize impingement and entrainment of fish. In addition, Constitution would attempt to capture aquatic organisms in areas that would be dewatered and would relocate them immediately downstream of construction operations. Freshwater mussels are not anticipated in any of the waterbodies proposed for dry crossings. In addition, removal of streamside vegetation at the crossings may reduce shading of the waterbody, diminish escape cover, and could result in locally elevated water temperatures. Constitution would mitigate potential impacts from dry crossing methods by adherence to the best management practices described in the ECPs, as described above.

Horizontal Directional Drill Crossings

Constitution modified its plans to use HDDs after issuance of the draft EIS. Currently, no HDDs are proposed and they have been replaced by Direct Pipe crossings, reroutes, or a dry open-cut crossing. Direct Pipe is another trenchless construction method similar to HDD as described in sections 2.3.2, 4.3.3, and below.

Conventional Bore Crossings

Conventional boring is a trenchless construction method that Constitution would mainly use for highway crossings, but it could also be used at associated wetland and waterbody crossings, which limits surface disturbance because no open trench is associated with this construction method. Constitution would dig bore pits on each side of the feature and tunnel below the road or streambed without the use of

drilling fluid. Constitution proposes to use this method at 14 waterbody crossings, the majority of which would be adjacent to roads. This method is limited because of the need to dig bore pits on each side of the feature, which in the case of waterbody crossings could cause those pits to fill with water. Additional detail regarding conventional bore crossings can be found in section 2.3.2.

Direct Pipe Crossings

The Direct Pipe method combines the HDD and conventional boring methods to lay prefabricated pipe simultaneously with boring of the pipeline tunnel. Direct pipe installations are shorter and shallower than the HDD method and are limited to distances of 900 feet. Soils with large or abundant rocks might preclude Direct Pipe crossings. Constitution proposes to use the Direct Pipe method at 7 waterbodies including at Bennettsville Creek (MP 47.7), Middle Brook (MP 87.9) and Schoharie Creek (MP 119.7) with the conventional dry crossing method used as an alternative. Possible impacts on aquatic resources from Direct Pipe construction would be similar to those of HDD construction, and primarily related to the potential for inadvertent releases of drilling fluids into waterbodies. However, the risk of a loss drilling fluids is lower for Direct Pipe compared to HDD given that the borehole would be continuously cased. Additional detail regarding Direct Pipe crossings can be found in section 2.3.2.

Blasting

Waterbodies with a shallow depth to bedrock along the pipeline project route include Dry Brook (MP 37.4), Mud Lake (MP 87.1), and West Kill (MP 101.8), as well 19 unnamed tributaries and 3 road ditches. No in-stream blasting is anticipated. If in-stream blasting is required, Constitution has committed to developing a detailed in-stream blasting plan that complies with state-specific regulations and permit conditions. However, this plan has not been provided to FERC. Therefore, **we recommend that:**

- **<u>Prior to in-stream blasting at any waterbody crossing</u>, Constitution should file with the Secretary for the review and approval of the Director of OEP, a site-specific Blasting Plan that provides protocols for in-stream blasting and the protection of the fisheries and aquatic resources and habitat. These plans should be developed in consultation with applicable state resources agencies.**

Hydrostatic Test Water

To comply with DOT regulations, Constitution would conduct hydrostatic testing of the pipeline prior to placing it into service (see section 4.3). Constitution proposes to use five waterbodies as sources of hydrostatic test water, all of which contain sensitive fisheries: Starrucca Creek in Pennsylvania, and Oquaga, Ouleout, Kortright, and Schoharie Creeks in New York. The PFBC approved the withdrawal of water from Starrucca Creek, but requested that water not be withdrawn between March 1 and June 15 (PFBC 2013c), which overlaps with Constitution's proposed water withdrawal window of December through March. Constitution has not received approval for water withdrawal from Oquaga, Ouleout, Kortright, and Schoharie Creeks from the NYSDEC, nor has Constitution verified whether water withdrawals would be subject to the in-stream work windows. Therefore, **we recommend that:**

- **Constitution should not withdraw water from Starrucca Creek outside of the PFBC recommended in-stream work window of June 16 through February 28, or should provide the PFBC approval to withdraw water outside this window. <u>Prior to construction</u>, Constitution should also file with the Secretary copies of consultation with the NYSDEC regarding the potential to withdraw water from Oquaga,**

Ouleout, Kortright, and Schoharie Creeks, as well as any timing restrictions placed on water withdrawal at those locations.

Constitution would mitigate impacts on aquatic resources by adhering to its ECPs which include the use of 0.1-inch mesh screens on intake pumps to reduce the impingement and entrainment of fishes, the discharge of water to the same watershed, control of the flow rate to prevent erosion, and maintaining normal waterbody flow during hydrostatic test water withdrawals. All test waters would be discharged in upland areas through a contained filtration structure to prevent flow into waterbodies and wetlands. With Constitution's proposed measures and our recommendation to consult with the applicable agencies regarding water withdrawal from fisheries of special concern, we conclude that hydrostatic testing would not significantly impact aquatic resources. Constitution would also file hydrostatic test permits prior to construction which would detail discharge timing, volume, and locations.

Spill Prevention Control and Countermeasures

Accidental spills of construction-related fluids (for example oil, gasoline, or hydraulic fluids) into waterbodies could result in water quality impacts that affect fish and other aquatic organisms. The potential impact would depend on the type and quantity of the spill, and the dispersal and attenuation characteristics of the waterbody. Minimization and mitigation procedures related to water quality are discussed in section 4.3.3.6. To reduce the potential for surface water contamination and resulting impacts on aquatic life, Constitution would implement the measures in its ECPs which include conducting routine inspections of construction equipment, tanks, and storage areas to help reduce the potential for spills or leaks; restricting refueling and the handling of hazardous materials to greater than 100 feet from wetland and waterbody resources; and the use of secondary containment around all containers and tanks. With adherence to these measures, we conclude that impacts on aquatic resources from potential spills would be adequately minimized.

4.6.2.4 Conclusion

Based on our review of potential project impacts on aquatic resources as described above, we conclude that the proposed projects would result in some temporary impacts on aquatic resources, but that these impacts would be adequately mitigated through adherence to the measures described in Constitution's ECPs, as well as our recommendations regarding the timing of construction activities and development of in-stream blasting plans.

4.7 SPECIAL STATUS SPECIES

Special status species are those species for which state or federal agencies afford an additional level of protection by law, regulation, or policy. For the purposes of this environmental analysis, special status species of plants and animals include species officially listed by the states of Pennsylvania or New York or the federal government as endangered or threatened (as per the ESA), or species of special concern.

Constitution's field reconnaissance surveys and wetland delineations were conducted from June 2012 to September 2013. The original study area was typically a 600-foot-wide corridor encompassing the project route and workspaces but was decreased to 300 feet during the 2013 survey season as the route became more defined. However, Constitution has not yet acquired survey access for about 24 percent of the pipeline route (an estimated 30 miles), has finalized special status species surveys focused on a subset of the route accounting for approximately 8 miles, and has not surveyed three of the proposed contractor yards sites.

4.7.1 Regulatory Requirements and Species Identification

The ESA requires each federal agency to ensure that any actions authorized, funded, or carried out by the agency do not jeopardize the continued existence of a federally listed endangered or threatened species, or result in the destruction or adverse modification of the designated critical habitat of a federally listed species. As the lead federal agency, the FERC is required to consult with the FWS and/or NOAA' National Marine Fisheries Service (NOAA Fisheries) to determine whether federally listed endangered or threatened species or designated critical habitat are found in the vicinity of a proposed project, and to determine the proposed action's potential effects on those species or critical habitats. Constitution and Iroquois, acting as the FERC's non-federal representatives for the purpose of complying with Section 7(a)(2) of the ESA, initiated informal consultation with the FWS on May 2, 2012 and February 22, 2013, respectively. Constitution submitted consultation letters to two FWS offices in the project area, including the New York and Pennsylvania Field Offices and Iroquois submitted a consultation letter to the New York field office. Additionally, Constitution has consulted with the Northeast Regional Office of the FWS, NOAA Fisheries, the PFBC, the PGC, the PADCNR, and the NYSDEC. In addition to the FWS's New York Field Office, Iroquois has consulted with the NYSDEC.

For actions involving major construction activities with the potential to adversely affect listed species or designated critical habitat, the FERC must prepare a biological assessment (BA) for those federally listed species that may be affected and report its findings to the FWS and NOAA Fisheries (as applicable). If it is determined that the action would adversely affect a federally listed species, the FERC must submit a request for formal consultation to comply with Section 7 of the ESA. In response, the FWS and/or NOAA Fisheries would issue a biological opinion as to whether or not the federal action would likely jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of designated critical habitat.

The FWS, which is responsible for terrestrial and freshwater species, and NOAA Fisheries, which is responsible for marine species, jointly administer the ESA. NOAA Fisheries, during early coordination with Constitution, indicated that no threatened or endangered species under its purview are expected to be within the proposed pipeline project area and that no further consultation is required. Additionally, Iroquois' proposed compressor transfer station would be constructed at the end of the pipeline; no threatened or endangered species under NOAA Fisheries', FWS', or NYSDEC's purview are expected within the compressor transfer station and no further consultation for the Iroquois project is required. Because Constitution's project may affect federally listed species, in compliance with Section 7 of the ESA, the FERC requests that the FWS consider the EIS, along with various survey reports prepared by Constitution, as the BA for the Constitution project.

In addition to federal law, Pennsylvania and New York have passed laws to protect state-listed threatened and endangered species. The state-specific regulations include the Pennsylvania ESA (Pennsylvania Code 58 §75.1-75.4); and the New York ESA (New York Environmental Conservation Law § 11-0535 and 6 NYCRR Part 182), revised November 2010. The overall goal of each of the state endangered species laws is to conserve, protect, restore, and enhance any listed species and their habitat.

Through our and Constitution's consultations with the protected species agencies and research, we have identified 4 federally listed species and 23 additional state-listed species in the general area of the pipeline project. The potential effects of Constitution's project on these species are discussed below.

4.7.2 Federally Listed Species and Species Proposed for Listing

We reviewed the information submitted by Constitution, performed our own research, and consulted with the agencies regarding federally listed species. According to the FWS, four federally

listed species may be present in the proposed pipeline project area in addition to one species that is proposed for listing as endangered. Our determination of effect for each species is included in table 4.7.2-1 and described in the species-specific discussions below.

TABLE 4.7.2-1
Federally Listed Species Potentially Occurring in the Constitution Pipeline Project Area

Common Name	Scientific Name	Federal Status[a]	State Status[a]	Determination of Effect
Mammals				
Indiana Bat	*Myotis sodalis*	E	PA-E; NY-E	*Not likely to adversely affect*.
Northern Myotis	*Myotis septentrionalis*	PE	PA-SC	*Not likely to adversely affect*.
Mussels				
Dwarf Wedgemussel	*Alasmidonta heterodon*	E	PA-E; NY-E	*Not likely to adversely affect*.
Reptiles				
Bog Turtle	*Clemmys muhlenbergii*	T	PA-E; NY-E	*No effect*.
Plants				
Northern Monkshood	*Acontum noveboracense*	T	NY-T	*Not likely to adversely affect*.

[a] E = endangered; PE = proposed as endangered; T = threatened; PA = Pennsylvania; NY = New York.
Sources: PGC 2013a; Steiner 2013; FWS 2013a; NYSDEC 2013i.

Indiana Bat

The Indiana bat is a federally listed endangered species, and is a state-listed endangered species in New York and Pennsylvania. The Indiana bat is relatively small, weighing only 0.25 ounce, and has a wingspan of 9 to 11 inches. It hibernates during winter in caves or, occasionally, in abandoned mines from November through March (FWS 2012a). For hibernation, it requires cool, humid caves with stable temperatures, under 50° F but above freezing. The hibernacula typically have large volumes of Indiana bats and often have large rooms and vertical or extensive passages (FWS 2006).

When active, the Indiana bat roosts in dead trees, dying trees, or live trees with exfoliating bark. During the summer months, most reproductive females occupy roost sites that receive direct sunlight for more than half the day. Roost trees are generally found within canopy gaps in a forest, fence line, or along a wooded edge. Maternity roosts are found in riparian zones, bottomland and floodplain habitats, and wooded wetlands, as well as in upland communities. Indiana bats forage in semi-open to closed forested habitats, forest edges, and riparian areas (FWS 2004). Threats to the species include anthropogenic disturbance and the spread of white-nose syndrome. White-nose syndrome is a contagious fungal disease affecting bats with a potentially high mortality rate and is known to be present in both New York and Pennsylvania. Critical habitat has not been designated for the species in either New York or Pennsylvania.

The pipeline project is within the range of the Indiana bat in Pennsylvania; however, there are no known maternity colonies in Susquehanna County, nor would the pipeline project fall within swarming habitat associated with known hibernacula for the species. Due to the potential presence of the species in Susquehanna County, and at the request of FWS, Constitution conducted mist-net and acoustic surveys along the proposed pipeline route in June and July 2012, and at additional sites in May and June 2013, using a qualified biologist and in accordance with the FWS and the PGC survey guidelines. No Indiana

bats were encountered during these surveys, although several state-listed bat species were found (section 4.7.3). As a result of the 2012 surveys, the FWS determined that tree-clearing related to the project was not likely to adversely affect the Indiana bat in Pennsylvania. The 2013 results were similar, but the FWS has not yet commented on them. Although seven additional access roads have been proposed for use in Pennsylvania since the 2013 surveys, they are existing roads that would require minimal clearing, and no bat surveys have been proposed for them by Constitution.

Constitution also consulted with the FWS – New York Field Office regarding the potential to affect the Indiana bat. The species is listed as having potential summer habitat in Schoharie County, New York; however, the FWS stated that the species is likely extirpated in that area and has indicated that no surveys are required within the New York portion of the project (FWS 2012b, FWS 2012d).

If individual Indiana bats are present within the pipeline project area, tree-clearing could remove potential roost trees and foraging areas. However, this represents only a small percentage of the available forest habitat in the project area. As such, and based on the negative survey results in Pennsylvania and the assumed extirpation within the only county of potential occurrence that would be crossed in New York, we have determined that the project is *not likely to adversely affect* the Indiana bat.

Northern Myotis

The northern myotis (also known as the northern long-eared bat) is proposed to be listed as endangered by the FWS and is listed by the State of Pennsylvania as a species of concern. At the time of the netting surveys noted above, the northern myotis was not federally listed; however, the FWS has proposed listing the species as endangered with a decision expected in April 2015. According to guidance provided in the FWS *Northern Long-eared Bat Interim Conference and Planning Guidance*, 'known habitat' for the northern myotis includes all suitable habitat within 5 miles of a hibernaculum and all suitable habitat within 3 miles of the location at which a northern myotis was caught during a mist-net survey conducted during the standard summer survey window (May 15 to August 15) (FWS 2014c). Based on this definition and 2012 and 2013 field survey results, the project would be in known northern myotis habitat in Pennsylvania.

As noted above, the FWS requested that Constitution conduct mist-net surveys across the Pennsylvania portion of the proposed project area to determine if the Indiana bat was present. Bat surveys were not required by the FWS in New York in 2012. Constitution surveyed areas in Pennsylvania in June and July 2012, and at additional areas in May and June 2013. Although no Indiana bats were encountered, seven bat species were found including 22 northern myotis. In 2013, Constitution also employed full spectrum acoustic detectors at 29 locations, resulting in the detection of approximately 3,700 bats, including 44 northern myotis. Based on the results of the 2012 and 2013 surveys, there are areas along the pipeline project in Pennsylvania that provide habitat for the northern myotis. Although bat surveys were not performed in New York, the range of the northern myotis extends into the counties in New York that would be crossed by the pipeline.

Construction and operation of the pipeline could impact bat species through direct mortality if clearing affected occupied roost trees, or indirectly through habitat loss and disruption. Therefore, some project-related impacts on the species could occur in both Pennsylvania and New York.

In addition, Constitution would install a 100-foot-tall monopole radio communication towers at the Turnpike M&R station and nine MLV sites (section 2.1.2). These towers would support back-up communications and data transmission and could adversely impact bat populations through increased collisions and disruption of echolocation. However, FWS-recommended measures to minimize bird and bat strikes (FWS 2014) were considered in the design of the proposed towers and include:

- no emission of light or sound;
- construction without guy wires; and
- collocation within aboveground facilities.

Further, the towers would transmit at UHFs which are considered too high for bats to hear (Bat Conservation Trust 2014). Therefore, we conclude that operation of the communication towers would not adversely affect bats' echolocation and feeding.

As described in more detail in section 4.5.3, Constitution would offset impacts on high and moderate value upland forest habitat by depositing funds in an account(s) for one or more potential measures including, but not limited to, acquisition of lands for forest management, restoration of upland forest and riparian corridors on acquired lands, grants for projects designed to conserve these habitats, and long-term management of forested lands. While primarily intended to mitigate impacts on upland forests and migratory birds, these measure would also benefit bats that roost in trees. The amount of funds deposited would be based on the total value of habitat lost and the cost of desired conservation efforts and would be determined in coordination with the FWS, NYSDEC, PADCNR and PGC. Agency coordination is ongoing regarding finalization of this mitigation plan.

Although the northern myotis is not currently federally listed, the FWS has encouraged project applicants and regulatory agencies to be proactive in planning so that projects are not unnecessarily affected or delayed should the FWS decide to list the northern myotis as endangered in April 2015.

The following text is an excerpt from the FWS's *Northern Long-eared Bat Interim Conference and Planning Guidance:*

> While there is no prohibition for "taking" proposed species, there are certain statutory requirements under the ESA for proposed species. Section 7(a)(4) of the ESA states, 'Each Federal agency shall confer with the Secretary on any agency action which is likely to jeopardize the continued existence of any species proposed to be listed or result in the destruction or adverse modification of critical habitat proposed to be designated for such species. Conference is a process of early interagency cooperation involving informal and/or formal discussions between the action agency and the FWS pursuant to section 7(a)(4) of the ESA regarding the likely impact of an action on proposed species or proposed critical habitat.
>
> While consultation under Section 7 of the ESA is required when a proposed action "may affect" a *listed* species, a conference is required only if the proposed action is likely to jeopardize the continued existence of a proposed species or destroy or adversely modify proposed critical habitat. The Conference process is discretionary for all other effect determinations besides jeopardy/adverse modification. However, it is in the best interest of the species, and our federal partners to consider the value of voluntary conservation measures in a conference opinion or conference report for projects that are not likely to cause jeopardy, but are likely to adversely affect the NLEB.

We agree that a proactive stance would be prudent in this case because the project may impact the northern myotis. As identified above, Constitution proposes to clear trees between September 1 and March 31 in order to avoid the peak migratory bird nesting seasons. Roosting of northern myotis also occurs during this same period. If construction were to be delayed, additional impacts on this species would occur.

We are recommending at the end of section 4.7.2 that Constitution not begin construction until all Section 7 consultation including a conference opinion for northern myotis is complete.

If project delays occur, impacts may occur on northern myotis that have vacated winter hibernacula and may be actively utilizing forest habitat on the right-of-way. We identified several measures that could be implemented to reduce or avoid impacts on northern myotis:

- Avoid nighttime construction activities and associated lighting in northern myotis habitat, with the exception of drilling (i.e., Direct Pipe or HDD) activities, refueling, and water pumping;
- Implement all practicable measures to reduce noise levels along the entire pipeline;
- Complete all drilling activities and blasting between September 16 and April 15;
- Provide notice to the FWS of when drilling activities are expected to be completed;
- Document acres of trees cleared and provide a final report of that acreage to the FWS and the FERC.

To be proactive and account for the possibility of clearing after March 31, and to avoid direct impacts on roosting individuals during peak periods (typically between May and July), **we recommend that:**

- **Constitution should develop a project- and site-specific tree clearing plan for the northern myotis if clearing occurs between April 1 and September 30 that includes the location of any potential roost trees in or adjacent to the construction corridor, and as applicable incorporate any of the FERC's identified mitigation measures in section 4.7.2. This plan should be filed with the Secretary for review and written approval of the Director of OEP <u>prior to construction.</u>**

FERC staff would incorporate this plan into its Section 7 consultation or conference for the northern myotis. Based on our recommendation below, Constitution would not be authorized to begin project construction until staff has fulfilled its Section 7 obligations. As such, and given our recommendation above regarding tree clearing and Constitution's implementation of its Upland Forest Plan, we conclude that the pipeline project *is likely to adversely affect* the northern myotis. However, this impact would be mitigated to the extent practicable.

Dwarf Wedgemussel

The dwarf wedgemussel is listed as federally endangered wherever it is present, and is state-listed as endangered in New York and Pennsylvania. The pipeline project would only cross the range of this species in the Delaware River watershed in Broome County, New York. The dwarf wedgemussel is a small freshwater mussel that rarely exceeds 1.5 inches in length. Typical habitat includes slow to moderately running waters of all substrates, including silt, sand, or gravel. Primary threats to the species are water pollution and stream impoundments which impede flow. Males release sperm in mid-summer or fall, which are collected by females when siphoning food from the water. The parasitic larvae are released the following spring and attach to host fish until they are ready to settle (NYSDEC 2013j). The dwarf wedgemussel has two known extant populations in New York, one in the upper Delaware River in Sullivan and Delaware Counties and one in the lower Neversink River in Orange County (NYNHP 2013b).

Although the project would not cross the Delaware River or the Neversink River, Constitution conducted habitat assessment surveys in waterbodies that it would cross in the Delaware River watershed. These surveys were conducted in August of 2013 across 35 waterbodies between MP 27.3 and MP 39.6; 3 waterbodies were not surveyed due to lack of survey access. Constitution will provide a survey report to

us and the consulting agencies when finalized, but indicated that no habitat or dwarf wedgemussels were present within the waterbodies surveyed adjacent to the proposed construction work areas.

Construction of the pipeline could impact the dwarf wedgemussel through direct mortality during flume, dam-and-pump, or cofferdam stream crossings, if it were present and stranded within the footprint of the construction, or through impacts on water quality and flow if populations were to be present downstream of activities causing increased turbidity or stream flow modifications. Operational impacts would be limited or avoided as Constitution would restore waterbodies following construction. Aboveground facilities would not be placed adjacent to streams, and only minimal maintenance clearing of streamside vegetation would occur. Constitution indicated that it did not anticipate encountering significant populations of mussels during waterbody crossings and did not propose any special measures for relocating mussels that could be stranded within the dewatered work zone for dry waterbody crossings. Therefore, **we recommend that:**

- **<u>Prior to construction within aquatic project segments containing potential mussel habitat</u>, Constitution should file with the Secretary impact avoidance or effective impact minimization or mitigation measures (e.g., utilization of trenchless crossing methods or mussel relocation) in consultation with the FWS, the PFBC, the PGC, the PADCNR, and the NYSDEC for any dwarf wedgemussels encountered during field surveys and/or construction.**

Based on the results of the 2013 surveys indicating that no dwarf wedgemussel specimens or habitat were found where survey access has been granted, Constitution's implementation of its Procedures (which include measures to maintain downstream flow and minimize sedimentation when crossing streams), and our recommendation to develop impact avoidance, minimization, or mitigation in the event that specimens are found during later surveys, we conclude that the pipeline project *is not likely to adversely affect* the dwarf wedgemussel.

Bog Turtle

The northern population of bog turtles is federally listed as threatened and state-listed as endangered in both Pennsylvania and New York. The species is one of the smallest turtles in the world at less than 5 inches long, with a dark brown or black carapace. Bog turtles have a small home range and use riverine or palustrine wetland habitat (FWS 2013a, NatureServe 2013).

Of the counties Constitution would cross, the bog turtle is only know to occur in Otsego County, New York (listed as historic range for the species [FWS 2012b]). The only facility proposed in Otsego County is one contractor yard (contractor yard 4a) that would impact a quarry and open land. Although riverine habitat is close to the proposed contractor yard, it would not be impacted. As the pipeline project would have minimal impacts in Otsego County, none of which would occur in bog turtle habitat, we have determined that the project would have *no effect* on the bog turtle.

Northern Monkshood

The Northern monkshood, a perennial flower, is federally listed as threatened and state-listed in New York as threatened. The only known occurrences of this species within New York are in Delaware County (FWS 2007a, 2012b). The plant itself is 1 to 4 feet high and its blue, hood-shaped flowers bloom between June and September. It is generally found on partially shaded cliffs, algific talus slopes, or streamsides with cool conditions. Threats to the Northern monkshood include habitat loss and degradation, livestock grazing, and misuse of pesticides (FWS 2007a).

If present within the pipeline project footprint, the Northern monkshood could be impacted through direct loss or degradation of suitable habitat during construction and operation of the project. To verify that no impact on the species would occur, Constitution conducted surveys in potentially suitable habitat along the primary pipeline route in Delaware County. Surveys were completed in September 2012 and July 2013, within the flowering season; no Northern monkshood were identified. There are four parcels of potential habitat for the Northern monkshood that Constitution has not yet surveyed due to lack of land access (MPs 72.9 to 73.0, 74.8 to 74.9, 76.4 to 76.5, and 83.4 to 83.5). Therefore, **we recommend that:**

- **<u>Prior to construction within project segments containing potential Northern monkshood habitat</u>, Constitution should file with the Secretary the results of completed Northern monkshood surveys and Constitution's consultation with the FWS and the NYSDEC regarding the results. Constitution should file the avoidance/minimization measures it would use in the event that Northern monkshood are found either prior to or during construction including:**
  - **a. avoidance of plant locations and associated habitat, as feasible, including "necking-down" or reducing construction footprint;**
  - **b. the feasibility of conventional boring, direct pipe, or HDD; and**
  - **c. the feasibility of transplanting and seed banking (only after all other options are considered).**

Based on the results of the 2012 and 2013 surveys that indicate that no Northern monkshood are present within potentially suitable habitat surveyed to date, and our recommendation to develop impact avoidance, minimization, or mitigation measures for the species as a contingency in the event populations are found, we conclude that the pipeline project is *not likely to adversely affect* the Northern monkshood.

Constitution is still conducting surveys and consulting with the FWS regarding federally listed threatened and endangered species that may be present in the project area. In addition, Constitution has added additional access roads and contractor yards that have not been reviewed by the agencies. Therefore, **we recommend that:**

- **Constitution should not begin construction of the proposed facilities <u>until</u>:**
  - **a. all outstanding biological surveys have been completed;**
  - **b. the FERC staff completes any necessary Section 7 consultation with the FWS (including a conference opinion regarding the northern myotis); and**
  - **c. Constitution has received written notification from the Director of OEP that construction and/or use of mitigation (including implementation of conservation measures) may begin.**

4.7.3 State-listed Species

In New York, the NYSDEC is responsible for special status species. In Pennsylvania, three agencies are responsible for special status species: the PADCNR is responsible for plants, terrestrial invertebrates, natural communities, and geologic features; the PGC is responsible for state-listed birds and mammals; and the PFBC is responsible for fish, reptiles, amphibians, and aquatic invertebrates. The PADCNR and the PFBC, during early coordination with Constitution, reviewed the pipeline project route and indicated that no adverse impacts are expected to occur to species under their purview during project construction or operation (PADCNR 2013a, PFBC 2013d). Constitution has since adopted additional

reroutes, access roads, and contractor yards and will provide updated route information as necessary to the applicable state agencies for their review in the third and fourth quarters of 2014.

Twenty-seven species that are state-listed as threatened, endangered, or of special concern were identified as potentially present in the pipeline project area (table 4.7.3-1). Five of these species, the Indiana bat, northern myotis, dwarf wedgemussel, bog turtle, and Northern monkshood, are also federally listed (or proposed for federal listing) and are therefore discussed above in section 4.7.2. The remaining species are discussed further below.

TABLE 4.7.3-1
State-Listed Species Potentially Occurring in the Constitution Pipeline Project Area

Common Name	Scientific Name	Federal Status[a]	State Status[a]	Conclusion
Birds				
Bald Eagle	*Haliaeetus leucocephalus*	BGEPA	PA-T; NY-T	Would not cause adverse impact.
Golden Eagle	*Aquila chrysaetos*	BGEPA	NY-E	Would not cause adverse impact.
Mammals				
Silver-haired Bat	*Lasionycteris noctivagans*		PA-SC	Would not cause adverse impact.
Eastern Small-footed Myotis	*Myotis leibii*		PA-T; NY-SC	Would not cause adverse impact.
Little Brown Bat	*Myotis lucifugus*	IR	N/A	Would not cause adverse impact.
Northern Myotis	*Myotis septentrionalis*	PE	PA-SC	Would not cause adverse impact.
Indiana Bat	*Myotis sodalis*	E	PA-E; NY-E	See section 4.7.2
Mussels				
Dwarf Wedgemussel	*Alasmidonta heterodon*	E	NY-E	See section 4.7.2
Yellow Lampmussel	*Lampsilis cariosa*		PA-ICS; NY-SC	Would not cause adverse impact.
Green Floater	*Lasmigona subviridis*		NY-T	Would not cause adverse impact.
Plants				
Hooker's Orchid	*Platanthera hookeri*		NY-E	Would not cause adverse impact.
Northern Monkshood	*Acontum noveboracense*	T	NY-T	See section 4.7.2
Northern Wild Comfrey	*Cynoglossum virgnianum*		NY-E	Would not cause adverse impact.
Red Currant	*Ribes triste*		PA-T	Would not cause adverse impact.
Mountain Starwort	*Stellaria borealis*		PA-SC	Would not cause adverse impact.
Bog Rosemary	*Andromeda polifolia*		PA-SC	Would not cause adverse impact.
Great-spurred Violet	*Viola selkirkii*		PA-SC	Would not cause adverse impact.
Canadian Milkwort	*Astragalus Canadensis*		PA-SC	Would not cause adverse impact.
Slender Sedge	*Carex lasiocarpa*		PA-SC	Would not cause adverse impact.
Soft-leaved Sedge	*Carex disperma*		PA-SC	Would not cause adverse impact.

TABLE 4.7.3-1 (continued) State-Listed Fauna Potentially Occurring in the Constitution Pipeline Project Area				
Common Name	**Scientific Name**	**Federal Status[a]**	**State Status[a]**	**Determination of Effect**
Marsh bedstraw	*Galium trifidum*		PA-SC	Would not cause adverse impact.
American Reed	*Phragmites australis americanus*		PA-SC	Would not cause adverse impact.
Kidney-leaved White Violet	*Viola renifolia*		PA-SC	Would not cause adverse impact.
Reptiles				
Timber Rattlesnake	*Crotalus horridus*		PA-C; NY-T	Would not cause adverse impact.
Bog Turtle	*Clemmys muhlenbergii*	T	PA-E; NY-E	See section 4.7.2.
Amphibians				
Eastern Hellbender	*Cryptobranchus alleganiensis*		NY-SC	Would not cause adverse impact
Fish				
American Eel	*Anguilla rostrata*		NY-SGCN	Would not cause adverse impact

[a] E = endangered; PE= proposed endangered; T = threatened; SC = species of concern; SGCN = species of greatest conservation need; PA = Pennsylvania; NY = New York; IR = in review for potential listing; ICS = immediate concern species; BGEPA = Bald and Golden Eagle Protection Act; C = Candidate (State) N/A = not applicable

Sources: PGC 2013a; Steiner 2013; PGC 2013b; PADCNR 2012; NYSDEC 2013i; NYSDEC 2013e.

Bald Eagle and Golden Eagle

The bald eagle was formerly a federally listed species, but was delisted in 2007 due to recovery of the population. Despite the delisting, the species retains federal protection under the Bald and Golden Eagle Protection Act, which prohibits the taking of eagles, their eggs, or their nests. Bald eagles are also state-listed as threatened in both New York and Pennsylvania, although the PGC is currently evaluating whether the Pennsylvania status should be changed to "secure" based on recent recovery data (PGC 2013c). Bald eagles mate for life and a mated pair will establish a nesting territory that they use for the rest of their lives. Nests are large structures that are typically built on tall trees or rock walls adjacent to large bodies of water. The nests are typically reused each year, with new nest materials added during preparation for the breeding season (NYSDEC 2013k). The breeding season can begin as early as late February and young generally fledge by early July (The Eagle Institute 2013).

During agency consultation, the NYSDEC provided the locations of three known bald eagle nests in the vicinity of the pipeline project. Constitution conducted aerial overflights of the primary route in March 2013 to determine if the three nests identified by the NYSDEC were active and whether any additional nests were present within 0.25-mile of the proposed centerline. One of the nest was occupied by a bald eagle during surveys (nest NY204, 0.3 mile from the proposed centerline), one was unoccupied at the time of surveys, but showed recent nest construction activity (nest NY163c, 0.4 mile from the proposed centerline), and one was not visible and occupation could not be verified (nest NY220, 0.7 mile from the proposed centerline). In addition, nests NY204 and NY163c are in close proximity to I-88 (within 1,000 feet), have forested and/or topographic buffers between them and the proposed construction area, and are likely conditioned to heightened anthropogenic noises. No new nests were observed within the survey corridor although one adult bald eagle was observed in flight in Susquehanna County, Pennsylvania**.**

Although no nests were encountered within the 0.25-mile survey corridor in 2013, nests NY204 and NY163c are within 0.5-mile of areas that may require excavation by blasting. Constitution would first attempt to dislodge shallow bedrock without blasting, by using heavy equipment such as specially designed track hoe buckets to rip and loosen the rock. If blasting does become necessary, it typically involves a small scale, controlled, rolling detonation procedure resulting in limited ground upheaval. These blasts do not typically result in large, above ground explosions. Blasting in proximity to nests during sensitive periods may cause the adults to abandon the nests, causing egg or fledging mortality. The National Bald Eagle Management Guidelines (FWS 2007b) indicate that blasting should be avoided within 0.5-mile of an active nest. Constitution has indicated that it does not propose blast noise level monitoring at active eagle nests nor behavioral monitoring of active nests, but it is consulting with the FWS and the NYSDEC to determine if blasting within 0.5-mile of bald eagle nests would present a significant impact on bald eagles and to ensure compliance with the MBTA and the BGEPA. In addition, Constitution is developing a mitigation plan for potential blasting in the vicinity of bald eagle nests that will include the following noise reduction measures:

- covering charges with mats to contain debris and muffle noise;
- placing all explosive charges into the rock by drill loading; and
- backfilling the trenchline prior to blasting.

The mitigation plan will be provided to the FWS for review and concurrence prior to construction.

Constitution has agreed to conduct additional bald eagle surveys along the entire project route in 2014 to verify that no new eagle nests have been built, as well as to survey new route modifications. Constitution has also agreed to survey recently proposed contractor yards and access roads that have not been surveyed or reviewed by the applicable agencies to determine if known nests are in the vicinity of the new facilities. Because the final survey results and mitigation plan are not yet available, **we recommend that:**

- **<u>Prior to construction within project segments containing potential bald eagle habitat</u>, Constitution should file with the Secretary for review and written approval of the Director of OEP the final bald eagle survey results, as well as the final bald eagle mitigation plan, developed in consultation with the FWS, the PGC, and the NYSDEC. The mitigation plan should include impact avoidance or effective impact minimization or mitigation measures for any nests encountered during the pre-construction surveys. Specific mitigation, or approval from the applicable agencies, should be included for potential blasting within 0.5 mile of an active nest.**

Based on the lack of bald eagle nests within 0.25-mile of the pipeline along surveyed areas and our recommendation to finalize mitigation for any nests that are found during the 2014 surveys, including measures for potential blasting in the vicinity of eagle nests, we conclude the pipeline project would not result in adverse impacts on bald eagles.

The golden eagle was formerly a federally listed species, but was delisted due to recovery of the population. Despite the delisting, the species retains federal protection under the Bald and Golden Eagle Protection Act, which prohibits the taking of eagles, their eggs, or their nests. Golden eagles are also state-listed as endangered in New York (NYSDEC 2014c). Golden eagles mate for life and a mated pair will establish a nesting territory that they use for the rest of their lives. Nests are large structures that are typically built on cliffs or tall trees adjacent to hunting grounds. The nests are typically reused each year, with new nest materials added during preparation for the breeding season (NYSDEC 2014c). They breed

in Canada in the summer and overwinter in the northern United States. Young generally fledge from the nest at 2 to 3 months of age (Cornell University 2014). During agency consultation, the NYSDEC did not identify the golden eagle as a species with known occurrences in the Project area, and no nests were observed within the survey corridor.

Given that golden eagles breed in Canada and that nesting pairs are not known in the project area, we conclude the pipeline project would not result in adverse impacts on golden eagles.

Bats

Three other special-status or rare bat species in addition to those discussed above are present within the proposed project area, including the:

- small-footed bat, which is listed as threatened in Pennsylvania and is a species of concern in New York;
- silver-haired bat, which is listed as a Pennsylvania species of concern; and
- little brown bat (which is not currently federally or state-listed), but is being reviewed by the FWS.

The small-footed bat is rarely found in large numbers, but the largest known populations are present in Pennsylvania, New York, Virginia, and West Virginia. Summer roosts include caves and mines, hollow trees, and cracks and crevices in rock walls (Butchkoski 2010). In October 2013, the FWS concluded that the small-footed bat did not warrant federal listing. The silver-haired bat utilizes forested areas where individuals can roost in tree cavities or under loose bark (PNHP 2013, Naumann 1999). The little brown bat is being reviewed by the FWS to determine if it may warrant future protection under the ESA due to large population declines from white-nose syndrome (FWS 2012b). The little brown bat roosts in trees, buildings, and under rocks (Havens 2006). All three of the species hibernate in caves or mines (Butchkoski 2010, PNHP 2013, Naumann 1999, Havens 2006). Threats to these bat species include destruction and disturbance of hibernation sites, as well as the spread of white-nose syndrome, as discussed above for the Indiana bat.

As noted above, the FWS requested that Constitution conduct mist-net surveys across the Pennsylvania portion of the proposed project to determine if the Indiana bat was present (section 4.7.2). Constitution surveyed areas in Pennsylvania in June and July 2012, and at additional areas in May and June 2013, and six silver-haired bats were captured. In 2013, Constitution's full spectrum acoustic detectors identified 551 silver-haired bats and 7 little brown bats. Based on the results of the 2012 and 2013 surveys, there are areas along the pipeline project in Pennsylvania that provide habitat for communities of state-listed or rare bats.

Construction and operation of the pipeline could impact state-listed or rare bat species through direct mortality if clearing affected occupied roost trees, or indirectly through habitat loss and disruption. To minimize impacts on the small-footed bat, the PGC has requested that certain areas of rocky habitat be avoided as they could be day or maternity roosts. Constitution has routed the proposed pipeline so that it avoids direct impacts on these habitats. The PGC also requested that Constitution clear trees or dead snags greater than 5 inches in diameter between November 1 to March 31 to minimize impacts on the northern myotis and silver-haired bats. See section 4.7.2 regarding potential impacts on bats from the proposed communications towers and also Constitution's proposed mitigation for impacts on upland forests, which provide habitat for bats.

As proposed, Constitution would conduct tree clearing outside of the PGC's recommended allowable rare bat construction window of November 1 to March 31. Constitution has proposed to conduct the majority of tree clearing from September 1 through March 31, with initial clearing occurring as late as April 1 and potentially continuing from May through August in limited areas to construct access roads and sensitive waterbody crossings. Constitution's rationale for its tree clearing schedule is premised upon a requirement to perform in-stream work at wild trout waters between January 1 and September 30 in Pennsylvania. Further, Constitution indicated that its proposed tree clearing would occur within the last one-half of the bat roosting period and outside of the peak bat roosting season. Given that the initial clearing would be limited in scope, the majority of tree clearing would occur past the peak bat roosting season, and the underlying reasons for the schedule (including competing resource protection windows), we consider Constitution's proposed clearing schedule to be practical and acceptable.

Constitution has indicated its intent to continue consultations with the PGC regarding mitigation for sensitive bat species along the project route; however, no such mitigation measures have been developed to date. Therefore, **we recommend that:**

- **<u>Prior to construction,</u> Constitution should develop impact avoidance, minimization, or mitigation measures in coordination with the FWS and the PGC for construction between April 1 and October 31 to minimize impacts on the small-footed bat, silver haired bat, and little brown bat. Constitution should file any such measures with the Secretary.**

Based on the results of the 2012 and 2013 surveys and other available information, there are areas along the pipeline project in Pennsylvania that provide habitat for communities of rare bats. However, with adherence to our recommendations to develop impact mitigation measures for rare bat species in Pennsylvania as well as our recommendation in section 4.5 to finalize an Upland Forest Mitigation Plan, we conclude that construction and operation of the project would not result in species-level adverse impacts on sensitive bat species.

Yellow Lampmussel

The yellow lampmussel is a freshwater mussel that is present in small to large rivers, especially those with sandy substrates in riffles. Although the species is not state or federally listed, it is a New York species of concern due to widespread population declines and extirpations that have been occurring since the 1970s. The predominant threat to this species is habitat degradation (NYS-OPRHP 2013).

The yellow lampmussel is known to be present in Schoharie Creek and has been recorded approximately 0.3 mile north of the proposed route. Constitution would cross Schoharie Creek using the trenchless Direct Pipe method, which avoids direct impacts on the waterbody by drilling underneath it. Constitution attempted to conduct mussel surveys adjacent to the proposed Schoharie Creek crossing (MP 119.8) in August and September of 2013; however, site conditions including deep water and high turbidity that limited visibility did not allow a determination of species presence or absence. Constitution is continuing to consult with the NYSDEC regarding this proposed crossing and potential impacts on the yellow lampmussel. However, as Constitution has proposed a trenchless crossing of the only potential habitat present in the project area, and the Direct Pipe method is not likely to result in an inadvertent loss of drilling mud on the stream bottom.

Additional consultation with the NYSDEC identified known occurrences of the yellow lampmussel within the vicinity of the spread 4a contractor yard (NYSDEC 2014d); however, sediment control BMPs would be implemented at all contractor yards which would prevent impacts on nearby aquatic resources. Therefore, based on Constitution's proposed construction methods and sediment

control BMPs, we conclude that the proposed project would not result in adverse impacts on the yellow lampmussel.

Green Floater

The green floater is a freshwater mussel that is state-listed as threatened in New York. They inhabit quiet waters with gravel and sand bottoms, and are typically not found in large rivers and strong currents (NatureServe 2014). This species is most abundant in stable perennial streams. Poor water quality is considered the largest threat to the green floater.

The green floater was not observed during Constitution's field surveys conducted to date, and the NYSDEC has no known occurrences in the vicinity of the proposed pipeline route. The species is known to occur in the vicinity of the previously proposed spread 3 contractor yard (NYSDEC 2014d), but this yard is no longer being considered for use by Constitution. Therefore, we conclude that the proposed project would not result in adverse impacts on the green floater.

Plants

Consultation with the applicable federal and state agencies indicated that 13 rare plant species are known to be present in the vicinity of the proposed pipeline project in Pennsylvania and New York (table 4.7.3-1). The Northern monkshood, which is federally listed as threatened, is discussed in section 4.7.2. The remaining 12 species are further described in table 4.7.3-2 with their habitat type and flowering season. Constitution, through desktop review and observations during fieldwork, determined where the proposed pipeline crosses potentially suitable habitat for these species and conducted field surveys over a 600-foot-wide corridor in 2012 and a 300-foot-wide corridor in 2013.

In New York, Constitution surveyed two parcels for Hooker's orchid and Northern wild comfrey during the appropriate flowering timeframes between August 2012 and July 2013; no specimens were observed. In Pennsylvania, Constitution surveyed seven of eight potentially suitable habitat parcels in July 2012 and May through July 2013. One species of concern, the soft-leaved sedge, was identified within one additional surveyed parcel. The soft-leaved sedge is a rare species and is not regulated outside of state lands; however, Constitution re-routed the pipeline to avoid the population and the wetland community in which it is present.

Construction and operation of the project could directly impact any of these plant species if they are present within the construction workspace. Constitution has completed surveys of most potential habitat along the proposed route and has modified the proposed route to avoid rare plant species encountered during surveys. Constitution has agreed to survey the remaining parcel of potential habitat in Pennsylvania (MP 7.0 to MP 8.0) for the marsh bedstraw once land access is granted.

Based on the results of the rare plant surveys, the only potential impact from the project would be on the marsh bedstraw; however, we are recommending below, that prior to construction Constitution submit the results of any outstanding surveys and subsequent mitigation measures. Consequently, we conclude that the proposed pipeline project is unlikely to cause an adverse effect to these plant species from construction and operation.

TABLE 4.7.3-2 Flowering Periods and Habitat Associations of State-Listed Plants				
Common Name	**Scientific Name**	**State Status[a]**	**Flowering Period**	**Preferred Habitat**
Hooker's Orchid	*Platanthera hookeri*	NY-E	Mid-May – early August	Dry to moist coniferous and deciduous forests with an open understory and successional forests.
Northern Wild Comfrey	*Cynoglossum virgnianum*	NY-E	Mid-May - July	Deciduous forest edge or along paths in sandy or rocky, dry soils.
Red Currant	*Ribes triste*	PA-T	June – July	Wet, rocky woods, swamps, and cliffs.
Mountain Starwort	*Stellaria borealis*	PA-SC	May – August	Seepy wooded slopes, sphagnum swamps, and stream banks
Bog Rosemary	*Andromeda polifolia*	PA-SC	Year-round	Bogs and peaty wetlands.
Great-spurred Violet	*Viola selkirkii*	PA-SC	May – July	Dry, cool woods and rock crevices.
Canadian Milkwort	*Astragalus Canadensis*	PA-SC	June – August	Rocky roadside banks, limestone ledges, and shale barrens.
Slender Sedge	*Carex lasiocarpa*	PA-SC	June – August	Sphagnum bogs and swales, medium fens.
Soft-leaved Sedge	*Carex disperma*	PA-SC	June – August	Bogs and acidic wet woods.
Marsh bedstraw	*Galium trifidum*	PA-SC	June – July	Moist woods, thickets, emergent wetlands, and swales.
American Reed	*Phragmites australis americanus*	PA-SC	July – September	Marshes, ditches, and moist disturbed ground.
Kidney-leaved White Violet	*Viola renifolia*	PA-SC	May - July	Dry, cool woods, rock crevices, and hummocks in swamps.

[a] DL = Delisted; E = endangered; T = threatened; SC = species of concern; PA = Pennsylvania; NY = New York

Sources: PADCNR 2012, NYNHP 2013c.

Timber Rattlesnake

The timber rattlesnake is a candidate species for listing by the State of Pennsylvania. The species is also state-listed as threatened in New York, with documented occurrence of the timber rattlesnake within the vicinity of the proposed contractor yard for spread 4a in Otsego County, New York (NYSDEC 2014d). There are no known occurrences of timber rattlesnakes in proximity to the proposed pipeline route in New York (NYSDEC 2013e), which does not cross Otsego County. Timber rattlesnakes are most often found in mountainous areas with numerous rocks and crevices, or in thick forested habitats. The species' peak mating time is between July and August and the young are born in August or September. Despite a 20-year life span, females only reproduce two to three times over the course of their lifetime. During the later stages of gestation, females often remain in their dens, making them vulnerable to predation and den disturbance by humans. Hibernation occurs from early October to late April (PSU 2006).

At the request of the PFBC, Constitution surveyed an area between Canawacta and Starrucca Creeks (MP 18.8 to MP 21.8), which contains numerous rocky outcrops that could be used for rattlesnake denning and gestational habitat. Phase I surveys, to determine and classify potential habitat, were conducted on four parcels of land in April and July 2013. Phase II surveys, to determine the presence or absence of timber rattlesnakes, were conducted in two of the four surveyed parcels in April 2013; no rattlesnakes were observed. Of the remaining two parcels that were surveyed in 2013, one did not require Phase II surveys because no suitable habitat was found and one parcel will have a Phase II survey in spring 2014. Two additional parcels will undergo Phase I and II surveys, as applicable, when survey

permission is obtained. Although timber rattlesnakes were determined to be absent at three of the six parcels of potential habitat, potential denning habitat was encountered at two of those parcels. In addition, the presence or absence of timber rattlesnakes or their habitat has not been determined on three parcels. We are recommending that prior to construction Constitution submit the results of any outstanding surveys and subsequent mitigation measures for state-listed species (section 4.7.4). Consequently, we conclude that the proposed pipeline project is unlikely to cause an adverse effect upon the timber rattlesnake.

Eastern Hellbender

The eastern hellbender is a large aquatic salamander reaching up to 29 inches in length. Eastern hellbenders inhabit perennial, freshwater streams with sufficient large rocks to provide cover. Their peak breeding season is in September with females nesting under large, flat rocks and males remaining with the eggs until hatching in late November (NYSDEC 2014e). The eastern hellbender is a species of concern in New York, but there are no known occurrences of eastern hellbender near the proposed route. While the species is known to occur in proximity to the spread 3 contractor yard (NYSDEC 2014d) and proposed route alternative M (NYSDEC 2012h), the spread 3 yard is no longer being considered for use by Constitution and in section 3 of this EIS we do not recommend adoption of alternative M.

Based on the lack of impacts on the eastern hellbender's known habitat, and our recommendation regarding the completion of studies and consultations for all state-listed species, we conclude that construction and operation of the proposed pipeline project would not result in adverse impacts on the eastern hellbender.

American Eel

The American eel is a "species of greatest conservation need" in New York and is currently under review for federal listing by the FWS. American eels are catadramous, spending their life in freshwater rivers and streams before migrating to the Sargasso Sea in the central Atlantic Ocean to spawn (NatureServe 2014). Spawning occurs in the winter and early spring with larvae transported by currents to coastal habitats. In late spring young eels begin moving upstream in river systems throughout the eastern United States. American eels spend their entire juvenile and sub-adult lives in estuarine and freshwater environments before reaching maturity between 8 and 18 years and undertaking the offshore spawning migration. They prefer soft bottom habitats with juveniles taking refuge in burrows, snags, and aquatic plants. Common prey items include crustaceans, small fish, and insects (NatureServe 2014).

The species is known to occur in the Susquehanna, Delaware, and Hudson Rivers and their tributaries. While there are no known occurrences of the American eel in the immediate proximity of the project route, the species could be present within creeks and tributaries that would be crossed by the pipeline. Construction of the pipeline could impact the American eel through direct mortality during flume, dam-and-pump, or cofferdam stream crossings if it were present within the footprint of the construction, or through impacts on water quality and flow if populations were present downstream of activities causing increased turbidity or stream flow modifications. However, construction impacts would be limited or avoided given Constitution's use of trenchless crossing methods at major waterbodies and its commitments to remove fauna from de-watered areas, continue downstream flow during dry crossings, mitigate downstream scouring, and to employ stream bank stabilization and restoration measures.

Based on Constitution's proposed construction, mitigation, and restoration methods we conclude that construction and operation of the proposed pipeline project would not result in adverse impacts on the American eel.

4.7.4 Conclusion

Constitution has surveyed the majority of potentially suitable habitat for all state-listed species noted by the applicable agencies as being present in the pipeline's vicinity. However, given that there are surveys and consultations for state-listed species that are not yet completed, **we recommend that:**

- **<u>Prior to construction</u>, Constitution should file with the Secretary the results of any outstanding surveys for New York and Pennsylvania state-listed species and identify additional mitigation measures developed in consultation with the applicable state agencies.**

Although bald eagles and sensitive bat species were found during field surveys, and surveys to determine the presence/absence of additional species are ongoing, Constitution would implement measures to minimize impacts on those species, as discussed above, and follow its state-specific ECPs, and its Plan and Procedures to minimize impacts on potential habitat and species. With those measures and our recommendations to submit the results of any outstanding surveys and consultation with the applicable agencies, we conclude that construction and operation of the proposed pipeline project would not adversely impact any state-listed species.

4.8 LAND USE, RECREATION, SPECIAL INTEREST AREAS, AND VISUAL RESOURCES

4.8.1 Land Use

This section discusses the land requirements for construction and operation of the proposed projects, the current use of those lands, and an evaluation of the project-related impacts. Constitution's proposed pipeline project consists of 124.4 miles of new natural gas pipeline that would cross one county in Pennsylvania and four counties in New York. One additional county in New York would not be crossed by the pipeline, but would be affected by one contractor yard (spread 4a contractor yard, see section 2.2.3). Of the 124.4 miles of proposed new 30-inch-diameter pipeline, 10.6 miles, or approximately 9 percent, would be collocated with existing right-of-way (see table 2.2.1-1). Constitution's project also includes 2 meter stations, 2 tie-ins, pig launchers/ receivers; 11 mainline valves; 10 communication towers, and other appurtenant facilities.

Per an agreement with Constitution, Iroquois would expand existing compression and metering facilities located in Wright, New York. Iroquois' Wright Interconnect Project would be constructed within the property line of its existing Wright Compressor Station. This section initially focuses on and discusses the proposed pipeline project, which accounts for over 99 percent of the land disturbances associated with both projects. Because Iroquois' project would have a comparatively small land disturbance associated with its construction, it is primarily discussed in sections 4.8.1.3 (aboveground facilities) and 4.8.6.2 (visual resources).

4.8.1.1 Environmental Setting

Seven general land use types would be affected by the Constitution and Iroquois projects. Table 4.8.1-1 summarizes the acreage of each land use type that would be affected. The definitions of each land use type are as follows:

- agricultural land – actively cultivated or specialty crops;
- industrial/commercial – manufacturing or industrial plants, paved areas, landfills, and commercial or retail facilities, and sand/gravel pits or quarries;
- open land – open fields, existing utility rights-of-way, herbaceous and scrub-shrub uplands, non-forested lands, and non-paved roads;
- open water – waterbody crossings greater than 100 feet;
- wetlands – emergent wetlands, scrub-shrub wetlands, and forested wetlands;
- forest/woodland – upland forest lands; and
- residential – existing developed residential areas and planned residential developments. This includes large developments, residentially zoned areas that have been developed, and short segments of the route at road crossings with homes near the route alignment.

Construction of the proposed projects would impact a total of 1,871.5 acres. Approximately 89.2 percent of this acreage would be utilized for the pipeline facilities, including the construction right-of-way (83.3 percent) and additional temporary extra workspace (5.9 percent). The remaining acreage impacted during construction would be associated with contractor yards (5.4 percent), access roads (4.3 percent), and aboveground facilities (1.1 percent). Following construction, lands outside of the permanent right-of-way, extra workspace areas, contractor yards, and temporary access roads would be allowed to revert to their original land use type. The primary land use types impacted during construction would be forested/woodland (55.2 percent) and agriculture (23.3 percent). Open water, wetlands, open land, industrial/commercial and residential would make up the remaining 21.4 percent of land types impacted during construction.

Operation of the projects would permanently encumber 761.5 acres. The easement along the new permanent pipeline right-of-way would account for 711.0 acres, or 93.4 percent of the acreage. The remaining 50.5 acres (6.6 percent) would be associated with aboveground facilities (including 4.5 acres for Iroquois' project) and permanent access roads. The primary land use types that would be newly encumbered on a permanent basis are forested/woodland (62.7 percent) and agriculture (20.1 percent). Open land, industrial/commercial lands, open water, residential lands, and wetlands would make up the remaining 17.2 percent of land use types associated with the permanent right-of-way, aboveground facilities, and permanent access roads.

4.8.1.2 Pipeline Facilities

The proposed pipeline project consists of 124.4 miles of 30-inch-diameter pipe. Table 4.8.1-2 summarizes the land uses crossed. Predominant land uses are forest land (60.1 percent), followed by agricultural land (19.7 percent), open land (10.0 percent), and wetlands (8.4 percent). Residences and other structures within 50 feet of the construction workspace are discussed in section 4.8.3.1. The remaining 1.8 percent of the land is comprised of residential, commercial/industrial (including roadways), and open water.

TABLE 4.8.1-1
Acreage Affected by Construction and Operation of the Proposed Projects

Facilities[a]/ County	Agricultural		Commercial & Industrial		Residential		Open Land		Wetland		Waterbody		Upland Forest		Total	
	Constr	Oper	Constr	Oper	Constr	Oper	Constr	Oper	Constr	Oper	Constr	Oper	Constr	Oper	Constr	Oper
PIPELINE FACILITIES																
Pennsylvania																
Susquehanna	66.9	28.9	1.5	1.1	3.7	1.6	24.0	10.8	14.4	4.0	2.0	1.2	205.8	100.2	318.3	147.8
New York																
Broome	46.7	19.7	1.2	1.0	1.8	0.8	44.8	21.2	17.0	2.6	1.1	0.6	98.5	47.6	211.1	93.5
Chenango	18.2	8.0	0.3	0.3	0.0	0.0	10.1	5.0	9.6	2.5	0.4	0.7	63.4	30.8	102.0	47.3
Delaware	114.9	47.3	2.2	1.5	0.7	0.3	41.8	19.5	26.6	6.7	2.1	1.4	348.1	171.2	536.4	247.9
Schoharie	108.9	45.2	1.6	1.2	3.3	1.5	40.7	19.9	23.8	3.2	0.9	0.7	211.7	102.8	390.9	174.5
Pipeline Facilities Subtotal	**355.6**	**149.1**	**6.8**	**5.1**	**9.5**	**4.2**	**161.4**	**76.4**	**91.4**	**19.0**	**6.5**	**4.6**	**927.5**	**452.6**	**1,558.7**	**711.0**
EXTRA WORKSPACES																
Pennsylvania																
Susquehanna	3.6	0.0	0.1	0.0	0.8	0.0	3.3	0.0	0.0	0.0	0.0	0.0	11.7	0.0	19.5	0.0
New York																
Broome	5.2	0.0	<0.1	0.0	0.4	0.0	4.1	0.0	0.0	0.0	0.0	0.0	7.0	0.0	16.7	0.0
Chenango	4.0	0.0	0.0	0.0	0.0	0.0	1.0	0.0	0.2	0.0	0.0	0.0	3.1	0.0	8.3	0.0
Delaware	9.0	0.0	0.2	0.0	0.2	0.0	5.6	0.0	1.9	0.0	0.0	0.0	22.8	0.0	39.7	0.0
Schoharie	9.6	0.0	0.1	0.0	0.2	0.0	4.3	0.0	1.4	0.0	0.0	0.0	10.9	0.0	26.5	0.0
Extra Workspaces Subtotal	**31.4**	**0.0**	**0.4**	**0.0**	**1.6**	**0.0**	**18.3**	**0.0**	**3.5**	**0.0**	**0.0**	**0.0**	**55.5**	**0.0**	**110.7**	**0.0**
ACCESS ROADS																
Pennsylvania																
Susquehanna	4.0	1.5	6.0	5.1	1.5	0.4	3.0	1.0	0.2	<0.1	<0.1	<0.1	21.6	10.1	36.3	18.1

TABLE 4.8.1-1 (continued)
Acreage Affected by Construction and Operation of the Proposed Projects

Facilities[a]/ County	Agricultural		Commercial & Industrial		Residential		Open Land		Wetland		Waterbody		Upland Forest		Total	
	Constr	Oper	Constr	Oper	Constr	Oper	Constr	Oper	Constr	Oper	Constr	Oper	Constr	Oper	Constr	Oper
New York																
Broome	0.5	0.2	2.2	1.8	0.5	0.3	0.4	0.1	0.0	0.0	<0.1	<0.1	0.6	0.4	4.2	2.8
Chenango	0.1	<0.1	0.2	0.2	<0.1	<0.1	<0.1	<0.1	0.0	0.0	0.0	0.0	0.9	0.4	1.2	0.6
Delaware	3.5	1.6	5.1	3.5	0.2	0.1	5.3	2.3	0.4	0.1	0.1	<0.1	15.8	7.0	30.4	14.6
Schoharie	1.5	0.7	0.6	0.7	0.6	0.2	1.3	1.0	0.0	0.0	<0.1	<0.1	3.8	1.9	7.8	4.5
Otsego	0.0	0.0	<0.1	<0.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	<0.1
Access Roads Subtotal	**9.6**	**4.0**	**14.1**	**11.3**	**2.8**	**1.0**	**10.0**	**4.4**	**0.6**	**0.1**	**0.1**	**0.0**	**42.7**	**19.8**	**79.9**	**40.6**
CONTRACTOR YARDS																
Pennsylvania																
Susquehanna	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	20.0	0.0
New York																
Broome	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Chenango	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
Delaware	36.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	36.3	0.0
Schoharie	3.9	0.0	4.6	0.0	0.0	0.0	9.8	0.0	0.0	0.0	0.0	0.0	0.0	0.0	18.3	0.0
Otsego	0.0	0.0	18.8	0.0	0.0	0.0	8.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.9	0.0
Contractor Yards Subtotal	**40.2**	**0.0**	**23.4**	**0.0**	**0.0**	**0.0**	**37.9**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**0.0**	**101.5**	**0.0**
METER, REGULATION, AND RECEIPT STATIONS																
Pennsylvania																
Susquehanna – Turnpike Road M&R	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	4.9	3.1	4.9	3.1

TABLE 4.8.1-1 (continued)
Acreage Affected by Construction and Operation of the Proposed Projects

Facilities[a]/ County	Agricultural		Commercial & Industrial		Residential		Open Land		Wetland		Waterbody		Upland Forest		Total	
	Constr	Oper	Constr	Oper	Constr	Oper	Constr	Oper	Constr	Oper	Constr	Oper	Constr	Oper	Constr	Oper
New York																
Schoharie – Westfall Road M&R	0.0	0.0	3.3	2.3	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	<0.1	<0.1	3.3	2.3
COMPRESSOR STATION MODIFICATION																
Iroquois' Wright Interconnect Project	0.0	0.0	2.1	2.1	0.0	0.0	7.1	0.5	0.0	0.0	0.0	0.0	3.3	1.9	12.5	4.5
Aboveground Facilities Subtotal	**0.0**	**0.0**	**5.4**	**4.4**	**0.0**	**0.0**	**7.1**	**0.5**	**0.0**	**0.0**	**0.0**	**0.0**	**8.2**	**5.0**	**20.7**	**9.9**
COUNTY PROJECT SUBTOTALS																
Pennsylvania																
Susquehanna	74.5	30.4	7.6	6.2	6.0	2.0	50.3	11.8	14.6	4.0	2.0	1.2	244.0	113.4	399.0	169.0
Subtotal Pennsylvania	**74.5**	**30.4**	**7.6**	**6.2**	**6.0**	**2.0**	**50.3**	**11.8**	**14.6**	**4.0**	**2.0**	**1.2**	**244.0**	**113.4**	**399.0**	**169.0**
New York																
Broome	52.4	19.9	3.4	2.8	2.7	1.1	49.3	21.3	17.0	2.6	1.1	0.6	106.1	48.0	232.0	96.3
Chenango	22.3	8.0	0.5	0.5	<0.1	<0.1	11.1	5.0	9.8	2.5	0.4	0.7	67.4	31.2	111.5	47.9
Delaware	163.7	48.9	7.5	5.0	1.1	0.4	52.7	21.8	28.9	6.8	2.2	1.4	386.7	178.2	642.8	262.5
Schoharie	123.9	45.9	12.3	6.3	4.1	1.7	63.2	21.4	25.2	3.2	0.9	0.7	229.7	106.6	459.3	185.8
Otsego	0.0	0.0	18.8	<0.1	0.0	0.0	8.1	0.0	0.0	0.0	0.0	0.0	0.0	0.0	26.9	<0.1
Subtotal New York	**362.3**	**122.7**	**42.5**	**14.6**	**7.9**	**3.2**	**184.4**	**69.5**	**80.9**	**15.1**	**4.6**	**3.4**	**789.9**	**364.0**	**1,472.5**	**592.5**
PROJECT TOTAL	**436.8**	**153.1**	**50.1**	**20.8**	**13.9**	**5.2**	**234.7**	**81.3**	**95.5**	**19.1**	**6.6**	**4.6**	**1,033.9**	**477.4**	**1,871.5**	**761.5**

[a] Impacts associated with MLVs and tie-ins are included in the pipeline facility impacts. Impacts associated with the pigging facilities are included in the meter station impacts.

TABLE 4.8.1-2
Land Uses Crossed by the Proposed Pipeline Facilities for the Constitution Pipeline Project (miles)

State/County	Mileposts	Agricultural	Forest Land	Open Land	Wetlands	Open Water	Commercial / Industrial	Residential	Total
30-inch diameter Pipeline									
Pennsylvania									
Susquehanna County	0.0 to 25.1	4.8	16.5	1.7	1.7	0.1	0.2	0.3	25.2
Subtotal Pennsylvania	0.0 to 25.1	4.8	16.5	1.7	1.7	0.1	0.2	0.3	25.2
New York									
Broome County	25.1 to 42.2	3.3	8.0	3.5	1.9	0.1	0.2	0.1	17.0
Chenango County	42.2 to 50.6	1.3	5.1	0.8	0.9	0.1	<0.1	0.0	8.3
Delaware County	50.6 to 93.4	7.8	28.3	3.2	3.3	0.2	0.2	<0.1	43.0
Schoharie County	93.4 to 124.4	7.4	17.0	3.2	2.6	0.1	0.2	0.3	30.9
Subtotal New York	25.1 to 124.4	19.7	58.4	10.7	8.7	0.6	0.7	0.4	99.2
Project Total	**0.00 to 124.4**	**24.6**	**74.9**	**12.4**	**10.4**	**0.7**	**0.8**	**0.7**	**124.4**

In general, land use-related impacts associated with the Constitution Pipeline project would include the disturbance of existing uses within the right-of-way during construction and a new permanent right-of-way for operation of the pipeline. Constitution proposes to generally use a 110-foot-wide construction right-of-way, consisting of 50 feet of permanent right-of-way and 60 feet of temporary construction workspace. In wetland areas, Constitution proposes to use a 75-foot-wide construction right-of-way except where a modification has been requested and found acceptable (see section 4.4.4). In designated interior forest areas, Constitution proposes to use a 100-foot-wide construction right-of-way, except where specialized side slope construction techniques are needed. In agricultural areas, Constitution proposes to expand the construction right-of-way to 125-feet-wide to allow for topsoil segregation.

In addition to the construction right-of-way, various extra workspaces would be used for project construction. As discussed in section 2.2.1.3, Constitution identified several areas where it stated that site-specific conditions require the use of extra workspace outside of the proposed nominal 110-foot-wide construction right-of-way. Appendix D lists the locations of these extra workspaces, their dimensions, area affected, justification, and other information. Based on our review, we find these requests to be acceptable. Additional discussion of these extra workspace areas is presented in section 4.4.4.

Where the pipeline would be installed at the same location as existing pipelines or electric transmission lines, the permanent right-of-way could consist of a portion of the existing, cleared permanent right-of-way and some additional new right-of-way (table 2.2.1-1). The pipeline project would require a new 50-foot-wide permanent right-of-way in most cases. The land retained as new permanent right-of-way would generally be allowed to revert to its former use, except for forested land as discussed below. Certain activities such as the construction of permanent structures, including houses, house additions, garages, patios, pools, or other objects not easily removable, or the planting of trees, would be prohibited within the permanent right-of-way. To facilitate pipeline inspection, operation, and maintenance, the entire permanent right-of-way in upland areas would be maintained in an herbaceous/scrub-shrub vegetated state. This maintained right-of-way would be mowed no more than once every 3 years, but a 10-foot-wide strip centered over the pipeline might be mowed annually to facilitate corrosion and other operational surveys. However, as discussed in section 4.6.1.4 annual mowing would not be allowed to during bird nesting season.

Specific impacts on agricultural land, industrial/commercial, open land, and forest/woodland areas are discussed below. Impacts on residential areas and specialty crops are discussed in sections 4.8.3.1 and 4.8.4, respectively. Wetlands and surface waters (open water) are discussed in sections 4.4 and 4.3.2, respectively.

Forest land that would be affected by the pipeline project consists mainly of northern hardwood, hemlock/northern hardwood, sugar maple/basswood, and aspen/gray birch forests (section 4.5.1). Where practicable, Constitution reduced the construction right-of-way from the typical 110-foot-wide right-of-way down to a 100-foot-wide right-of–way within interior forests. This reduction in work area resulted in 51.6 acres of interior forest impacts being avoided. Although trees cleared within temporary construction work areas would be allowed to regenerate to pre-construction conditions following construction, impacts on forest resources in these areas would last for several years. Following construction, the maintained portion of the right-of-way would be permanently converted to a non-forested condition (see section 4.5.5). Forest lands are discussed in more detail in section 4.8.4. Constitution's preliminary Migratory Bird and Upland Forest Plan, which details plans to provide mitigation for impacts on forest resources, is discussed in section 4.5.3.

Agricultural lands affected by construction primarily include active crop lands or hayfields, as well as pasture land that may be used for grazing. In general, agricultural lands are distributed along the

entire pipeline route. The primary impacts in these areas would be short term and occur during the growing season concurrent with construction. Farmers would experience some loss of crop production in areas directly disturbed by construction-related activities. Farmers may have to alter sowing patterns in order to best farm areas that may have limited access due to construction activity. Grazing animals may also have to be moved to different areas or other fields, and/or be penned with gates. Following construction, agricultural practices within the pipeline right-of-way would be allowed to resume. Constitution would restore all disturbed agricultural areas associated with construction in accordance with its ECPs, which include crop productivity monitoring and farmland restoration procedures developed by the NYSDAM, as well as all other applicable federal, state, and local permit requirements. Typical mitigation measures include topsoil segregation, soil decompaction, and repair/replacement of irrigation and drainage structures damaged by construction (table 4.8.1-3). Agricultural lands, including specialty crops (fruit, vegetables, Christmas trees, and maple trees for syrup) are discussed in more detail in section 4.8.4.2. Impacts on and mitigation for prime farmlands and statewide important farmlands are discussed in section 4.2.2.7.

TABLE 4.8.1-3
Agricultural Drain Tiles or Irrigation Systems Crossed by the Proposed Constitution Pipeline Project

Approximate Milepost	Drain Type	County/State
10.59 - 10.70	Drain Tile[a]	Susquehanna, PA
10.95 - 11.01	Drain Tile[a]	Susquehanna, PA
100.68- 100.82	Drain Tile[a]	Schoharie, NY
104.88 - 104.97	Clay Tile[b]	Schoharie, NY

[a] Drain tiles were identified through landowner consultation. Mileposts represent enter and exit for the entire parcel, exact drain tile locations to be determined through additional landowner discussion.

[b] Clay tiles identified through field surveys. Mileposts represent the drain tile locations.

Open lands that would be affected by the pipeline project include open fields, existing utility rights-of-way, herbaceous and scrub-shrub uplands, non-forested lands, and non-paved roads. Construction-related impacts on open land would include the removal of vegetation and disturbance of soils. Impacts on open land would be temporary and short-term and would be minimized by the implementation of Constitution's state-specific ECPs. Following construction, most open land uses would be able to continue. However, some activities, such as the building of new commercial or residential structures, would be prohibited on the permanent right-of-way. Road and railroad crossings are discussed in sections 2.3.2.4 and 4.9.4. Section 4.8.4 provides discussion on potential effects to a commuter parking lot for I-88 and other special use areas.

Industrial/commercial land uses could be temporarily impacted during construction of the pipeline project by increased dust from exposed soils, construction noise, and traffic congestion. Constitution would minimize impacts on commercial land uses by coordinating driveway crossings with business owners to provide access across the construction right-of-way.

Constitution would ensure access for emergency vehicles during road crossings by using temporary platforms across the pipeline trench as needed. Road surfaces would be restored as soon as practicable so that normal access could resume, and commercial land uses would be restored to pre-construction conditions, or as specified in landowner agreements. As discussed in section 4.9.4, Constitution has developed and would implement a Residential Access and Traffic Mitigation Plan.

4.8.1.3 Aboveground Facilities

Constitution proposes to construct two new Meter and Regulation Stations (the Turnpike Road M&R Station in Susquehanna County, Pennsylvania and the Westfall Road M&R Station in Schoharie County, New York); install pig launcher and receiver facilities at the Turnpike Road M&R Station and the Westfall Road M&R Station, respectively; and install two tie-ins (the Sutton Road tie-in and the White Road tie-in) and 11 MLVs. Two MLVs and the two tie-ins would be in Pennsylvania and 9 MLVs would be in New York. Constitution proposed to move the location of MLV No.6 in Delaware County, New York from MP 66.7 to MP 65.9 after issuance of the draft EIS. Constitution would install communication towers within the Turnpike Road M&R station and at nine other MLV sites. Iroquois proposes to expand its existing Wright Compressor Station by constructing a new compressor transfer station to facilitate the transfer of gas from Constitution's pipeline.

A total of about 20.7 acres of land would be disturbed by construction of these aboveground facilities. Of this total, 9.9 acres would be permanently retained for operation. Table 4.8.1-1 summarizes the land requirements and land uses for the aboveground facilities. The dominant land use that would be affected by these facilities is forest land.

The Turnpike Road M&R Receipt Station would affect 4.9 acres of upland forest land during construction. A 365-foot by 365-foot site affecting 3.1 acres of upland forest lands would be permanently affected during operation of the facility. The Westfall Road M&R Station would affect less than 0.1 acre of upland forest land and 3.3 acres of industrial/commercial land during construction. During operation, the facility would permanently affect an irregularly shaped 2.3-acre site which includes less than 0.1 acre of permanent impacts on upland forest land.

A total of 3.1 acres of currently forested land would be permanently converted to industrial/commercial land associated with the meter stations' footprints. The remaining 1.8 acres would be allowed to revert to forest vegetation. Following construction, Constitution would seed these lands outside of the permanent footprint of the M&R stations in accordance with its ECP. The stations' impacts on forested land would be long-term and permanent, depending on the time it takes vegetation to re-grow to pre-construction conditions. Additional information on forest lands, including a discussion on invasive species mitigation, can be found in section 4.5.

A pig launcher and MLV #1 would be located at the Turnpike Road M&R Station and a pig receiver and MLV #11 would be located at the Westfall Road M&S Receipt Station. The Sutton Road and White Road Tie-ins, as well as MLVs 2 – 10, would be located within Constitution's permanent pipeline right-of-way. Therefore these project features would not impact any additional acreage that is not already accounted for in the pipeline and aboveground facility land disturbance impact acreages. However, they would result in permanent conversion of forested lands to industrial lands, whereas the pipeline right-of-way would result in conversion to open lands. They would also result in minor, permanent impacts on visual resources (discussed below).

Construction of Iroquois' compressor transfer station would take place within the property boundary of Iroquois' existing 53.2 acre Wright Compressor Station. The facility, which is owned by Iroquois, is comprised of forested, open, and industrial/commercial lands. Construction of the compressor transfer station would require a total of 12.5 acres of land within the facility, including 3.3 acres of forest/woodland, 7.1 acres of open land, and 2.1 acres of industrial/commercial land. Operation of Iroquois' project would permanently impact 4.5 acres, including 2.1 acres of commercial/industrial land, 1.9 acres of forest/woodlands, and 0.5 acre of open land. Following construction, Iroquois would restore land not required for operation of the compressor station to pre-construction conditions. The 1.9 acres of forested land required for operation would result in a permanent impact, converting forest land to

industrial/commercial land. The remaining 1.4 acres of forested land not required for operation would be allowed to revert to pre-existing conditions; however, this would still result in long-term impacts on forested lands.

Iroquois would use two existing access roads to access the Iroquois project site. The main access road is paved from Westfall Road to the existing station, where it transitions to gravel and to the TGP right-of-way. Iroquois would pave the portion of the road that is currently graveled and extend the road to access Constitution's proposed Westfall Road M&R Station. This modification and expansion would impact 0.2 acre. Another existing access road would serve for access between the contractor yard area and the compressor station site. Iroquois would extend this road to allow for construction access, impacting 0.2 acre.

4.8.1.4 Project Contractor Yards

Constitution proposes to use six temporary contractor yards to support construction activities. One yard would be in Pennsylvania and the other five would be in New York. These yards would temporarily affect about 40.2 acres of agricultural lands, 37.9 acres of open land, and 23.4 acres of commercial land (see Table 4.8.1-1).

4.8.1.5 Access Roads and Cathodic Protection Systems

In addition to public roads, Constitution proposes to use 68 permanent access roads and 10 temporary access roads (3 in Pennsylvania and 7 in New York). Four of the temporary access roads would be newly constructed and would impact 3.0 acres of mixed land use types including agricultural, commercial/industrial, open, and upland forest. Following construction, these temporary roads would be restored and reseeded according to Constitution's ECPs and Plan. Constitution's proposed access roads are listed in appendix E and discussed further in sections 2.2.4 and 4.8.6.4.

Of the 68 permanent access roads 24 would be in Pennsylvania and 44 would be in New York). Fifty-eight of the permanent and temporary access roads are existing roads, or would be a combination of existing and new roads, and would involve some modifications or expansions. However, the remaining 20 access roads would be newly constructed. Some of the required improvements include the addition of gravel or culverts, and the removal or clearing of trees in order to accommodate the movement of equipment and materials to the construction right-of-way (appendix E). During construction, access roads would encumber 79.9 acres, of which 10.8 acres would be associated with the 20 newly constructed roads. All roads would be 12 feet wide along straight sections and up to 24 feet wide as required for curves and corners. The permanent access roads would impact 40.6 acres during operations. Section 4.3 of this EIS includes a recommendation that permanent fill not be used in either waterbodies or wetlands to construct access roads. Cathodic protection facilities for the pipeline, which are described in more detail in section 2 of this EIS, would be associated with the permanent access road easements.

4.8.2 Landownership and Easement Requirements

Pipeline operators must obtain easements from existing landowners to construct and operate authorized facilities, or acquire the land on which the facilities would be located. Easements can be temporary, granting the operator the use of the land during construction (e.g., extra workspaces, temporary access roads, contractor yards), or permanent, granting the operator the right to operate and maintain the facilities once constructed.

Constitution would need to acquire new easements or acquire the necessary land to construct and operate the new pipeline. These new easements would convey both temporary (for construction) and permanent (no greater than 50-feet-wide for operation) rights-of-way to Constitution.

An easement agreement between a company and a landowner typically specifies compensation for losses resulting from construction, including losses of non-renewable and other resources, damages to property during construction, and restrictions on existing uses that would not be permitted on the permanent right-of-way. Compensation would be fully determined through negotiations between Constitution and the landowner. Constitution identified that it has based its offerings on a market study conducted by a licensed real estate appraiser.

If an easement cannot be negotiated with a landowner and if the projects are approved by the Commission, Constitution may use the right of eminent domain to acquire the property necessary to construct and operate its project. This right would apply to all project-related workspace covered by an approval, including the temporary and permanent rights-of-way, aboveground facility sites, contractor yards, access roads, and extra workspaces. Constitution would still be required to compensate the landowner for the right-of-way and damages incurred during construction. However, the level of compensation would be determined by a court according to state or federal law. Iroquois already owns the property where its project would be located, so eminent domain does not apply in this case.

4.8.3 Existing Residences, Commercial and Industrial Facilities, and Planned Developments

As currently designed, approximately 13.9 acres of residential land would be impacted by construction of the projects, all of which would be associated with the pipeline. Following construction, 5.2 acres of residential land would be within the permanent pipeline right-of-way and would be subject to restrictions such as planting large trees or the placement of certain structures. The remaining 8.7 acres of would not be subject to any restrictions; however, all residential lands would be restored to pre-construction conditions to the extent possible. In restoring properties, Constitution would adhere to its state-specific ECPs and any specific requirements identified by landowners and agreed to during negotiations. In most cases, property owners would be able to use the permanent right-of-way as they did before construction as long as the use does not conflict with project operation and the terms of the landowner's negotiated easement agreement. There are no residences within 50 feet of the Iroquois project, and no planned developments have been identified within a 0.25 mile radius of the compressor station site.

We received comments raising concerns about trespassing and decreased privacy associated with unauthorized use of the project right-of-way during operations. Constitution's Plan (based on our Plan) and ECPs adopt measures to mitigate unauthorized access to the right-of-way. Specifically, Constitution would implement the following measures in forested lands to minimize access by unauthorized vehicles, in coordination with the property owner:

- posting no trespassing signs;
- installation of gates and/or fencing;
- installation of screening such as shallow-root trees; and/or
- strategic placement of access barriers such as slash and timber, piping, or boulders.

We conclude these measures would be sufficient to reduce unauthorized access by vehicles. In addition to these measures landowners could take additional steps against trespassing within the confines of local and state law.

4.8.3.1 Existing Residences; Commercial and Industrial Facilities

Table 4.8.3-1 lists residences and other structures within 50 feet of any proposed construction work area by milepost, and indicates the distance and orientation of each from the proposed work areas. Constitution's construction work area would be within 50 feet of six residential structures, (all single family dwellings). Three of the residences (MPs 40.4, 96.5, and 119.7) would be within 25 feet of construction work areas.

TABLE 4.8.3-1
Residences and Other Structures Within 50 feet of the Construction Work Area for the Constitution Pipeline Project

State/County	Milepost	Description of Structure	Approximate Distance and Direction from Construction Work Area (feet)	Approximate Distance and Direction from Pipeline Centerline (feet)
Pennsylvania				
Susquehanna	3.0	Structure[a]	11 north	46 north
Susquehanna	6.2	Outhouse	0	4 west
Susquehanna	8.4	Shed	16 north	141 north
Susquehanna	9.8	Pump House	28 west	78 west
Susquehanna	10.8	House	28 south	103 south
Susquehanna	10.9	Shed	12 south	62 south
Susquehanna	10.9	Barn	1 south	76 south
Susquehanna	14.4	Barn	19 north	144 north
Susquehanna	15.0	Barn	25 west	185 south
Susquehanna	21.6	House	44 east	94 south
New York				
Broome	29.2	Structure[a]	10 east	85 east
Broome	35.3	Chicken Coop	25 west	75 west
Broome	40.4	Frame Porch	29 north	104 north
Broome	40.4	House	24 north	99 north
Broome	47.4	Structure[a]	46 east	213 east
Delaware	55.6	Wood Barn	36 south	111 south
Delaware	60.6	Structure[a]	25 east	150 east
Delaware	60.6	Structure[a]	37 east	162 east
Delaware	71.6	Shed	45 west	95 west
Delaware	79.4	Sugar Shack[a]	0	100 east
Delaware	86.7	Structure[a]	0	65 east
Delaware	86.7	Structure[a]	25 east	100 east
Delaware	87.9	Wood Shed	24 north	49 north
Delaware	90.3	Foundation	32 south	82 south
Schoharie	96.5	House	2 west	77 west

TABLE 4.8.3-1 (continued) Residences and Other Structures Within 50 feet of the Construction Work Area for the Constitution Pipeline Project				
State/County	**Milepost**	**Description of Structure**	**Approximate Distance and Direction from Construction Work Area (feet)**	**Approximate Distance and Direction from Pipeline Centerline (feet)**
Schoharie	96.7	House	26 east	101 east
Schoharie	99.3	Subdivision[b]	Unknown	Unknown
Schoharie	100.6	Structure [a]	36 south	111 south
Schoharie	100.6	Structure [a]	0	54 south
Schoharie	100.7	Wood Stove	17 south	92 south
Schoharie	100.7	Shed	5 south	70 south
Schoharie	104.6	Abandoned Stable	0	114 east
Schoharie	119.7	House	16 east	141 East
Schoharie	120.1	Structure [a]	0	72 south
Schoharie	121.4	Pool House	19 south	44 south
Schoharie	121.4	Structure [a]	39 south	64 south

[a] Portions or all of the parcel were not necessarily surveyed; therefore these descriptions are based on review of aerial photography. While the use of most these structures was not discernible, they do not appear to be residential.

[b] The Subdivision at MP 99.3 was recently completed but the specific details regarding its location are at this time unknown.

Of these structures, the residences located within 50 feet of the construction work area would be most likely to experience the effects of project construction and operation. In general, as the distance to the construction work area increases, the impacts on residences decrease. In residential areas, the two greatest impacts associated with construction and operation of a pipeline are temporary disturbances during construction and the encumbrance of a permanent right-of-way, which would prevent the construction of permanent structures within the right-of-way, as well as certain other limitations or restrictions.

Constitution would notify local residents a minimum of one week in advance of construction activities. Potential impacts on residences within 50 feet of the work areas would be minimized by:

- using dust control measures;
- installing temporary safety fencing for at least 100 feet on either side of the residence and maintaining it while the trench is open;
- maintaining a 25-foot-wide buffer between work areas and the residence for at least 100 feet on either side of the residence;
- avoiding removal of mature trees and landscaping (where possible); and
- restoring lawn areas and landscaping immediately after backfill.

Three residences and one pool house are within 25 feet of proposed construction work areas, and potential impacts on these residences would be minimized by measures listed above with the exception of the 25-foot buffer. In addition, Constitution has committed to delay excavation of the trench near these

residences until the pipeline is ready to be installed, and would immediately backfill the trench after the pipeline is lowered-in.

Constitution prepared site-specific plans for the six residences and pool house currently identified as within 50 feet of proposed construction work areas and these plans are presented in appendix O. Twelve structures are on parcels that have not yet been surveyed, in part or whole, and were deemed unlikely to be residential based on our review of aerial photography. In addition, a subdivision that was recently completed at MP 99.3 was identified, but its specific location in relation to the pipeline is unknown. We noted that a water well is within the extra workspace for tract ALT-F-NY-SC-007.002 at milepost 96.5, but the well would be fenced away from the work areas by safety fencing and protected from disturbance. Additionally, the well would be subject to Constitution's well protection measures as described in sections 4.3.1 and 4.3.2. We also noted that a septic field is within the proposed workspace for tract ALT-F-NY-SC-011.000 at milepost 96.7, but no known impact mitigation measures have been proposed by Constitution. We have reviewed the site-specific plans, mitigation, and associated workspace justifications, and found them acceptable with the exception of the septic field. In order to assure that impacts on residential properties are minimized, **we recommend that:**

- **<u>Prior to construction</u>, Constitution should file an updated classification of the current use of the twelve unsurveyed structures identified in table 4.8.3-1 of the EIS within 50 feet of the construction work area. If any of the structures are found to be occupied residences, site-specific plans should be developed and filed with the Secretary for review and written approval of the Director of OEP. Also, Constitution should provide an updated site-specific plan for tract ALT-F-NY-SC-011.000 at MP 96.7 that includes adequate impact avoidance, minimization, or mitigation measures for the septic field.**

- **<u>Prior to construction</u>, Constitution should confirm the distance and location of the subdivision at MP 99.3 in relation to the pipeline, and provide a site-specific plan if within 50 feet of the construction work area.**

Our experience has shown that when project sponsors maintain communication with landowners during construction and restoration phases, issues in and near residential areas can be effectively managed and resolved. Constitution has developed an environmental complaint resolution procedure that it would implement during project construction and restoration. Constitution would work to notify affected landowners or complainants (even if they are not the landowner), within 24 hours of receiving a complaint. If contact is not possible within 24 hours, Constitution would continue to attempt to contact the affected parties either in person, by telephone, electronic mail, or by mail if necessary. All complaints and follow-up correspondence would be documented and any action required to resolve the issue would be discussed with the affected landowner and/or complainant. We find these procedures to be consistent with those implemented by other companies for similar projects. Further, we are recommending in section 5.0 that Constitution file weekly reports with us to document complaints and resolution status.

Commercial structures in close proximity to the pipeline project could also experience short-term disruptions to businesses as a result of in-street construction, detours, or restricted access due to lane closures. These impacts and corresponding mitigation measures are discussed in more detail in section 4.9.4. Implementation of Constitution's general construction methods for working near residences and commercial areas, such as boring of public roadways, avoidance of road closures, development of a Residential Access and Traffic Mitigation Plan, and the environmental complaint resolution procedure would minimize disruption to residential and commercial areas to the extent practicable.

Operational impacts would be limited to the 5.2 acres of residential lands located within the permanent right-of-way, which would have restricted use. Specifically, no trees over fifteen feet tall or permanent structures would be permitted within the permanent right-of-way.

4.8.3.2 Planned Developments

Constitution contacted local and county officials in the affected municipalities of Pennsylvania and New York in 2012 and 2013 to identify planned residential, commercial, or industrial developments within 0.5 mile of the proposed facilities. Those developments identified are provided in table 4.8.3-2, although consultations are still ongoing. A discussion of cumulative impacts associated with the proposed pipeline project and these developments is provided in section 4.13.

TABLE 4.8.3-2
Planned Developments Within 0.5 Mile of the Construction Work Area for the Constitution Pipeline Project

State/County	Location (Milepost)	Direction from Constitution Pipeline	Planned Project	Approximate Distance from Construction Work Area (feet)	Project Status
Pennsylvania					
Susquehanna			*None Identified*		
New York					
Chenango			*None Identified*		
Delaware			*None Identified*		
Schoharie	114.3	Northwest	Subdivision (Oak Meadows)	650	Approved
Schoharie	115.0	North	Subdivision (Carolina – Catapano Estates)	810	Approved
Schoharie	120.8	South	Apartments	1,848	Approved
Schoharie	121.5	Crossed	Subdivision (Tiscione)	0	Approved

To date no planned developments in Pennsylvania within 0.5 mile of the pipeline project have been identified. In New York five planned projects were identified as being within 0.5 mile of the pipeline project including three subdivisions, an apartment complex, and a water/sewer line infrastructure project in Schoharie County. The status of the subdivisions suggests that while they are approved, construction has not yet begun. No planned developments were identified in Broome, Chenango, or Delaware Counties.

The majority of the developments identified would not be subject to adverse impacts because they are located several hundred feet away from the route and have a sufficient buffer between them. However, one of the developments would be directly crossed by the route. Subdivisions identified in Schoharie County include the Tiscione subdivision, a multi-phase residential community (Oak Meadows), and Carolina - Catapano Estates. Oak Meadows and Carolina - Catapano Estates would be located approximately 650 and 810 feet away from the proposed pipeline project, respectively. See section 3.4.3 of this EIS regarding a minor route variation that would move the route to within approximately 450 feet of the Carolina - Catapano Estates subdivision. The Tiscione subdivision would be crossed at MP 121.5. The planned apartment complex near MP 120.8 is more than 0.25 mile away. Constitution has consulted with the property manager regarding the status and details for the Tiscione subdivision crossed at MP

121.5. While the subdivision has been approved, the property manager confirmed to Constitution that construction of the development is not scheduled at this time and that an easement agreement allowing survey and construction has been signed. Constitution has stated that it would continue to work with the property manager regarding construction of the project to ensure that the pipeline does not interfere with the planned development. Per DOT specifications, Class 3 pipe would be installed in this area (see section 4.12 for more information on this classification). Based on this information, we conclude that the proposed pipeline would not result in a significant impact on the Tiscione subdivision.

Constitution incorporated several route variations into its pipeline route to minimize or avoid impacts on planned developments as described in section 3.0. In addition to implementation of Constitution's general construction impact minimization methods, Constitution also attempted to route the pipeline along property boundaries where practicable to minimize potential impacts on existing and planned residential developments.

We conclude that implementation of the identified mitigation measures, in addition to our recommendation, would minimize or mitigate the impacts of the pipeline project on existing planned residential areas and developments. Overall, construction activities would result in temporary impacts for any residence occupied at the time of pipeline installation. Operational impacts would be limited to the encumbrance of a permanent right-of-way, which would prevent the construction of permanent structures within the right-of-way.

4.8.4 Recreation and Special Interest Areas

The Constitution project would not cross any national or state-designated Wild and Scenic Rivers, waterbodies listed on the Nationwide Rivers Inventory, or lands managed by or associated with the U.S. Bureau of Land Management, Wetland Reserve Program, Emergency Conservation Program, Grassland Reserve Program, national forests, national parks, state parks, or Indian Reservations. The pipeline project is outside of any Coastal Zone Management Act areas; as such, no impacts on coastal resources are expected. However, portions of the pipeline project could affect several other recreation and/or special interest areas that are within 0.25 mile of the proposed project (table 4.8.4-1). Further discussion of these areas is included below. Scenic byways are discussed in section 4.8.6.5. In addition, no recreational or scenic areas would be impacted by the Iroquois project. Section 4.6.1 provides a discussion on crossings of Audubon Society-designated IBAs.

One of the primary concerns when crossing recreation and special interest areas is the impact of construction on the purpose for which the area was established (e.g., the recreational activities, public access, and resources the area aims to protect). Construction could alter visual aesthetics by removing existing vegetation and disturbing soils; these potential impacts are discussed in section 4.8.6. Construction could also generate dust and noise, which could be a nuisance to recreational users. Construction could also interfere with or diminish the quality of the recreational experience by affecting wildlife movements or disturbing hikers while using trails.

In general, impacts on recreational and special interest areas would be temporary and limited to the period of active construction, which typically would last only several days to several weeks in any one area. These impacts would be minimized by implementation of Constitution's ECPs. In addition, Constitution has proposed specific mitigation measures as described below for some of the recreation and special interest areas that would be affected.

TABLE 4.8.4-1
Federal, State, Recreation, and Conservation Lands Located Within 0.25 Mile of the Constitution Pipeline Project

State/County	Milepost Location	Name of Area	Landowner	Existing Land Use[a]	Approximate Crossing Length (feet)	Construction	Operation
Pennsylvania							
Susquehanna	21.5	Delaware and Hudson Rail-Trail[b]	Rail-Trail Council of the Northeast Pennsylvania, Inc.	F,I, OL	9	<0.1	<0.1
Susquehanna	23.9	State Game Lands No. 70	PA Game Commission	N/A	0	N/A	N/A
New York							
Broome	25.1	Boy Scout Camp	Boy Scouts of America	N/A	0	N/A	N/A
Broome	37.3	Girl Scout Camp	Girl Scouts of America	N/A	0	N/A	N/A
Chenango	42.5	Melondy Hill State Forest	NYSDEC	F,I	307	0.9	0.4
Chenango	44.6	Melondy Hill State Forest	NYSEC	N/A	0	N/A	N/A
Chenango	50.1	Finger Lakes Trail	Finger Lakes Trail Conference	OL	32	<0.1	<0.1
Delaware	51.4	DelChenango Rod and Gun Club	DelChenango Rod and Gun Club	OL	83	0.2	0.1
Delaware	52.4	Pine Hill State Forest	NYSDEC	N/A	0	N/A	N/A
Delaware	75.0	Emmons Pond Bog Preserve	The Nature Conservancy	N/A	0	N/A	N/A
Schoharie	97.0	Clapper Hollow State Forest	NYSDEC	F, W, R, OW, OL	333	1.4	0.5
Schoharie	110.4	Petersburg State Forest	NYSDEC	N/A	0[c]	N/A	N/A

[a] I = Industrial/commercial OL = Open Land, OW = Open Water , W = Wetland, F = Forest/woodland, R = Residential, N/A - Not Applicable

[b] The rail-trail consists of a now-defunct railroad bed being used as a recreational trail.

[c] The proposed right-of-way does not cross state forest lands, but an extra workspace would abut the forest.

Construction periods could coincide with a variety of hunting seasons. No state-designated land would be crossed in Pennsylvania; therefore, public hunting areas in this state would not be affected. Potential impacts on hunting on New York State public lands are discussed in section 4.8.4.1. However, it is also likely that hunting occurs on private lands throughout the projects' area, therefore Constitution would educate construction workers about hunting seasons prior to initiation of work; require workers to wear orange vests, and would conduct daily safety meetings to inform workers of relevant conditions. Constitution would coordinate with landowners regarding the timing of construction activities so that hunters could be informed of planned construction activities.

Following construction, most open land uses would be able to continue. Constitution would continue to consult with the owners and managing agencies of recreation and special interest areas regarding the need for specific construction mitigation measures.

4.8.4.1 State Forests

No Pennsylvania State Forests would be crossed by or are within 0.25 mile of the proposed pipeline project. Constitution's project would cross two state forests in New York: Melondy Hill State Forest (MP 42.5) in Chenango County and Clapper Hollow State Forest (MP 97.0) in Schoharie County. The pipeline also would be approximately 109 feet from Melondy Hill State Forest near MP 44.6. Two other state forests in New York would not be crossed by the Constitution pipeline, but would be within 0.25 mile of the pipeline. Pine Hill State Forest in Delaware County would be 866 feet southeast of MP 52.4 and Petersburg State Forest in Schoharie County is immediately adjacent to an extra workspace proposed southeast of MP 110.4.

Constitution has been consulting with the NYSDEC on routing through the New York State Forests and to obtain the necessary approvals to construct and operate the pipeline within these lands. The NYSDEC manages these forests for diversity of habitat; in particular the Clapper Hollow State Forest is managed for snowshoe hare habitat. The state forests support a variety of activities, including hiking and hunting, as well as winter recreation with snowmobiling and cross-country skiing.

Construction of the project would impact 0.9 acre of a single, contiguous, 5,417-acre tract within the Melondy Hill State Forest and 1.4 acres of an 820-acre tract of the Clapper Hollow State Forest. Recreational activities, such as hiking, hunting, snowmobiling, cross-country skiing may be restricted during the period of construction due to the presence of workers, equipment, or construction activity. While the crossing of Clapper Hallow State Forest would be in an area where hunting is not permitted, and no direct impacts on hunters would occur, the presence of construction personnel and equipment could diminish the value of hunting activities in the general area by reducing or limiting access to hunting areas near construction areas and/or if construction activities (e.g. noise, movement of equipment) causing wildlife (or hunters) to avoid nearby hunting areas. However, construction at any single point within the forests would be short-term. Following construction, 0.4 acre and 0.5 acre of the Melondy Hill State Forest and Clapper Hollow State Forest, respectively, would be permanently affected by operation of Constitution's project and convert to open lands. Areas affected only temporarily by construction would be restored to previous conditions to the extent possible in accordance with Constitution's ECPs and any specific requirements identified by the NYSDEC. All authorized recreational activities could resume within the permanent right-of-way once construction and restoration activities have been completed.

4.8.4.2 Organic Farm Lands and Specialty Crops

The proposed pipeline project crosses several tracts of land supporting specialty crops including tree farms (Christmas trees, pine, and spruce), a Certified Green Tag Forest, an Organic Rated Farm, and an maple sugar operation (table 4.8.4-2), as well as 33.4 miles of agricultural districts (7 districts in total

crossed 53 times, table 4.8.4-3). These districts are part of a voluntary program administered by the NYSDAM to protect and conserve active farm operations. Farm operations within an agricultural district can receive private nuisance protection under the "right-to-farm" provision of the Agricultural Districts Law and protection from unreasonably restrictive local laws, as well as receiving tax breaks. The NYSDAM has identified Schoharie Valley as a concentrated area of high-value crops, and the Delaware County Soils and Water Conservation District identified Delaware County as supporting a substantial number of beef and dairy farms.

TABLE 4.8.4-2
Organic and Specialty Crops Crossed by the Constitution Pipeline Project in New York

Crop or Special Use Type	County	Start Milepost	End Milepost	Acres Impacted	
				Construction	Operation
Tree Farm (Spruce and Pine)	Delaware	59.1	59.2	1.9	0.9
Christmas Tree Farm	Delaware	71.6	71.6	1.1	0.3
Christmas Tree Farm	Delaware	71.6	71.6	0.3	0.1
Sugar Bush[a]	Delaware	79.5	79.6	1.3 (estimated)	0.6 (estimated)
Tree Farm	Delaware	88.9	88.9	1.6	0.6
Certified Green Tag Forest[b]	Delaware	90.7	91.7	12.0	5.9
(The Charlotte Forest)		91.7	91.8	1.5	0.6
Organic Rated Farm[b]	Schoharie	101.7	101.8	0.6	0.2
Tree Farm	Schoharie	111.7	111.8	1.6	0.8

[a] Access to this parcel has not been granted so acres of impact were estimated by Commission staff based on length of parcel crossing and typical right-of-way widths.

[b] Area of the specific crop has not yet been determined. Mileposts listed represent parcel boundary entry and exit points.

TABLE 4.8.4-3
Agricultural Districts Crossed by the Constitution Pipeline Project in New York

County	Town	Agricultural District	Start Milepost	End Milepost	Total Miles Crossed
Broome	Sanford	3	29.7	31.5	1.8
Broome	Sanford	3	32.7	32.9	0.2
Broome	Sanford	3	33.5	35.7	2.2
Broome	Sanford	3	35.7	36.2	0.5
Broome	Sanford	3	36.3	37.3	1.0
Broome	Sanford	3	38.1	38.9	0.9
Chenango	Afton	5	42.8	43.9	1.1
Chenango	Afton	5	44.7	44.9	0.2
Chenango	Afton	5	45.3	45.5	0.2
Chenango	Afton	5	45.7	47.0	1.3

TABLE 4.8.4-3 (continued) Agricultural Districts Crossed by the Constitution Pipeline Project					
County	**Town**	**Agricultural District**	**Start Milepost**	**End Milepost**	**Total Miles Crossed**
Chenango	Afton	5	47.2	47.5	0.3
Chenango	Bainbridge	5	47.5	48.0	0.5
Chenango	Bainbridge	5	48.0	50.1	2.1
Delaware	Masonville	12	51.6	51.8	0.2
Delaware	Sidney	12	55.5	55.6	0.1
Delaware	Sidney	12	56.0	56.3	0.3
Delaware	Sidney	12	56.5	57.8	1.3
Delaware	Sidney	12	57.8	58.1	0.3
Delaware	Sidney	12	59.7	60.1	0.4
Delaware	Franklin	14	65.5	66.0	0.5
Delaware	Franklin	14	66.0	66.7	0.7
Delaware	Franklin	14	67.5	68.2	0.6
Delaware	Franklin	14	68.3	68.6	0.3
Delaware	Franklin	14	68.9	71.0	2.1
Delaware	Franklin	14	71.5	71.5	0.1
Delaware	Davenport	17	77.4	77.7	0.3
Delaware	Davenport	17	77.7	77.9	0.2
Delaware	Davenport	17	78.1	78.2	0.1
Delaware	Davenport	17	78.2	79.2	1.0
Delaware	Davenport	17	82.1	82.4	0.4
Delaware	Davenport	17	84.8	85.1	0.2
Delaware	Davenport	17	86.7	87.0	0.3
Delaware	Davenport	17	87.1	87.8	0.8
Delaware	Davenport	17	87.9	87.9	0.0
Delaware	Davenport	17	88.2	88.4	0.3
Delaware	Davenport	17	88.5	88.6	0.2
Delaware	Davenport	17	88.9	89.0	0.2
Delaware	Harpersfield	17	89.0	89.0	0.0
Delaware	Harpersfield	1	89.1	89.1	0.1
Delaware	Harpersfield	1	89.2	89.7	0.5
Delaware	Harpersfield	1	92.4	93.5	1.2
Schoharie	Summit	3	104.1	104.8	0.6
Schoharie	Summit	3	104.9	105.0	0.2
Schoharie	Richmondville	3	105.0	105.7	0.7
Schoharie	Richmondville	3	107.5	107.7	0.2
Schoharie	Richmondville	3	107.9	109.9	2.1
Schoharie	Middleburg	1	114.1	115.6	1.5
Schoharie	Schoharie	1	115.6	117.0	1.4
Schoharie	Schoharie	1	117.1	117.2	0.1

TABLE 4.8.4-3 (continued) Agricultural Districts Crossed by the Constitution Pipeline Project					
County	**Town**	**Agricultural District**	**Start Milepost**	**End Milepost**	**Total Miles Crossed**
Schoharie	Schoharie	1	118.3	119.0	0.8
Schoharie	Schoharie	1	119.7	120.1	0.3
Schoharie	Schoharie	2	121.9	122.6	0.7
Schoharie	Schoharie	2	123.5	123.7	0.2
				TOTAL MILES CROSSED	**33.4**

As noted in table 4.8.4-2, the proposed pipeline crosses approximately 1 mile of a Certified Green Tag Forest in Delaware County known as the Charlotte Forest. The Charlotte Forest is a 924-acre tract of land (NY-DE-226.000) named after the Charlotte River, which crosses the property.

The landowners and agents of the Charlotte Forest have filed several comment letters regarding impacts on the forest and request avoidance of the tract. The landowners state that the pipeline would cross extensive and unique wetlands, as well as Delaware County's largest block of interior forest and also could introduce invasive species into the Clapper and Mud Lakes wetland complexes. Staff from the FERC met with landowners of the Charlotte Forest in September of 2012 to discuss their concerns and to conduct a site visit of portions of the Forest. The FERC also attempted throughout the project to facilitate discussion between the landowner and Constitution; however, the issues remained unresolved

In letters to FERC, the landowners of the Charlotte Forest reported that their coordination attempts with Constitution have been unsuccessful. In the draft EIS, we recommended that Constitution further assess minor route deviations for tract NY-DE-226.000 (the Charlotte Forest) in coordination with the landowners and either incorporate a route that avoids the resources of concern or otherwise explain how potential impacts on resources have been effectively avoided, minimized, or mitigated. Subsequently, in an environmental information request we asked Constitution to provide detailed assessments of potential reroutes and potential trenchless crossing methods for this parcel. In August 2014, the COE (a cooperating agency for the development of this EIS), reported that it visited the subject parcel to review a wetland delineation prepared by the property owner. As a result the COE determined that the proposed pipeline route would be located in both uplands and wetlands, and that the adjacent Clapper Lake and Mud Pond wetland complexes were not hydrologically connected in the area examined. We have included a recommendation in section 3.4.3.regarding additional mitigation measures for this parcel, including a reduction in the construction and operational right-of-way widths to minimize impacts on forest lands. We also are recommending in section 4.5 that Constitution extend monitoring for invasive species based on inspections performed by the FERC.

Constitution has committed to continuing coordination with landowners to avoid and minimize impacts on specialty crops, including route deviations as discussed in section 3.4. Where impacts on specialty crops cannot be avoided, Constitution would implement special construction procedures in accordance with its ECPs. Such practices could include working with landowners to properly restore affected areas and drainage features, use of AIs to monitor construction activities, and post-construction monitoring and resolution of problem areas. These practices would be applied in actively cultivated or rotated cropland, pastures, and hayfields to minimize potential impacts. Constitution stated that it would compensate farmers for loss of dairy production or other measurable impacts on livestock associated with construction of the proposed pipeline.

Constitution would limit potential impacts on organic farms, such as the one located at MP 101.7 through implementation of its Organic Farm Protection Plan. The NYSDAM has recommended that Constitution use only organic straw/hay for mulch in certified organic agricultural land. Constitution has stated that it would use organic straw (or other approved materials as allowed by each farm's Organic System Plan) for mulching and erosion control structures and as requested by certified organic farm operators. We have reviewed Constitution's Organic Farm Protection Plan and find it acceptable.

Constitution has attempted to coordinate with the owner of the sugar bush operation at MP 79.5 in Delaware County, New York. However, Constitution reported that so far coordination attempts have been unsuccessful. Because potential impacts on the operation are not fully described, **we recommend that**:

- **<u>Prior to construction</u>, Constitution should file with the Secretary for review and written approval of the Director of OEP an impact avoidance, minimization, or mitigation plan for specialty crops (e.g., the sugar bush operation at MP 79.5), in consultation with the landowner.**

Constitution has committed to employ AIs during installation of the pipeline and during post-construction restoration efforts. The AIs would conduct field reviews and consult with affected landowners, conservation districts, and the NYSDAM in order to provide site-specific content to be incorporated into the final version of Constitution's ECPs. The AIs would also provide training to construction personnel on proper standards and requirements for working on agricultural lands, as well as providing technical field supervision including monitoring of construction and restoration activities. In addition, the AIs would be responsible for documenting compliance with the ECPs and requesting any modifications to the ECPs affecting agricultural resources.

Constitution has committed to work with individual landowners regarding the appropriate placement of fencing to exclude work areas, establishment of crossing locations for livestock, and relocation of livestock to temporary grazing sites during the construction phase. Crop yields would be monitored as outlined in Constitutions ECPs, which are sourced from the measures developed by NYSDAM. These measures would ensure that yields in areas affected by construction return to yields similar to preconstruction or those of adjacent, undisturbed areas. Finally, the owners of agricultural land would be compensated for any measureable loss of agricultural or livestock production in accordance with the terms of landowner agreements. Impacts on agricultural lands would be short-term and offset by compensation agreed to during easement negotiations.

Some agricultural lands along the route have vulnerable soils, which are associated with slopes, soil wetness conditions, and/or shallow bedrock that have the potential for greater disturbance from construction. Constitution is currently consulting with the NYSDAM and NRCS regarding the identification and crossings of these areas. The NYSDAM guidelines related to vulnerable soils were incorporated into Constitution's ECPs. Implementation of the measures would minimize impacts on agricultural lands, including those with vulnerable soils. Section 4.2 provides additional discussion of vulnerable agricultural soils crossed by the proposed pipeline project.

4.8.4.3 Conservation and Other Special Use Lands

The pipeline project would cross a number of parcels enrolled in a variety of conservation programs including:

- Conservation Reserve Enhancement Program;

- Clean and Green Program;
- 480 and 480a Real Property Tax eligible lands; and
- Nature Conservancy Lands.

In addition to lands enrolled in these programs, several other special use lands are near, but would not be crossed by the pipeline. Those include lands associated with the Farmable Wetlands Program, Emergency Conservation Program, Grassland Reserve Program, Land and Water Conservation Program, Community Conservation Partnerships Program, New York State's Farmland Protection Program, and the Environmental Protection Fund.

Lands managed by the NRCS and the Farm Service Agency that would be crossed by the proposed pipeline project are designated as Conservation Reserve Enhancement Program parcels. These lands are administered by the Farm Service Agency, with the NRCS providing land eligibility determinations as well as conservation planning and practice implementation. The Enhancement Program provides financial assistance to eligible farmers and ranchers in order to encourage landowners to conduct environmental enhancement projects on their lands. Constitution's project would cross four parcels enrolled in the Enhancement Program, all of which are in Pennsylvania (table 4.8.4-4).

TABLE 4.8.4-4
Potential Farm Service Agency Program Enrolled Lands Crossed by the Constitution Pipeline Project

		Acres Affected	
County	**Milepost**	**Construction**	**Operation**
Susquehanna	2.2	4.6	2.3
Susquehanna	2.6	7.3	3.1
Susquehanna	11.4	2.3	1.1
Susquehanna	11.6	2.1	1.1
	Project Total	**16.3**	**7.6**

The Clean and Green Program (Act 319) is administered by the Pennsylvania Department of Agriculture with the goal of preserving agricultural and forest land. Lands that meet the requirements of this program are subject to tax breaks, because the tax assessments are based on the use of the land rather than fair market value. Once enrolled in the program, lands must maintain the specified acreage and use indefinitely or incur roll-back taxes for the last seven years plus 6 percent interest. Exactly 100 tracts enrolled in this program would be crossed by the pipeline. Constitution stated that it would negotiate compensation of such fees or penalties, including roll-back taxes and increased annual taxes, as part of the easement for each tract if the project would render the parcel ineligible for the program. These tracts are listed in appendix P.

The 480 and 480a Real Property Tax program provides real property tax exemptions for certain forest lands of at least 50 eligible acres for Section 480a or 15 acres for Section 480 in New York State. Section 480 governs lands enrolled in the program prior to September 1974, and 480a governs lands subsequently enrolled after 1974. Twenty-three tracts enrolled in this program would be crossed by the project. These tracts are listed in table 4.8.4-5.

TABLE 4.8.4-5 480/480a Properties Crossed by the Constitution Pipeline Project in New York				
			Acres Affected (Total Parcel)	
County	Start Milepost	End Milepost	Construction	Operation
Broome	29.0	29.0	0.3	0.2
Broome	29.1	29.1	0.6	0.3
Broome	37.6	37.7	2.3	1.0
Broome	37.8	38.1	3.1	1.4
Broome	38.5	38.7	1.6	1.0
Broome	38.7	38.8	1.8	0.8
Broome	38.8	38.9	1.0	0.5
Broome	N/A	N/A	0.0	0.0
Broome	40.8	41.1	3.6	1.6
Chenango	N/A	N/A	0.0	0.0
Chenango	50.4	50.5	1.8	0.9
Chenango	N/A	N/A	0.0	0.0
Delaware	51.2	51.5	4.1	1.8
Delaware	53.6	53.9	5.0	1.8
Delaware	55.0	55.1	1.0	1.0
Delaware	N/A	N/A	0.0	0.0
Delaware	59.0	59.3	3.5	1.3
Delaware	59.3	59.6	4.8	2.2
Delaware	63.3	63.5	2.5	1.3
Delaware	63.5	63.5	0.4	0.2
Delaware	64.6	64.8	2.7	1.3
Delaware	67.3	67.5	2.9	1.4
Delaware	78.1	78.2	1.4	0.6
Delaware	78.2	78.6	5.5	2.2
Delaware	78.6	78.9	3.3	1.6
Delaware	86.1	86.2	1.3	0.8
Delaware	87.3	87.8	5.9	3.0
Delaware	87.9	87.9	0.1	0.1
Schoharie	118.3	119.0	8.7	4.2

Constitution has stated that, based on NYSDEC regulation Title 6 New York Codes, Rules and Regulations Part 199, it does not believe that the tracts enrolled in the programs discussed above would be subject to fees or penalties as a result of the pipeline right-of-way or easement. The title states that "The owner of certified tracts shall not be subject to any penalty that would otherwise apply because such a tract or any portion thereof is converted to a use other than forest crops production by virtue of a voluntary proceeding, providing such proceeding involves the establishment of rights-of-way for public highway or energy transmission purposes wherein such corridors have been established subsequent to public hearing as needed in the public interest and are environmentally compatible." However, actions taken to install the pipeline may require landowners to amend their Forest Management Plans, which are subject to approval by the NYSDEC. Constitution has indicated it would work with landowners to assist

with amendments to the Management Plans, including providing maps of the right-of-way and a schedule of operational clearing required for the tract. If a tract is removed from the 480/480a program as a result of the project, Constitution stated that it would negotiate compensation of such fees or penalties, including roll-back taxes and increased annual taxes, as part of the easement agreement for each tract, if applicable.

Two trails would be crossed by the pipeline project, the Delaware and Hudson Rail-Trail at MP 21.5 in Susquehanna County, Pennsylvania and the Finger Lakes Trail at MP 50.1 in Chenango County, New York. The D&H Rail-Trail was acquired and developed by the Trails Conservation Corporation (predecessor to the Rail-Trail Council of Northeast Pennsylvania) using grant funding assistance from the Bureau of Recreation and Conservation through the Keystone Recreation, Park and Conservation Fund. The trail is 38 miles long supporting non-motorized use (e.g. biking, hiking, horseback riding), except in the winter when the trail is maintained by the NorthEast Pennsylvania SnoTrails association for snowmobiling. The trail crossing would be approximately 9 feet long at an unimproved railroad bed and would be accomplished by conventional bore eliminating surface impacts on the trail. The Finger Lakes Trail is over 950 miles long connecting the Allegany State Forest to the Long Path in Catskills Forest Preserve. Portions of the trail are part of the North Country National Scenic Trail. This trail also supports year-round use with cross-country skiing and snowshoeing in the winter months. Constitution has proposed to cross the trail with a conventional bore to avoid surface impacts; therefore, it does not anticipate the need to close the trail. Also, as requested by Finger Lakes Trail Conference, Inc., Constitution would provide advanced notice of construction so the Trail Conference can take measures to notify trail users. Constitution has committed to continue to consult with the Trail Conference regarding the approximate 32-foot-long crossing.

Following submittal of the draft EIS, Constitution adopted a re-route near State Highway 30A resulting in a crossing of a commuter parking lot off I-88 in the Town of Schoharie. In consultation with the NYSDOT, Constitution has committed to maintaining access to and use of the commuter parking lot during construction or provide an alternative parking area.

A portion of the DelChenango Rod and Gun Club would be crossed by pipeline project at MP 51.2. The route as proposed would cross the firing range of the gun club. Constitution has coordinated with the owner regarding the crossing location, appropriate depth of cover, safety measures, and potential measures to avoid, minimize, or mitigate potential impacts on the firing range during construction and routine operation of the pipeline. According to Constitution's anticipated construction schedule, construction would take place between January and December, during which time the range would be closed in winter months, but open during the warm season. Temporary closures would be posted in the clubhouse, as well as at the range. Temporary fencing would help limit access, and construction personnel would be required to wear orange safety vests while on site. Operational impacts would be limited to periodic temporary closures of the range for routine maintenance of the right-of-way. Similar notification and safety measures would be undertaken for these periodic closures.

State Game Lands No. 70 (MP 23.9), one Boy Scout Camp (MP 25.1), one Girl Scout Camp (MP 37.3), and a tract owned by The Nature Conservancy (Emmons Pond Bog Preserve, MP 75.0) are all within 0.25 mile of the proposed project, but would not be crossed or directly affected. Potential impacts associated with construction, installation, and operation for these areas would be limited to noise and visual impacts. For related discussions see sections 4.11.2 and 4.8.6, respectively.

In general, recreation areas and special use areas crossed by Constitution's project are expected to experience some temporary impacts during construction. Clearing of trees, noise, dust, and limited access may prevent or curtail recreational activities. Users of these areas such as hikers, wildlife enthusiasts, sightseers, bikers, and other recreationalists may be prevented from use of the immediate area around the

temporary right-of-way during construction. Nearby recreation areas and special use areas are expected to experience similar temporary impacts as areas crossed, but as the distance to the construction work area increases, these impacts would generally decrease. Where recreational use would be allowed to proceed near construction activities, and otherwise, Constitution would post signs, install safety fencing, and establish detours around construction activities to ensure recreationalist's safety.

Constitution would consult with the appropriate federal, state, and managing agencies to develop and implement measures to mitigate and reduce impacts on these areas as needed. Direct access to some entry points within these areas may be temporarily limited or restricted due to increased traffic or road closures during construction. For further discussion of transportation impacts and mitigation measures, refer to sections 4.9.4.

We received comments about a school property that would be crossed by the pipeline in Schoharie County, New York. Among other things, the Schoharie Career and Technical Education School teaches students how to operate excavators, backhoes, bulldozers, and other construction equipment. The potential for interference with the training and safety and welfare of the students were the primary concerns raised by the commentors. Since the draft EIS Constitution has adjusted the proposed crossing of this property to avoid areas used by the school for excavation and construction activities, and also removed access road PAR-73A from the property as more fully described in section 3.4.3 of this EIS. However, since the proposed pipeline would still cross the property, we determined that installation of temporary and permanent safety fencing to prevent inadvertent contact between student-operated heavy equipment and the pipeline is warranted for safety reasons, and we have recommended that measure in section 3.4.3.2. Given Constitution's reroute and removal of the access road, as well as our recommendation for safety fencing, we conclude that impacts on the Schoharie Career and Technical Education School have been effectively minimized.

4.8.5 Hazardous Waste Sites

Based on field and database research, as well as in consultation with state environmental agencies, Constitution identified 53 known contaminated sites that are within 0.25 mile of the pipeline project area. Information on contaminated soil, groundwater, and sediments near the proposed facilities is provided in sections 4.2.2, 4.3.1.6, and 4.3.3, respectively.

None of the sites identified would be crossed by the pipeline; therefore, no impacts associated with construction, installation, and operation of the project are expected. To address both known and unanticipated contamination along the pipeline route, Constitution has prepared state-specific ECPs which include measures for the unanticipated discovery of contamination. These plans identify procedures to be employed if contaminated soil and groundwater are encountered during construction. These measures could include the suspension of construction activities when suspected contamination is encountered, evacuations if necessary, proper notifications, and follow up actions as appropriate including mobilization of emergency response personnel and regulatory agency coordination.

4.8.6 Visual Resources

"Visual resources" refers to the composite of basic terrain features, geologic features, hydrologic features, vegetation patterns, and anthropogenic features that influence the visual appeal of an area for residents or visitors. The proposed pipeline project would cross state and privately owned lands. No federal lands, national or state designated wild or scenic rivers would be crossed. Iroquois' project would be constructed at the site of an existing compressor station.

4.8.6.1 Pipeline

Visual resources along the proposed pipeline route are a function of geology, climate, and historical processes, and include topographic relief, vegetation, water, wildlife, land use, and human uses and development. A portion of the pipeline (about 9.0 percent) would be installed within or parallel to existing pipeline and/or utility rights-of-way. As a result, the visual resources along this portion of the project have been previously affected by other similar activities.

Constitution proposes to generally use a 110-foot-wide construction right-of-way, consisting of 50 feet of permanent right-of-way and 60 feet of temporary construction workspace for the 30-inch-diameter pipeline. In agricultural areas, Constitution is proposing to use a 125-foot-wide construction right-of-way to accommodate the topsoil segregation along the entire right-of-way through these lands. These impacts are discussed in more detail in section 4.8.4.2.

Some areas would be wider than the standards identified above to provide extra workspace for waterbody, road, and utility crossings. Visual impacts associated with the construction right-of-way and extra workspaces include the removal of existing vegetation and the exposure of bare soils, as well as earthwork and grading scars associated with heavy equipment tracks, trenching, blasting (if required), and machinery and tool storage. Other visual effects could result from the removal of large individual trees that have intrinsic aesthetic value; the removal or alteration of vegetation that may currently provide a visual barrier; or landform changes that introduce contrasts in visual scale, spatial characteristics, form, line, color, or texture.

Visual impacts would be greatest where the pipeline route parallels or crosses roads and the pipeline right-of-way may be seen by passing motorists; from residences where vegetation used for visual screening or for ornamental value is removed; and where the pipeline is routed through forested areas. The duration of visual impacts would depend on the type of vegetation that is cleared or altered. The duration of impact from clearing would be shortest in open areas where the re-establishment of vegetation following construction would be relatively rapid (generally less than 5 years). The duration would be greater in forested land, which would take many years to regenerate. The greatest potential visual impact would result from the removal of large specimen trees, which would take longer than other vegetation to regenerate and would be prevented from re-establishing on the permanent right-of-way.

The area crossed by the pipeline is predominately forest lands, comprising mostly a mixture of northern hardwood, hemlock/northern hardwood, sugar maple/basswood, and aspen/gray birch. While trees cleared within temporary construction work areas would be allowed to regenerate to pre-construction conditions following construction, impacts on forest resources within these areas would last for several years. The predominately forested setting would help to minimize the number of visual receptors along the forested portion of the right-of-way. The visual effect of the pipeline would also be mitigated by the Direct Pipe trenchless crossings, where surface impacts and impacts on visual resources between the Direct Pipe (and HDD sites if proposed) entry and exit holes would be avoided. After construction, all disturbed areas would be restored and areas outside of the permanent right-of-way would be returned to pre-construction conditions in compliance with federal, state, and local permits; landowner agreements; and Constitution's easement requirements, with the exception of aboveground facility sites.

4.8.6.2 Aboveground Facilities

Each of the meter and regulator stations would be installed at locations with aesthetics and topography similar to that described for the pipeline. The meter and regulator stations would be in areas characterized as residential, agricultural, and upland forest; however, the station would be installed in

primarily upland forested areas. Meter stations serve as interconnects with other pipeline systems, and are sited close to existing, previously disturbed, and cleared pipeline rights of way.

Following the issuance of our draft EIS, Constitution filed supplemental information identifying the need for communication towers at the Turnpike M&R Station and at nine other MLV locations. We subsequently issued an Environmental Information Request asking Constitution to conduct a visual impact assessment for these towers. The results of this assessment were filed in June of 2014 (available at http://elibrary.ferc.gov:0/idmws/file_list.asp?document_id=14222572). Constitution's visual assessment was based on criteria from our comments in the Environmental Information Request and from NYSDEC policy for Assessing and Mitigating Visual Impacts (2000). The analysis included visual modeling for each site using ArcGIS software taking into account the height of the tower (100 feet), distance to visual receptors from the tower, topography, and forested areas (which included estimations of new, nearby cleared areas resulting from construction) to identify locations with a 0.5-mile viewshed from which the tower had the potential to be visible. In addition the "optimal" vantage point for each tower was identified as listed in table 4.8.4-6.

Five of the 10 communication towers would be located in rural areas with limited visual receptors and within areas of existing vegetation that would act as a natural buffer, thus limiting the visibility of the communication towers. We have assessed these locations to have limited to no discernable change in the existing viewsheds; thus, resulting visual impacts would be minor but permanent. The other five communication towers, however, (MLV Nos. 3, 4, 6, 8 and 10) would be closer to residences and would generally be visible to a larger viewshed. Constitution has identified these five locations as areas to be reassessed for additional visual screening measures following construction; however, Constitution has not identified, described, or committed to a reporting process or potential follow-up mitigation measures. Therefore, **we recommend that:**

- **No more than 60 days following the authorization of in-service, Constitution should file with the Secretary for review and written approval of the Director of OEP, site-specific reports for each of the five sites identified in table 4.8.4-6 describing follow-up impact assessments, description of mitigation or visual screening measures, or justification for why no such mitigation measures were required.**

In general, the impacts on visual resources resulting from the construction and operation of the MLVs would be minimal as each site is small (typically less than 0.1 acre) and would be operated within the pipeline operational right-of-way or within a proposed aboveground facility (e.g., meter and regulator station site). Visual impacts associated with MLV #1 and #11 are included in the discussion above for meter stations. MLVs along the operational right-of-way would be enclosed in a chain-link security fence. Proximity of residences to the MLV sites range from 270 feet to 1,750 feet. Generally, the existing vegetation and distance from the MLV would minimize visual impacts. To further mitigate visual impacts for MLVs along the operational right-of-way (MLVs #2 through #10), Constitution would install slats in the fencing to help screen the MLV to visual receptors. Slat color would be selected to blend with the existing environment, typically brown, green or gray.

TABLE 4.8.4-6
Communication Towers Associated with the Constitution Pipeline Project

Facility/Tower ID	Municipality/State	MP	Distance to Optimal Vantage Point[a] (feet)	Existing Land Use within the Viewshed	Assessment of Impacts
Turnpike Road M&R Station (with MLV No. 1)	Brooklyn, PA	0.0	700	Agriculture, Residential, Forest	No to limited visibility
MLV and Tower No. 2 – Walkers Road	Jackson, PA	15.2	2,200	Agriculture, Residential, Forest	No to limited visibility
MLV and Tower No. 3 – Vale Road	Sanford, NY	26.7	200	Residential, Forest	**Additional visual screening measures may be required**
MLV and Tower No. 4 – O'Brien Road	Sanford, NY	41.2	300	Residential, Forest, Open Land	**Additional visual screening measures may be required**
MLV and Tower No. 5 – Access Road/Town Road	Masonville, NY	52.1	2,400	Residential, Forest, Open Land	Not visible
MLV and Tower No. 6 – Otego Road	Franklin, NY	65.9	750	Agriculture, Residential, Forest, Open Land	**Additional visual screening measures may be required**
MLV and Tower No. 7 – County Road 10	Davenport, NY	81.8	700	Residential, Forest, Open Land	Not visible
MLV and Tower No. 8 – Clapper Hollow Road	Summit, NY	95.1	500	Agriculture, Residential, Forest, Open Land	**Additional visual screening measures may be required**
MLV and Tower No. 9 – Access Road/Dodge Lodge Road	Richmondville, NY	108.5	1,300	Agriculture, Residential, Forest, Open Land	Not visible
MLV and Tower No. 10 – Smith Road	Schoharie, NY	119.6	350	Agriculture, Residential, Commercial, Open Land, Waterbody	**Additional visual screening measures may be required**

[a] Private Residence

Pig launchers, and pig receivers would be constructed within the pipeline right-of-way or near existing developed sites, thereby minimizing impacts on visual resources.

Construction and operation of the Iroquois project could also result in visual resource impacts. The compressor transfer station would be located off of Westfall Road and would be visible to motorists approaching the area. There are eight residences within 0.5 mile of the proposed compressor transfer station site; however, due to existing vegetation, only six have a potential view of the site. Iroquois' compressor building would be located approximately 10 to 15 feet below the elevation of Westfall Road, which would decrease the potential for visual impacts. Also, the compressor transfer station would be constructed immediately adjacent to an existing compressor station. While construction of the Iroquois

project would require the clearing of 3.3 acres of forest land, the surrounding forest land combined with site topography and the existing industrial setting indicate that visual impacts from construction would be short-term and minor. Due to the rural location of the compressor transfer station site in an existing industrial setting surrounded by in part by forest land, it is anticipated that visual impacts on nearby visual receptors during operation would be permanent but minor.

4.8.6.3 Contractor Yards

The contractor yards would be located on lands classified as agricultural, open, and industrial/commercial. With the possible exception of minor grading activities and surfacing, soils at the contractor yards would not be disturbed. As a result, there would be no permanent impacts on visual resources associated with the use of these yards. The only impacts at yards would be temporary when trailers, vehicles, pipe, and other construction-related materials are stored at these sites during construction.

4.8.6.4 Access Roads

Constitution proposes to use 78 roads for temporary access to the pipeline right-of-way during construction, of which 68 would be for permanent access to the pipeline right-of-way and aboveground facilities during operation. Access roads would be maintained at a width of 12 to 24 feet as required for curves and corners. Most of these roads are currently paved, graveled, or have dirt surfaces and would require minor improvements; but this would not have a significant impact on visual resources. Alternatively, the four temporary access roads and sixteen permanent access roads would be newly constructed. Construction of these roads would require some tree clearing in addition to grading and graveling, impacting 10.8 acres.

After construction, the 10 roads used for temporary access would be returned to pre-construction conditions unless another arrangement is mutually agreed upon with the landowner. The permanent access road retained for operation would result in 40.6 acres of roadway, of which 7.8 acres would be associated with the new permanent access roads.

4.8.6.5 Scenic Byways

The proposed pipeline route crosses one roadway in Pennsylvania that is designated as scenic, Viaduct Valley Way Scenic Byway (MP 16.8). No scenic byways in New York would be crossed; however, the New York State Department of Public Service has raised concerns about visual impacts on Route 17/I-86 in the Town of Sanford (MP 28.7). To avoid disruption of the roadway and traffic flow, Constitution proposes to use the conventional bore construction technique to cross the scenic byway and Route 17/I-86. The crossings would both be within or adjacent to existing open lands, which would minimize potential long-term visual impacts since pre-construction and post-construction land use characteristics would be similar.

During construction, some activity may be seen from the roadway, but this impact would be temporary, occurring only during construction, lasting up to a week at either location. Mitigation measures that may be needed would be addressed during the standard permitting process with the NYSDOT. Impacts would be short-term and would occur only during construction.

4.8.6.6 Agricultural Lands and Open Land

About 9.0 percent of the pipeline route would be within or adjacent to existing rights-of-way for pipelines, electric transmission lines, or roads. Visual impacts associated with pipeline construction in

agricultural and open land areas along the route would be temporary and would result from the presence of construction equipment and post-construction visual scarring. In agricultural land, any visual scarring would remain within the right-of-way until new crops are planted. After replanting of the crops, any remaining visual impact from pipeline construction would be minor, but visual evidence of construction may last for a few years.

4.8.6.7 Forested Land

The pipeline project and the modified compressor station would affect 1,033.9 acres of forest land during construction. Trees within the construction right-of-way would be cleared. Constitution has proposed construction mitigation and restoration measures to reduce potential impacts on forested land. The permanent right-of-way would be periodically mowed, thereby preventing regeneration of trees for the life of the project. In the construction right-of-way, trees would be allowed to re-grow; however, larger trees likely would not grow to maturity within the construction right-of-way for many decades. The permanent right-of-way would generally be maintained clear of trees. Removal of trees along both the permanent and construction rights-of-way in otherwise forested areas would leave a corridor that would persist for the duration of pipeline operation and that would be visible from some vantage points in the pipeline project area. The forested nature of Constitution's project suggests that visibility of the permanent right-of-way would be limited with some exceptions, such as road crossings or other vantage points. Overall, the visual impact related to the construction right-of-way would be long term, but minor and localized, while the visual impact related to the permanent right-of-way would be permanent, but relatively minor and localized.

4.9 SOCIOECONOMICS

The socioeconomic conditions and impacts associated with the proposed pipeline, two new M&R stations (one each in Pennsylvania and New York), associated facilities, and an expansion of an existing compressor station are discussed below. This section focuses initially on Constitution's pipeline project. Based on an agreement with Constitution, Iroquois would expand existing compression and metering facilities located in Wright, New York that would facilitate operation of the pipeline project. Iroquois' project would be within the property boundary of the existing Wright Compressor Station; as such, Iroquois' project would have a comparatively small impact on socioeconomic conditions, which are discussed below as applicable.

The primary socioeconomic impacts of the Constitution project include population effects associated with the influx of construction workers and the impact of these workers on public services and temporary housing during construction. Secondary socioeconomic effects include increased vehicle traffic necessary to move materials, equipment, and workers to and from the right-of-way, increased property tax revenue, job opportunities, and income associated with local construction employment.

4.9.1 Population and Employment

Table 4.9.1-1 provides a summary of selected demographic and socioeconomic conditions for the communities that would be affected by the projects in Pennsylvania and New York. The major occupations in the projects area are in the fields of education; health and social services; retail trade; and manufacturing.

TABLE 4.9.1-1
Existing Economic Conditions for the Area Surrounding the Projects

State/County	2010 Population[a]	Population Density (Persons/ sq. mi.)[a]	Per Capita Income[b]	Unemployment Rate for July 2013[c] (percent)	Civilian Workforce[b]	Top Three Industries[b,d]
Pennsylvania	**12,702,379**	**283.9**	**$27,824**	**7.5**	**6,447,161**	**A,D,C**
Susquehanna County	43,356	52.7	$23,392	7.5	21,505	A,D,C
New York	**19,378,102**	**411.2**	**$31,796**	**7.5**	**9,855,104**	**A,B,C**
Broome County	200,600	284.2	$24,766	7.7	99,146	A,C,D
Chenango County	50,477	56.5	$22,786	6.6	24,898	A,D,C
Delaware County	47,980	33.3	$23,120	7.6	23,253	A,D,C
Otsego County	62,259	62.2	$23,176	6.5	29,675	A,B,C
Schoharie County	32,749	52.7	$25,362	7.7	16,920	A,C,E

Source:
[a] U.S. Census Bureau 2013a
[b] U.S. Census Bureau 2013b
[c] U.S. Department of Labor 2013a
[d] Industry Key:
A = Educational Services and Health Care and Social Assistance
B = Professional, Scientific, Management, Administrative, and Waste Management
C = Retail Trade
D = Manufacturing
E = Construction

The population of Susquehanna County, Pennsylvania is 43,356 with a population density of 52.7 people per square mile (U.S. Census Bureau 2013a). The county-level civilian workforce is estimated to be 21,505 people with an unemployment rate of 7.5 percent (Bureau of Labor Statistics 2013b). Per capita income in Susquehanna County is about $4,400 lower than the state average of $27,824 (based on 2007-2011 five-year estimates).

In New York, the populations in potentially affected counties (Broome, Chenango, Delaware, Otsego and Schoharie Counties) range from 32,749 to 200,600 and population densities range from 33.3 to 284.2 people per square mile (U.S. Census Bureau 2013a). The county-level civilian workforces range from 16,920 to 99,146 people. Based on five-year estimates, per capita incomes in these counties range from $6,400 to $9,000 lower than the New York State average of $31,796. Unemployment rates within the potentially affected New York counties range from 6.5 to 7.7 percent (U.S. Department of Labor 2013a).

Construction of the pipeline project would temporarily increase the population in the general vicinity of the project. Table 4.9.1-2 lists the size of the estimated construction workforce for the projects by spread, worksite, and county. The construction workforce would be comprised of five spreads of 260 workers each for an estimated peak workforce of 1,300 during the 8 to 12 month-long construction period. Construction of the Iroquois project would require a peak workforce of 75 workers and take about 9 months to complete. Combined, this would represent an estimated 0.3 percent increase in the projects' area population. A peak total workforce of 520 workers may be present within a single county during periods of coinciding construction spreads.

TABLE 4.9.1-2
Estimated Workforce and Work Schedule for the Projects

Project Facility (miles)[a]	County/State	Start Milepost	End Milepost	Crossing Length (Miles)	Construction: Duration	Construction: Peak Workforce (Peak when spreads overlap)
Pipeline Spreads						
Pipeline Spread 1(21.6) Pipeline Spread 2 (25.7)	Susquehanna, PA	0.0	25.2	25.2[b]	26 weeks (Spread 1) 4 weeks (Spread 2)	260 (520)
Pipeline Spread 2 (25.7)	Broome, NY	25.2	42.2	17.0[b]	21 weeks (Spread 2)	260 (260)
Pipeline Spread 2 (25.7) Pipeline Spread 3 (24.3)	Chenango, NY	42.2	50.5	8.3[b]	7 weeks (Spread 2) 4 weeks (Spread 3)	260 (520)
Pipeline Spread 3 (24.3) Pipeline Spread 4 (21.4) Pipeline Spread 5 (31.4)	Delaware, NY	50.5	93.5	43.0[b]	26 weeks (Spread 3) 26 weeks (Spread 4) 1 weeks (Spread 5)	260 (520)
Pipeline Spread 5 (31.4)	Schoharie, NY	93.5	124.4	30.9[b]	32 weeks (Spread 5)	260 (260)
Direct Pipe						
Direct Pipe 1	Susquehanna, PA	15.3	15.7	0.4	7 months	16
Direct Pipe 2	Chenango, NY	47.7	48.0	0.3		
Direct Pipe 3	Delaware, NY	85.8	86.1	0.3		
Direct Pipe 4	Delaware, NY	87.8	88.2	0.4		
Direct Pipe 5	Schoharie, NY	119.8	--	N/A	7 months	28
Aboveground Facilities						
Turnpike Road Meter Station	Susquehanna, PA	0.0	--	N/A	7 months	24
White Road and Sutton Road Tie-ins	Susquehanna, PA	3.3, 9.4	--	N/A		10
Westfall Road Meter Station	Schoharie, NY	124.4	--	N/A		24
Iroquois						
Compressor Transfer Station	Schoharie, NY	--	--	N/A	9 months	75

[a] All personnel listed for Direct Pipe and aboveground facilities are already included in the pipeline facilities personnel number. Workforce for the compressor station would be in addition to the workforce for the pipeline.

[b] Crossing lengths were calculated based on start and end milepost, thus may not reflect the true crossing length.

Constitution anticipates hiring local construction workers with the requisite experience for the installation of natural gas facilities. These local hires would include paving, landscape, fencing, or hauling contractors, appraisers, and industrial suppliers in Pennsylvania and New York. Additional construction personnel hired from outside the Constitution project area would include supervisory personnel and inspectors who would temporarily relocate to the project area. Local hiring could temporarily decrease the unemployment rate. According to the economic analysis conducted by the Center for Government Research (CGR), unemployment rate changes would range from less than 0.1 percent (Broome County, New York) to 0.8 percent (Delaware County, New York) (CGR 2013). This would result in a temporary, but positive impact on employment for counties within the project area.

In addition to direct hires, the pipeline project would be expected to provide a number of temporary indirect jobs as purchases are made by non-local workers on food, clothing, lodging, gasoline, and entertainment. The jobs would have a temporary, stimulatory effect on the local economy. A study by Inform & Empower, Center for Government Research, which was commissioned by Constitution to examine the economic benefits of its proposed project, estimated that the pipeline project would generate more than 224 indirect jobs in New York, five of which would be more long-term in non-specified fields. According to the study, jobs associated with construction and operation would generate approximately $113 million in personal income for those individuals directly and indirectly employed. It is estimated that a proportionately smaller number of jobs and corresponding income and taxes would be created by the pipeline project in Pennsylvania. This would include 57 indirect jobs and approximately $29 million in personal income for those directly and indirectly employed during operation and construction.

Population impacts are expected to be temporary and minor in the project area. The pipeline project's effects on the total population would include the influx of non-local construction workers and any family members accompanying them. Assuming the construction workforce comprises a maximum of 1,300 individuals and approximately 75 percent of the total workforce would be non-local; there would be an influx of about 975 workers into the area due to Constitution's project. Additionally, construction of Iroquois' compressor transfer station would require a peak workforce of 75. Iroquois has stated that it would work with contractors to employ local workers where skill-sets and experience align with construction activities. The proportion of local hires typical for these types of construction activities typically ranges from approximately 25 percent to 40 percent. More specialized jobs such as inspectors would likely be non-local hires. The influx may be higher, however, if workers bring family members with them. The U.S. Census Bureau (2013c) reports the average household size as 2.60 persons, which means the population in the area could increase by about 2,500 people during construction. Given the population of the project area (totaling 437,421) and distribution of the construction workforce, the addition of 2,500 people would not be a significant change. An estimated seven new full-time, local employees would be directly hired to operate the facilities on a permanent basis. As discussed above, the creation of new, full-time positions would result in an estimated 5 indirect hires during operation. Operation of Iroquois' project would require no additional workforce.

4.9.2 Housing

Housing statistics for the counties affected by the proposed project are presented in table 4.9.2-1. Based on a five-year average (2007-2011), the number of vacant housing units across the six potentially affected counties in Pennsylvania and New York ranged from a high of 10,915 vacant units in Delaware County, New York to a low of 4,384 vacant units in Schoharie County, New York (U.S. Census Bureau 2013a). Rental vacancy rates varied from 4.2 percent in Susquehanna County, Pennsylvania to 8.3 percent in Otsego County, New York.

Temporary housing availability varies seasonally and geographically within the counties and communities near the proposed facilities. The demand for temporary housing in the project area is generally greatest during the summer months when tourism is at its highest. Temporary housing is available in the form of daily, weekly, and monthly rentals in motels and hotels. Table 4.9.2-1 provides the approximate number of hotels/motels in the counties crossed by the project. Other available temporary housing such as bed and breakfast facilities, apartments, and vacation properties, available in these or neighboring counties within commuting distance of Constitution's project area are not included. Therefore, the actual availability of temporary housing is greater than presented in table 4.9.2-1.

TABLE 4.9.2-1
Housing Statistics by County in the Vicinity of the Projects

State/County	Owner Occupied[a]	Renter Occupied[a]	Median Monthly Housing Costs ($US dollars)[a]	For Seasonal or Occasional Use[b]	Vacant Housing Units[a]	Rental Vacancy Rate (percent)[a]	Number of Hotels/ Motels[c]
Pennsylvania	**3,498,381**	**1,454,185**	**$479**	**161,582**	**602,373**	**6.5**	**N/A**
Susquehanna County[d]	13,558	3,715	$467	3,828	5,671	4.2	2
New York	**3,955,232**	**3,260,455**	**$687**	**289,301**	**865,616**	**4.6**	**N/A**
Broome County	53,498	26,759	$470	1,272	10,174	7.4	20
Chenango County	15,371	4,632	$457	2,584	4,674	6.7	2
Delaware County	15,301	4,876	$457	9,276	10,915	7.2	6
Otsego County	17,885	6,735	$462	3,621	6,157	8.3	7
Schoharie County	9,817	2,984	$481	2,942	4,384	5.5	3

[a] U.S. Census Bureau 2013d
[b] U.S. Census Bureau 2013e
[c] EPodunk 2013
[d] Susquehanna County Tourism Committee 2013
N/A = Not applicable

Construction of the pipeline project could temporarily decrease the availability of housing in the area. The project could have a short-term positive impact on the area rental industry through increased demand and higher rates of occupancy; however, no significant impacts on the local housing markets are expected. Assuming that the local construction workers do not require housing, a total of 975 housing units for the non-local Constitution workforce and 56 housing units for the Iroquois project workforce may be required during peak construction activities. Given the vacancy rates (4.2 percent to 8.3 percent) and the number of vacant housing units in the counties that would be affected by the project (41,975 between Pennsylvania and New York), construction crews should not encounter difficulty in finding temporary housing. At a maximum, the workforce would utilize about 2.5 percent of the vacant housing units. While some of the construction activity would be conducted during the peak tourism season, sufficient temporary housing is still likely to be available, but may be more difficult to find and/or more expensive to secure. Additional housing options for construction workers, as well as tourists not reported here include campgrounds, bed and breakfast lodges, or inns. We also find that there is no evidence that existing, interstate natural gas pipelines in Pennsylvania or New York have resulted in a decrease in tourism. Therefore, impacts on tourism due to the construction of Constitution's project are expected to be minimal.

The estimated four to seven new permanent employees required for Constitution's project would have no measureable impact on housing stocks in the project area.

4.9.3 Public Services

A wide range of public services and facilities are present in each county in Pennsylvania and New York and include full-service law enforcement, paid and volunteer fire departments, schools, and hospitals. All six counties in Constitution's project area have sheriff/police departments. Table 4.9.3-1 provides an overview of selected public services available in the larger municipalities in the vicinity of the project.

TABLE 4.9.3-1
Public Service Infrastructure for the Projects

State/County	Number of Fire Department and EMS	Number of Police Precincts/ Departments	Number of School Districts (students enrolled)	Closest School (distance in miles)	Number of Hospitals (number of beds)
Pennsylvania					
Susquehanna County	16	8	3 (3,250)	Susquehanna Community Elementary, Junior, and Senior High Schools (1.3)	3 (98)
New York					
Broome County	37	6	2 (1,790)	Deposit Elementary and Middle-High Schools (3.0)	3 (767)
Chenango County	20	6	2 (1,640)	Afton Elementary and Middle-High Schools (1.6)	1 (58)
Delaware County	29	7	3 (1,976)	Charlotte Valley Central School District: K-12, Sidney Elementary and Middle Schools (1.3)	3 (63)
Otsego County	30	3	1 (2,119)[a]	St. Mary's School (1.4 from contractor yard)	2 (444)
Schoharie County	13	2	4 (4,525[b])	Joseph B. Radez Elementary School District: K-5 (1.8)	1 (40)

[a] Proposed pipeline does not cross Otsego County, but a contractor yard would be located there.
[b] http://www.newyorkschools.com/

Based on the number of police and fire stations, schools, and hospitals, there appears to be adequate public service infrastructure in the project vicinity to accommodate the temporary needs of the 975 non-local construction workers and their families.

Constitution would require each of its contractors to have a health and safety plan, covering location-specific or work-specific requirements, to minimize the potential for on-the-job accidents. The contractors and Constitution's site safety staff are responsible for monitoring compliance with the plans. In the event of an accident, Constitution could require police, fire, and/or medical services, depending on the type of emergency; however, the anticipated demand for these services is not expected to exceed the existing capabilities of the emergency service infrastructure. Short-term impacts on certain other public services are possible, which would include the need for localized police assistance or certified flaggers to control traffic flow during construction activities. Additional discussion of traffic and public service assistance necessary to support traffic controls is provided in section 4.9.4.

Constitution has established a Community Grant Program that would benefit the local communities within the counties traversed by the project. The Grant Program was established to identify

and help fund noteworthy projects that benefit the surrounding communities. As of July 2014, Constitution has distributed $1.3 million to various groups and organizations in all five counties that would be crossed by the proposed pipeline, plus Otsego County, New York. These grants include funding for fire departments, ambulance services, and police organizations, as well as community groups and social programs. Constitution indicated that it does not currently plan to link its Grant Program to mitigation that may be required by regulatory agencies.

The four closest hospitals to the proposed pipeline route are the Barnes-Kasson Hospital in Susquehanna County, Pennsylvania (approximately 1 mile), Aurelia Osborn Fox Hospital in Otsego County, New York (approximately 3 miles), Cobleskill Regional Hospital in Schoharie County, New York (approximately 4 miles), and Tri-Town Regional Healthcare in Delaware County, New York (approximately 1 mile). In addition, there are three hospitals in Broome County, two hospitals in Otsego County, and one hospital in Chenango County, New York (UHS Chenango Memorial Hospital).

No schools were identified within 0.25 mile of the pipeline project[3]. The closest school to the proposed pipeline would be located over a mile away. Based on the duration of the construction schedule, it is unlikely that the families of all of the workers would relocate to the area, since this would require temporarily switching students to a new school, and presumably back to their previous school the following year. Therefore, we conclude that a small number of construction workers would choose to relocate their families. Those students that are relocated would reside throughout the project area and would be dispersed among multiple schools and school districts. Based on the number and size of schools in the pipeline project area, there appears to be adequate education infrastructure in the vicinity of the proposed pipeline to accommodate any temporary educational needs of the non-local construction workers and their families.

In summary, there are ample public services available in the area to meet the needs of the projects. Additional discussion on the safety measures that would be implemented for the projects is provided in section 4.12.

Operation of the pipeline would require the addition of four to seven full-time permanent positions. The impacts on public services due to these employees would be negligible, but permanent.

4.9.4 Transportation and Traffic

In Pennsylvania, the principal north-south roadways are I-81 and the principal east-west roadway is PA-706/167 while in New York these are NY-17 and I-88. However, the majority of the pipeline project would be in rural areas, and most of the roads impacted by the pipeline project would be county or private roads. Construction of Constitution's project could affect transportation and traffic across and within roadways and railroads due to increased vehicle traffic associated with the commuting of the construction workforce to the work area as well as the movement of construction vehicles and delivery of equipment and materials. Constitution has stated that it would utilize major highways, as well as using the construction right-of-way to the extent practicable, to mitigate impacts on local roadways.

During construction, Constitution would utilize equipment tracking mats, special construction entrances, or other appropriate measures to minimize the amount of soil tracked from the right-of-way onto roadways. In accordance with Constitution's ECPs, construction crews would be required to remove

[3] For the purposes of the analysis of potential impacts on schools due to the influx of non-local workers and accompanying underage children, schools identified were limited to kindergarten through grade 12. See section 4.8.5 for additional details on schools.

any dirt or debris that is tracked onto roadway surfaces at construction entrances. Once construction is complete, Constitution would be responsible for repairing any damage to roads resulting from construction activities.

Construction of the pipeline would require a peak workforce of 1,300 workers distributed along five construction spreads. Constitution expects the majority of the workforce to be on-site prior to peak morning commuting hours and to depart after peak evening commuting hours. Constitution also proposes to utilize buses to transport workers from designated parking locations to the construction work areas.

4.9.4.1 Construction Across and Within Roadways and Railroads

The pipeline project would require 132 crossings of 118 public or private roads and 4 railroads (appendix F). Two of the railroads are active and two are inactive, although one inactive railroad is used as a recreational trail. These roads and railroads are listed in appendix F along with the proposed crossing methods. Roads would either be conventionally bored, open-cut, or crossed by Direct Pipe. All railroads would be conventionally bored. A description of the conventional boring, HDD (which was proposed at the time of the draft EIS, but has been replaced by other crossing methods), and Direct Pipe construction techniques is provided in section 2.0. Open-cut road crossing methods are described below. The use of conventional boring and Direct Pipe methods would avoid surface impacts for 107 road crossings and all 4 railroads, but the use of the open-cut crossing method would not. Constitution would be responsible for obtaining road crossing permits from the applicable federal, state, and local agencies (which could dictate specific requirements for the day-to-day construction activities and methods at each crossing) and has committed to the repair of any roads damaged by its pipeline project.

The open-cut crossing method would primarily be used at 25 locations, consisting of a combination of private and public roads, and driveways. The first step for an open-cut crossing is to install traffic control devices, followed by excavation of the trench across the road, one lane at a time. Steel plates are then placed across the trench to allow vehicle access across the trench. One lane is left open for the majority of the process, except for the short period of time when the pipeline is lowered into the trench. If alternate routes around any particular crossing location exist, Constitution may temporarily close the road and detour traffic around the area.

Constitution developed a Residential Access and Traffic Mitigation Plan. The plan contains details regarding:

- locations and types of temporary traffic control measures, including signage, channelization devices, barricades, and flagmen;
- a communication plan for public notification of the location and duration of road closures;
- crossings of private driveways; and
- emergency access response management, which includes establishing temporary travel lanes and the staging of steel plate bridges on-site to place over the open trench in the event that emergency vehicles need to use the roadway.

We find Constitution's plan to be acceptable as it would reduce impacts on traffic flow. Based on the mitigation measures listed above, we expect the impacts from construction across and within roadways to be minor and temporary.

The FHWA and NYSDOT identified they will need to complete additional reviews of the segment of pipeline near MP 29 in the vicinity of New York Route 17. The proposed route is collocated with New York Route 17 over a short distance and crosses it in three places. The NYSDOT indicated that New York Route 17 is involved in a project to upgrade it to an interstate in the coming years (designated as I-86). The FHWA and NYSDOT need to evaluate any project that could conflict with the future designation of the interstate. This includes the proposed location of Constitution's pipeline adjacent to the current New York Route 17 and plans for maintenance, which may not be feasible once the route is upgraded to an interstate. Based on our recommendation in the draft EIS, Constitution has initiated communication with the NYSDOT, and consultation is ongoing. The NYSDOT indicated that Constitution would be required to design and construct the crossing of NY Route 17 to meet interstate standards. The crossing design would be reviewed by NYSDOT during the permit approval process. Because Constitution has agreed to adoption of these measures, we conclude that any impacts on the upgrade of New York Route 17 would be avoided.

Construction activities associated with the expansion of Iroquois' compressor station could result in short-term impacts on transportation infrastructure. These activities would be similar to those associated with the pipeline such as increased traffic flow due to movement of construction vehicles, personnel, and equipment; and potential damage to local roadways from heavy construction equipment. Iroquois committed to coordinate with the Town of Wright and Schoharie County to address any substantive impacts on roads as a result of its project. Given the relatively low numbers of workers that would commute, we do not expect traffic delays associated with construction of the compressor transfer station.

4.9.5 Property Values and Mortgages

We received comments regarding the potential effect of the project on property values. Specific issues mentioned include; devaluation of property if encumbered by a pipeline easement; being the responsible party for property taxes within a pipeline easement; paying increased landowner insurance premiums for project-related effects; and negative economic effects resulting from changes in land use (e.g. loss of timber production within the permanent right-of-way). As described in section 4.8.2, Constitution would acquire easements for both the temporary (construction) and permanent rights-of-way and compensate landowners for the easements, the limited use during construction, and any construction-related damages.

We received comments regarding economic impacts on agriculture, timber production, and specialty crops. Construction of the pipeline project would impact approximately 436.8 acres of agricultural land, as discussed in section 4.8.1. No agricultural land would be affected by Iroquois' project. Constitution would compensate landowners at current market value for any crop damage or measureable loss resulting from construction of the project. Compensation to landowners would be calculated by value of the crop loss at 100 percent the first year, 50 percent the second year, and 25 percent the third year. Constitution has committed to continue to work with individual landowners to avoid impacts on specialty crops, such as organic farms or Christmas tree farms (section 4.8.4).

Approximately 1,033.9 acres of forested land would be impacted during construction of the projects. Constitution has retained local appraisers to review the route, and timber appraisals would be conducted on an individual property basis. Landowners would be compensated for any marketable timber that is removed from their property during construction. Iroquois already owns all of the land that would be affected by the compressor transfer station. Impacts on agricultural and forest lands are discussed in sections 4.5 and 4.8.

Land values are determined by appraisals which take into account objective characteristics of the property such as size, location, and any improvements. The potential impact of a pipeline on the value of a tract of land would be related to many tract-specific variables, including the size of the tract, the current value of the land, the utilities and services available or accessible, the current land use, and the values of the adjacent properties. However, subjective valuation is generally not considered in appraisals. That is not to say that the presence of a pipeline, and the restrictions associated with a pipeline easement, could not influence a potential buyer's decision to purchase a property. If a buyer is looking for a property for a specific use, which the presence of the pipeline renders infeasible, then the buyer may decide to purchase another property more suitable to their objectives. For example, a buyer wanting to develop the land for a commercial property with sub-surface structures would likely not find the property suitable, but a farmer looking for land for grazing or additional cropland could find it suitable for their needs. This would be similar to other buyer-specific preferences that not all homes have, such as close proximity to shopping, relative seclusion, or access to high quality school districts.

Several studies examined the effects of pipeline easements on sales and property values and evaluated the impact of natural gas pipelines on real estate. The first study (Diskin et al. in 2011) looked at the effects of natural gas transmission pipelines on residential values in Arizona. The study concluded that there was no identifiable systematic relationship between proximity to a pipeline and residential sale price or value.

Studies conducted in 2008 by PGP Valuation Inc. (PGP 2008) for Palomar Gas Transmission, Inc. and by Ecowest for the Oregon LNG Project reached similar conclusions. Both studies evaluated the potential effect on property values of a natural gas pipeline that was constructed in 2003/2004 in northwestern Oregon, including along the western edge of the Portland metropolitan area. The PGP study found that:

- there was no measurable long-term impact on property values resulting from natural gas pipelines for the particular pipeline project studied;
- interviews with buyers and brokers indicated no measurable impact on value or price; and
- there was no trend in the data to suggest an extension of marketing periods (i.e., time while the property is on sale) for properties with gas pipeline easements.

The Ecowest study concluded that the pipeline had no statistically significant or economically significant impact on residential properties. The study also concluded that there was no relationship between proximity to the pipeline and sale price (Fruits 2008).

Another study (Hansen et al. 2006) analyzed property sales near a pipeline accident location in Washington State, using methodologies that considered proximity and persistence over time. This study noted a decline in property values following the incident. However, the effect was very localized, and declined as the distance from the affected pipeline increased. The effect also diminished over time in the years following the incident.

Prior to the issuance of draft EIS, we contacted several appraisers in the project area to inquire about the potential impacts on property values due to the presence of a natural gas pipeline. However, formal responses to our inquiries were not received in time for incorporation into the draft EIS. Subsequently, Michael Coles of Coles and Associates has provided responses to our questions regarding potential impacts on property values (Coles 2013, Coles 2014). Mr. Coles conducts appraisals in the project area and also teaches seminars for appraisers and realtors, including discussions of mineral rights and pipeline easements. According to Mr. Coles, "the empirical evidence indicates no difference in value attributable to the existence of the pipeline easement." Further, Mr. Coles was not aware of appraisers

making adjustments in the appraisal reports for the existence of a pipeline easement. In addition, he stated that the large number of variables that impact home values make it difficult to determine the incremental effect that any one variable may have on a home's value. However, Mr. Coles did explain that perceived safety issues or the limitation on use of land within the permanent easement could reduce the number of potential buyers for a property, which may extend the number of days the property is on the market. We contacted several other appraisers (Armstrong Appraisals, Advanced Appraisers, and RPI Appraisal); however, they would not agree to be cited for the purposes of this EIS.

We received a comment highlighting a trial in Texas in which the landowners were awarded $2.1 million (Peregrine Pipeline Company, L.P. v. Eagle Ford Land Partners, LP 2014). The landowners claimed that lands used for construction and associated with the permanent easement, which were taken through eminent domain in 2007, were not adequately compensated for and that damages, including a decrease in property value, occurred on the remainder of their properties. Of the $2.1 million awarded to the landowners about $500,000 was associated with pre-and post-judgment interest and other "recoverable" costs, and $1.35 million was awarded for fair market value and damage to the remainder of the property. The fair market value awarded for lands directly impacted by the pipeline project was $282,590, which is substantially more than the $80,000 appraised value associated with condemnation. The FERC does not get involved in specific eminent domain cases, nor do we have input into court-directed compensation. In the event that a landowner believed that they were not justly compensated by an eminent domain court, the landowner could appeal the compensation award, as occurred in the Texas case.

Several commenters provided references to papers that investigate impacts on property values. However, most of facilities referenced in these papers differ substantially from Constitution's project, as they discuss impacts on property values that have natural gas drilling leases. A natural gas lease is a contract between a landowner and a company which grants the company development rights to the subsurface oil and gas deposits. These leases are not subject to eminent domain and are regulated by the State (NYSDEC 2014f). Constitution is proposing to construct and operate a natural gas pipeline to transport natural gas, see section 1.1, and is not directly associated with, nor would the project involve extraction or production of natural gas. The purpose of this EIS is to assess the potential impacts of construction and operation of the project, and therefore impacts due to depreciation of property values due to natural gas drilling leases are outside the scope of this document.

Based on the above literature review and interviews with local appraisers, we found no consistent information suggesting that the presence of a natural gas pipeline easement would decrease property values. We also find that there is no evidence that existing, interstate natural gas pipelines in Pennsylvania or New York have resulted in a decrease in property values. Given these factors, and in consideration of the numerous variables that can affect property value, we conclude that there is not sufficient evidence to demonstrate that the Constitution pipeline would result in decreased property values.

We also researched the issue raised by commentors claiming that installation of the pipeline and the corresponding easement would hinder the ability to for a prospective buyer to obtain a mortgage or have impacts on mortgage rates. We contacted several national banks serving the project area, including Wells Fargo, Citizens Bank, Bank of America, and Chase Bank. Representatives at local corporate offices for these banks would not formally respond to our questions and asked that our correspondence not be cited in this document.

During the draft EIS comment period, we received a comment from a landowner who stated that he had spoken to representatives at three local banks (SFCU, Community Bank, and NBT Bank of Sidney), and he stated that these banks would not be able to provide a mortgage on his property if a

pipeline lease or pipeline were present. We contacted representatives at each of these three banks, and again, they would not formally respond to our questions and asked that our correspondence not be cited in this document. Therefore, we are unable to confirm that the presence of a pipeline easement would affect the ability of a prospective homebuyer to obtain a mortgage. Lenders consider many factors when assessing whether or not to offer a mortgage for a property. Most of these are directly related to the lender's evaluation of the prospective borrower's ability to repay the loan. A property value assessment and appraisal is also taken into consideration. As discussed above, there is no conclusive evidence that the mere presence of a pipeline would negatively affect the value of a property. Therefore, we do not expect an easement to affect a bank's appraisal of a property in its consideration of financing a loan. Furthermore, based on our experience in reviewing natural gas pipelines across the United States, we have never documented an instance where a FERC-jurisdictional pipeline project has affected the ability of a prospective buyer to obtain a mortgage. We therefore find these claims to be unlikely.

Furthermore, in conjunction with determining the appropriate level of financing for an individual, banks use an appraisal process to value properties for which they are financing. As we have discussed above, we found that the presence of a pipeline would not affect the value of a property; therefore we do not expect an appraisal to be impacted by a pipeline. Because the appraisal is the only factor that could possibly include the presence of an easement, we conclude that the project would not have a marked effect on the ability of a prospective buyer to obtain a mortgage.

Several commenters also raised concerns regarding the impact of the communications towers on property values. The closest residence to each of the 10 proposed communication towers would range from 200 feet to 2,300 feet. There have been several studies that have looked at the relationship between cellular towers and property values. We note that landowners with a cellular tower on their property typically receive regular lease payments, while the landowner with a communication tower such as those proposed by Constitution may only receive a one-time payment.

Two studies were published in The Appraisal Journal that assessed impacts on property values due to the presence of cell phone tower(s). The first study was conducted by Bond and Wang (2005) and uses a case study approach to determine the perceptions toward communication towers of residents in Christchurch, New Zealand. The study included both a survey questionnaire and a sales transaction comparison in areas ranging from within 300 meters of a cell phone tower to over 1 kilometer from a tower. They found that based on the results of the questionnaire, responses were variable, with residents' most common concerns focusing on the safety and health impacts of the tower and negative impacts on property values. A comparison of recent sales transactions indicated a potential negative impact on property values due to the presence of the cellular towers, but the researchers concluded that this could be due to the perceived adverse health effects of the towers that had recently received widespread media coverage in the area. The same authors conducted follow up research to the 2005 study, to assess potential impacts based on another case study in Florida in 2004 (Bond 2007). Overall, this study found that there was minimal effect on property values due to cell phone towers in close proximity to neighborhoods. Bond hypothesized that this may have been due to the presence of similar structures in the area such as power lines and poles.

Another study (which was commissioned by a communications company) was based on a case study in the Richmond-Petersburg Metropolitan Statistical Area in Virginia (Dorin and Smith 1999). The study focused on communication towers that were in excess of 150 feet tall and were visible to nearby residential areas. Using a comparative analysis model approach, the researchers found no conclusive evidence to indicate the towers would have a negative impact on the value of properties within sight of the tower. In addition, the researchers conducted personal interviews with homeowners, who indicated that the tower did not have an impact on their decisions to purchase their homes.

In a report by Valentine Appraisal Associates (Valentine 2014) prepared for Bay Communications II LLC and AT&T, a comparison study was conducted of sales of single family homes that were in close proximity to communication towers relative to single family homes that were not within proximity of communication towers or similar structures. The report found that there was no indication that the tower resulted in a devaluation of the properties in close proximity to the tower. Local real estate brokers were interviewed and indicated that buyers did not consider the presence of the towers as a limitation or concern. The local tax assessors were also contacted, and none of those who were interviewed had reduced their assessments due to the presence of a tower.

Based on this literature review, we find no conclusive evidence indicating that the communication towers would have an impact on property values. As stated in several of the studies, the perception of residents and potential buyers were varied, with some stating that it had no effect on their decisions to buy or maintain a home, while others indicated that there were safety concerns as well as concerns regarding the decrease in the aesthetics of the area. A discussion of visual impacts is provided in section 4.8.6.

4.9.6 Insurance

We received comments regarding the potential for insurance premium adjustments or loss of coverage associated with a pipeline easement on a residential property. Specifically, commenters noted that they were told by their insurance company that either their property insurance coverage would be cancelled if a pipeline was installed on their property or that if they accepted compensation from the pipeline company, then their property would become uninsurable. Other commenters stated that their insurance premiums would rise to an unaffordable level if the pipeline was installed. To address these comments, we conducted independent research on the matter.

The initial phase of our research involved calling insurance offices for a variety of agencies in the project area. We asked whether the presence of a utility crossing would change the terms of an existing or new residential insurance policy, which types of utilities may cause a change, how a policy might change, and what factors would influence a change in the policy terms, including the potential for a policy to be dropped completely. Results of this initial investigation suggested that the potential for a residential insurance policy to be affected could exist, but the extent of any action and corresponding corrective action would depend upon several factors including the terms of the individual land owner's policy and the terms of the applicant's own policy (in this case Constitution). Insurance company contacts were not able to speak directly to the potential factors that could cause a change in a policy (e.g. type of utility, proximity of the residence to the utility), or provide quantitative information on the potential change in a policy premium (in dollars or percent).

The next phase of research involved identifying and writing to representatives from five major insurance companies (i.e. holding major market share in the United States and the project area). The goal of the written correspondence was to reach out to the corporate offices of insurance companies to obtain more definitive information on conditions under which a policy may be modified or dropped, specific factors used to evaluate the action, and what corrective action could be undertaken by the landowner or company to mitigate any change in a policy. The written correspondence included the questions posed in the calls to agents; a synopsis of our findings from conducting the calls; as well as follow-up questions seeking clarification on the plausibility of a change or dropped policy, details on potential corrective actions, as well specific scenarios or quantitative information. Despite repeated attempts at follow-up, to date only one response has been received and the contact stated that they could not provide the information we requested. This contact also shared our correspondence with the Insurance Information Institute, but they too were unable to assist us.

As we had been unsuccessful in confirming exclusively under what conditions a landowner's insurance policy could be changed as a result of a pipeline easement, and to mitigate for potential impacts, we recommended in the draft EIS that Constitution document pipeline-related complaints concerning landowners' homeowner insurance policies, describe any mitigation efforts, and report regularly to the Commission. Constitution agreed to comply with our recommendation and requested clarification of the recommendation. To address the insurance-related issues **we recommend that:**

- **Constitution should file with the Secretary reports describing any documented complaints from a homeowner that a homeowner's insurance policy was cancelled or voided due directly to the grant of the pipeline right-of-way or installation of the pipeline and/or that the premium for the homeowner's insurance increased materially and directly as a result of the grant of the pipeline right of way or installation of the pipeline. The reports should also identify how Constitution has mitigated the impact. During construction these reports should be included in Constitution's status reports (see recommendation 7 in section 5.2) and in quarterly reports <u>for a 2 year period following in-service of the project</u>.**

We also received comments on the potential for the Constitution Pipeline Project to limit or negate land an owner's title insurance or prevent the acquisition of title insurance for a new purchase. Title insurance can be issued to a lending firm or to a (new or current) property owner. Title insurance protects the policy holders, i.e., the bank or the homeowner, and protects financial interest in the property against any liability related to defects in the title, liens, or other deficiencies. Lenders may require title insurance as part of the loan process, and the policy covers the lender for the life of the loan. New property owners can option to purchase title insurance at the time of purchase or later on as desired. These policies generally cover the property owner as long as they hold the title to the property.

In order to evaluate the potential for impacts on title insurance due to the Constitution pipeline and associated right-of-way easements we contacted several title insurance companies that service the project area, as well as the Pennsylvania and New York offices of the American Land Title Association (LTA). To date neither office of the LTA has responded to our inquiry. However, a Senior Title Officer with Investors Title Insurance Company did provide responses to several questions we posed regarding title insurance and a pipeline easement (Investors Title Insurance Company 2014). Mr. Frank Tortora confirmed that Investors Title Insurance Company has previously issued title insurance coverage for properties with existing utility crossings/easements on them, including transmission lines, natural gas pipelines, oil pipelines, and natural gas wells. These easements/leases and the rights and conditions of are treated as exceptions in the policy and as such an existing easement/lease should not cause a policy to be dropped or cancelled. Mr. Tortora explained that a new natural gas pipeline on a property that has title insurance with Investors Title Insurance Company would generally not result in a dropped or cancelled policy; again, the easement/lease would be an exception from coverage. Mr. Tortora also explained that issuance of title insurance does not dictate the closing of a real estate transaction and that real estate transactions often occur without title insurance, as such the lack of title insurance in and of itself would not necessarily negate the financing of a property.

4.9.7 Economy and Tax Revenues

Construction and operation of the project would have a beneficial impact on local sales tax revenue. Table 4.9.7-1 provides the estimated payroll, cost of materials purchased locally, and projected sales tax revenues associated with project construction. Payroll taxes would also be collected from the workers employed on the projects. Constitution anticipates that its total payroll would be approximately $129.8 million during the construction phase ($26.8 million in Pennsylvania and $103.1 million in New York). Economic impacts due to construction of Iroquois' project may be beneficial at the local and

county level in the form of increased sales and payroll taxes. However, these impacts would be limited to the duration of the construction period.

TABLE 4.9.7-1
Socioeconomic Impact Resulting from Construction and Operation of the Constitution Pipeline Project

	Construction (in millions)		Operation (in millions)
State/County	**Construction Payroll**	**Cost of Materials Purchased**	**Property Taxes (Annual)**
Pennsylvania	**$26.8**	**$7.4**	**$0.25**
Susquehanna County	$26.8	$7.4	$0.25
New York	**$103.1**	**$20.3**	**$12.7**
Broome County	$17.7	$4.9	$2.1
Chenango County	$8.6	$2.4	$1.3
Delaware County	$44.7	$12.3	$4.9
Schoharie County	$32.1	$0.7	$4.4
Total for Project Area	**$129.9**	**$27.7**	**$12.95**

Source: Center for Governmental Research 2013

Construction of the proposed pipeline project would have a short-term, beneficial effect in terms of increased payroll and local material purchases. Because about 25 percent of the workers are expected to be local, and non-local workers would temporarily relocate to the pipeline project vicinity, a substantial portion of the payroll likely would be spent with local vendors and businesses. While most of the materials for Constitution's project construction would be purchased from national vendors, common supplies (e.g., stone and concrete) would likely be purchased from vendors in the project area. Construction of the pipeline project would also result in increased state and local sales tax revenues associated with the purchase of some construction materials, as well as goods and services, by the construction workforce.

We do not expect the project to have any long-term negative economic impact. The pipeline would be installed underground, and any surface impacts, such as damaged roads, would be repaired. Once installed, the pipeline would not impede normal surface traffic or access to businesses, and most pre-construction property uses would be allowed. The long-term positive economic impacts from the proposed pipeline include an increase in annual property taxes ranging from $250 thousand per year in Susquehanna County, Pennsylvania to $4.9 million in Delaware County, New York. This increase in property taxes paid would benefit the local governments and their budgets annually for the life of Constitution's project. Constitution would be responsible for any increase in valuation for property tax purposes resulting from operation of the pipeline project. The landowner would not bear responsibility for increased property taxes resulting from installation or operation of the pipeline.

Operation of Iroquois' project would result in $1.5 million in annual property taxes to the Town of Wright. These tax payments would be beyond those taxes already paid for the existing Wright Compressor Station. As the Town of Wright has a per capita income of $19,711 with 8.9% of the population living below the poverty line, this increase in property tax could have a substantial positive impact on the Town's budget, and thereby the community that it serves. Moreover, the increase in annual property taxes would be a long-term positive impact on the local government.

4.9.8 Environmental Justice

Executive Order 12898 (EO 12898) on Environmental Justice recognizes the importance of using the NEPA process to identify and address, as appropriate, any disproportionately high and adverse health or environmental effects of federal programs, policies, and activities on minority populations and low-income populations. Consistent with EO 12898, the CEQ called on federal agencies to actively scrutinize the following issues with respect to environmental justice (CEQ 1997a):

- the racial and economic composition of affected communities;
- health-related issues that may amplify project effects on minority or low-income individuals; and
- public participation strategies, including community or tribal participation in the process.

The EPA's Environmental Justice Policies focus on enhancing opportunities for residents to participate in decision making. The EPA (2011b) states that Environmental Justice involves meaningful involvement so that: "(1) potentially affected community residents have an appropriate opportunity to participate in decisions about a proposed activity that will affect their environment and/or health; (2) the public's contributions can influence the regulatory agency's decision; (3) the concerns of all participants involved will be considered in the decision-making process; and (4) the decision-makers seek out and facilitate the involvement of those potentially affected."

As discussed in section 1.3, there have been many opportunities for the public to comment on and provide input about the projects. Constitution and Iroquois met with many different stakeholders during the initial development of the route including local residents and affected landowners. These efforts included Constitution holding a number of open houses in the project area for the affected communities and local authorities. Constitution and Iroquois also established, and are maintaining, websites to share information about the projects with the public.

Constitution also used the FERC's pre-filing process (section 1.3). One of the major goals of this process is to increase public awareness and encourage public input regarding every aspect of the project before an application is filed. As part of this process, FERC staff participated in all of Constitution's open houses to receive input from the public about the pipeline project. Interested parties have had, and will continue to be given, opportunities to participate in the NEPA review process. To date, this included the opportunity to participate in FERC's public scoping meetings within the area of the projects to identify concerns and issues that should be covered in the EIS, the opportunity to submit written comments about the projects to the FERC, and to comment on the draft EIS either electronically, in writing, or at the draft EIS comment meetings held within the project area. All comments on the draft EIS were responded to in the Final EIS.

Guidance from the CEQ states that "minority populations should be identified where either: (a) the minority population of the affected area exceeds 50 percent or (b) the minority population percentage of the affected area is meaningfully greater than the minority population percentage in the general population or other appropriate unit of geographic analysis" (CEQ 1997a). Minority populations, defined as Hispanics, Asian-Americans and Pacific Islanders, African-Americans, and American Indians and Alaskan Natives persons, comprise less than 20 percent of the population in each of the counties that would be traversed by the projects, and those counties would comprise the region of influence for the projects (table 4.9.8-1). To further assess whether the minority population in the region of influence is substantially greater than the minority population in surrounding areas, we compared county-level demographics to the respective statewide proportions. The proportion of individual minority populations is less than respective state-level statistics in all of the counties that make up the region of influence for

the projects (table 4.9.8-1). These statistics indicate that a disproportionate effect on minority populations is unlikely, according to the guidance set forth by the CEQ.

TABLE 4.9.8-1
Racial/Ethnic Statistics for the Area Surrounding the Projects

State/County	Racial/Ethnic Group (percent)						Persons of Hispanic or Latino Origin (percent)
	White	Black	Native American and Alaska Native	Asian	Native Hawaiian and Other Pacific Islander	Persons Reporting Two or More Races	
Pennsylvania	**83.5**	**11.4**	**0.3**	**3.0**	**0.1**	**1.7**	**6.1**
Susquehanna County	98.3	0.4	0.1	0.3	0.1	0.8	1.6
New York	**71.2**	**17.5**	**1.0**	**8.0**	**0.1**	**2.2**	**18.2**
Broome County	88.5	5.2	0.2	3.6	0.1	2.4	3.6
Chenango County	97.0	0.8	0.4	0.5	<0.1	1.3	2.0
Delaware County	95.7	1.8	0.3	0.8	<0.1	1.3	3.3
Otsego County	94.9	2.0	0.2	1.3	<0.1	1.5	3.3
Schoharie County	96.3	1.3	0.3	0.8	<0.1	1.3	2.9

Source: http://quickfacts.census.gov/qfd/states/36/36025.html

The U.S. Census Bureau defines "low-income populations" as those living below the established poverty level. The U.S. Census Bureau also reports the percentage of county populations with an income below the poverty level, which is presented in table 4.9.8-2. In order to evaluate the potential for a low-income population to be impacted disproportionately, we compared the poverty level rates for counties within the region of influence to those of their respective state levels.

TABLE 4.9.8-2
Economic Statistics for the Area Surrounding the Projects (Five-year Average: 2007-2011)

State/County	Median Household Income[a]	Persons Below Poverty[a] (percent)	Households Receiving Cash Public Assistance[b] (percent)	Households Receiving Food Stamp/SNAP benefits in the past 12 months[b] (percent)
Pennsylvania	**$51,016.00**	**12.4**	3.4	10.1
Susquehanna County	$46,473.00	11.3	2.2	8.4
New York	**$56,951.00**	**14.5**	**3.1**	**12.3**
Broome County	$45,619.00	16.2	3.7	11.5
Chenango County	$44,662.00	13.9	1.9	12.7
Delaware County	$43,554.00	14.1	2.2	8.4
Otsego County	$45,334.00	16.4	1.5	8.4
Schoharie County	$50,795.00	10.7	1.3	10.8

[a] http://quickfacts.census.gov/qfd/states/36/36025.html
[b] http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk

The majority of the counties in the project area have poverty rates that are similar to or lower than the respective statewide levels, but two of the counties within the region of influence have poverty rates that are higher than the respective state levels (Broome County and Otsego County, New York). While these statistics are indicative of a potentially disproportionate effect on low-income communities, the county levels are only slightly higher than their respective state levels. Otsego County would be the location of a contractor yard, a portion of a permanent access road, and the possible location of a warehouse to accommodate the seven full-time operational staff. The pipeline would not cross this county. Given these factors, we conclude that the project would not have a disproportionate effect on low-income communities in Otsego County. Sanford is the only town proposed to be crossed by the pipeline in Broome County, although a contractor yard is proposed to be located in Deposit Village, which is also in Broome County. The U.S. Census Bureau reports poverty levels for Sanford and Deposit Village as 13.1 and 24.8 percent, respectively (U.S. Census Bureau 2013a). We conclude that the proposed project would not have a disproportionate effect on low-income communities in Sanford due to the lower than state-wide poverty level in that town. Because the contractor yard would be over 5 miles from the center of Deposit Village, we conclude that the project would not have a permanent or significant disproportionate effect on low-income communities in Deposit Village. Because the areas crossed by the project as a whole have generally smaller lower-income populations than the remainder of Pennsylvania and New York, the potential for disproportionate effects to low-income communities is low overall.

As described above, Constitution's project and Iroquois' project would have negligible to minor negative impacts and minor to moderate positive impacts on socioeconomic characteristics and economies within the region of influence. As discussed throughout this EIS, potentially negative environmental effects associated with the projects would be minimized and/or mitigated, as applicable. Although the racial and economic composition of the counties traversed by the proposed projects shows some deviations from state-level statistics, there is no evidence that the projects would cause a disproportionate share of adverse environmental or socioeconomic impacts on any racial, ethnic, or socioeconomic group.

The primary health issues related to the proposed projects would be the risk associated with an unanticipated pipeline or compressor station failure. Section 4.12 discusses the localized risks to public safety that could result from a pipeline failure and describes how applicable safety regulations and standards would minimize the potential for these risks. Because the projects would generally traverse sparsely populated areas, the number of persons who would be at risk of injury due to a pipeline failure would be low; and there is no evidence that such risks would be disproportionately borne by any racial, ethnic, or socioeconomic group.

Construction of the projects would result in minor positive impacts due to increases in payroll taxes, purchases made by the workforce, and expenses associated with the acquisition of material goods and equipment. Operation of the projects would have a minor to moderate positive effect on the counties and local communities due to the increase to property taxes that would be collected.

4.10 CULTURAL RESOURCES

Section 106 of the National Historic Preservation Act (NHPA) (16 USC 470), as amended, requires the FERC to take into account the effects of its undertakings (including the issuance of Certificates) on properties listed or eligible for listing in the National Register of Historic Places (NRHP) and to provide the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on the undertaking. Constitution and Iroquois, as non-federal parties, are assisting the FERC in meeting our obligations under Section 106 by preparing the necessary information, analyses, and recommendations as authorized by 36 CFR 800.2(a)(3).

Construction and operation of the projects could potentially affect historic properties (that is, cultural resources listed or eligible for listing in the NRHP). These historic properties could include prehistoric or historic archaeological sites, districts, buildings, structures, or objects, as well as locations with traditional value to Native Americans or other groups. Historic properties generally must possess integrity of location, design, setting, materials, workmanship, feeling, and association, and must meet one or more of the criteria specified in 36 CFR 60.4.

4.10.1 Constitution Pipeline Project

4.10.1.1 Cultural Resources Investigations

Constitution conducted Phase I cultural resources field survey for archaeological resources during 2012 and 2013. The Phase I surveys conducted during 2012 examined a 600-foot-wide survey corridor along the proposed pipeline route and those conducted during 2013 examined a 300-foot-wide corridor. The survey corridors are sufficiently wide to encompass the pipeline construction right-of-way, associated extra workspace, MLVs, and pig launchers/receivers.

As of October, 29 2013, Constitution had obtained landowner permission and conducted field surveys for approximately 76 percent of the length of the proposed pipeline route. Constitution has not completed Phase I surveys for meter stations, access roads, contractor yards, cathodic protection systems, other facilities outside the pipeline survey corridor, or minor route variations proposed following issuance of the draft EIS. Phase II evaluation investigations at potentially NRHP-eligible archaeological sites that would be directly affected by the project are currently ongoing.

As of November 2013, Constitution had conducted historic aboveground resource surveys of all property parcels within or crossed by the survey corridor except for 10 parcels in New York for which access permission was not obtained and which could not be adequately examined from public rights-of-way. Constitution will conduct surveys of the remaining property parcels once access permission is obtained. Constitution has also conducted the preliminary assessment of effects of the proposed project on NRHP-eligible historic aboveground resources within the pipeline's area of potential impacts.

Historic aboveground resource surveys have not been completed for access roads, contractor yards, cathodic protection sites, other ancillary facilities outside the survey corridor, or minor route variations proposed following issuance of the draft EIS. Constitution also has not completed the analysis of visual effects from proposed aboveground facilities to historic aboveground resources pending completion of detailed project plans for these facilities.

The reports completed to date were submitted to the FERC, the Pennsylvania Historical and Museum Commission (PHMC), and the New York Office of Parks, Recreation and Historic Preservation (OPRHP) for review.

4.10.1.2 Results of Cultural Resource Investigations in Pennsylvania

Archaeological Sites

Constitution has identified 25 archaeological sites within the survey corridor of the proposed pipeline route. Eleven sites are historic, 1 site is a cemetery, and 13 sites consist of one or more stone piles each. It is unclear whether the stone piles are associated with pre-contact Native American occupation of the area or with historic land use activity. Constitution also identified a cemetery along a proposed access road corridor.

One historic site and six stone pile sites are within the currently proposed pipeline construction right-of-way and one cemetery is within a proposed access road corridor (table 4.10.1-1) (URS Corporation 2013a). These resources would be impacted by the project as currently proposed.

TABLE 4.10.1-1
Archaeological Sites Within the Proposed Area of Direct Impact in Pennsylvania[a]

Site No.	Temporary No.	Temporal Period	Site Type	Constitution Recommended NRHP Evaluation	PHMC NRHP Recommendation	Constitution Recommended Future Action
--	PASu44-SP1 to SP22	Unknown	Stone Piles	Culturally sensitive area	Pending	Mitigation[b]
36SQ169	PASu45-Site1	Historic	Domestic	Potentially eligible	Potentially eligible	Phase II Testing
--	PASu218-SP1 to SP6	Unknown	Stone Piles	Culturally sensitive area	Pending	Alignment shift to avoid site
--	PASu218-SP7 to SP8	Unknown	Stone Piles	Culturally sensitive area	Pending	Alignment shift to avoid site
Pending	PASu-TAR1-Cemetery	Historic	Cemetery	Culturally sensitive area	Avoid	Access road modification to avoid cemetery
--	PASu51-SP1 to SP3	Unknown	Stone Piles	Culturally sensitive area	Pending	Alignment shift to avoid site
--	PASu236-SP1 to SP2	Unknown	Stone Piles	Culturally sensitive area	Pending	Mitigation[c]
--	PASu31-SP1 to SP3	Unknown	Stone Piles	Culturally sensitive area	No further work	Alignment shift to avoid site

[a] The PHMC classifies stone pile sites as non-site cultural resources; it does not assign official site numbers to these resources or make recommendations on their NRHP eligibility.

[b] Five of 22 stone piles would be within the area of direct impact.

[c] One of two stone piles would be within the area of direct impact.

Constitution evaluated the historic site (Site 36SQ169) as potentially eligible for listing in the NRHP. The PHMC agrees with this recommendation. Constitution is conducting Phase II investigations to formally evaluate the site. If the investigations indicate that the site is eligible for listing in the NRHP, Constitution would consider modifications to the project to avoid the site. If avoidance is not feasible due to terrain or construction constraints, further investigations would be required to mitigate any adverse effects that would occur.

Constitution has not made recommendations on the NRHP eligibility of the cemetery or stone pile sites, but has provisionally designated them "culturally sensitive." The PHMC has not commented on the eligibility status of the cemetery. The PHMC considers the stone pile sites to be non-site cultural resources and does not comment on their NRHP-eligibility status. Constitution plans to modify the proposed access road to avoid the cemetery, and to modify the pipeline alignment to avoid four of the six stone pile sites. It has filed minor route variations designed to avoid three stone pile sites. It has not filed documentation that these route variations avoid the stone pile sites and it has not completed surveys of the route variations or filed the PHMC's comments on these route variations. It has not filed a route variation to avoid the fourth stone pile site. Portions of two stone pile sites cannot be completely avoided due to terrain and construction constraints. Five of 22 stone piles at one site (Site PASu44-SP1 to SP22) and 1 of 2 stone piles at another site (Site PASu236-SP1 to SP2) would be within the pipeline construction right-of-way and would be destroyed. Constitution is considering measures to mitigate impacts on these sites. Based on prior discussions between Constitution and the Oneida Nation, these measures could

potentially involve archaeological documentation of the stone piles to be impacted complemented by further contextual research of regional stone pile sites.

Constitution has not completed surveys for archaeological resources for property parcels for which access permission has not been granted, aboveground facilities, access roads, contractor yards, other facilities or extra workspace outside the survey corridor, or minor route variations proposed following issuance of the draft EIS. It has also not provided the results of deep testing of the Starucca Creek pipeline crossing.

Historic Aboveground Resources

Constitution has identified 30 historic aboveground resources within the area of impact for the proposed pipeline route in Pennsylvania (Zeoli 2013a). The PHMC has recommended that these historic aboveground resources are not eligible for listing in the NRHP. We concur. The pipeline would not affect any of these resources.

Two previously recorded historic railroads would also be crossed by Constitution's project. These railroads remain unevaluated. The PHMC determined that Constitution would not be required to document or evaluate railroads as historic aboveground resources for the project, but they would be required to consult with the PHMC to address potential direct impacts on existing railroad-related features. Constitution intends to cross underneath all rail beds by means of conventional bores, thereby avoiding direct impacts.

Aboveground historic resources surveys for aboveground facilities, access roads, contractor yards, or other facilities or extra workspace outside the survey corridor, and minor route variations are pending.

4.10.1.3 Results of Cultural Resource Investigations in New York

Archaeological Sites

Constitution has identified 94 archaeological sites within the New York portion of the project. Thirty-two sites are prehistoric, 27 sites are historic, 1 site is both prehistoric and historic, 3 sites are cemeteries, and 31 sites consist of one or more stone piles each. It is unclear whether the stone piles are associated with pre-contact Native American occupation of the area or with historic land use activity.

Thirty-six sites fall within the currently proposed pipeline construction right-of-way and one site is in the area of potential impact at the proposed Schoharie County contractor yard (table 4.10.1-2) (URS Corporation 2013b). These sites would be impacted by the project as currently proposed. They include 15 prehistoric sites, 10 historic sites, and 1 site that is both prehistoric and historic. Constitution has recommended 16 of these sites as potentially eligible for listing in the NRHP and 10 sites as not eligible. Sites that would be impacted also include 11 sites that consist of stone piles. Constitution has not made recommendations on the NRHP eligibility of the stone pile sites, but has provisionally designated them "culturally sensitive." The OPRHP agrees with these recommendations except that it recommends additional testing at three sites before commenting on their eligibility.

Constitution plans to modify the project to avoid five sites recommended as potentially eligible by shifting the pipeline alignment (two sites), modification of the Schoharie County contractor yard (one site), and more precisely defining site boundaries and installing protective barriers (two sites). Constitution plans to perform Phase II testing to formally evaluate the NRHP eligibility of the other 11 sites presently recommended potentially eligible. If Phase II testing were to indicate any of these sites are

eligible for listing in the NRHP, Constitution would consider modifications to the project to avoid them. If they could not be avoided due to terrain or construction constraints, further investigations would be required to mitigate any adverse effects that would occur. The OPRHP agrees with these recommendations. Constitution also plans to modify the project to avoid 11 stone pile sites classified as culturally sensitive.

TABLE 4.10.1-2
Archaeological Sites Within the Proposed Area of Direct Impact in New York

Site No.	Temporary No.	Temporal Period	Site Type	Constitution Recommended NRHP Evaluation	OPRHP NRHP Recommendation	Constitution Recommended Future Action
A00712.000035	NYBr202-Site1	Historic	Domestic	Potentially Eligible	Potentially Eligible	Alignment shift to avoid site
A00712.000040	NYBr22-Site1	Historic	Domestic	Potentially Eligible	Potentially Eligible	Refine site boundary/install protective barrier to avoid
A00712.000036	NYBr205-Site1	Historic	Agricultural	Potentially Eligible	Potentially Eligible	Refine site boundary/install protective barrier to avoid
--	NYBr25-Site1	Prehistoric	Isolate	Not Eligible	Not Eligible	No further work
A00712.000045	NYBr28-Site2	Historic	Trash Scatter	Not Eligible	Not Eligible	No further work
A00712.000037	NYBr213-Site1	Prehistoric	Open	Potentially Eligible	Potentially Eligible	Phase II testing
A00712.000048	NYBr31-Site1	Historic	Agricultural	Not Eligible	Not Eligible	No further work
--	NYBr32-Site1	Prehistoric	Isolate	Not Eligible	Not Eligible	No further work
A00712.000038	NYBr220-SP1	Unknown	Stone Pile	Culturally sensitive area	Culturally sensitive area	Alignment shift to avoid site
A00712.000039	NYBr220-SP2	Unknown	Stone Pile	Culturally sensitive area	Culturally sensitive area	Alignment shift to avoid site
A02517.000314	NYDe06-Site1	Prehistoric	Open	Not Eligible	Not Eligible	No further work
A02517.000316	NYDe07-Site2	Historic	Domestic	Potentially Eligible	Potentially Eligible	Alignment shift to avoid site
A02517.000326	NYDe07-SP1 & SP19 to SP20	Unknown	Stone Pile	Culturally sensitive area	Culturally sensitive area	Alignment shift to avoid site
A02517.000315	NYDe07-Site1	Historic	Unknown	Not Eligible	Not Eligible	No further work
A02517.000323	NYDe15-Site2	Prehistoric	Open	Not Eligible	Needs further testing	--
A02507.000155	NYDe29-SP1 to SP4	Unknown	Stone Piles	Culturally sensitive area	Culturally sensitive area	Alignment shift to avoid site
A02504.000051	NYDe31-SP1	Unknown	Stone Piles	Culturally sensitive area	Culturally sensitive area	Alignment shift to avoid site
A02504.000048	NYDe231-Site1	Prehistoric	Open	Potentially Eligible	Potentially Eligible	Phase II testing

TABLE 4.10.1-2 Archaeological Sites Within the Proposed Area of Direct Impact in New York						
Site No.	**Temporary No.**	**Temporal Period**	**Site Type**	**Constitution Recommended NRHP Evaluation**	**OPRHP NRHP Recommendation**	**Constitution Recommended Future Action**
A02504.000053	NYDe39-SP2 to SP4	Unknown	Stone Piles	Culturally sensitive area	Culturally sensitive area	Workspace modification to avoid site
A02504.000049	NYDe233-SP1 & SP2	Unknown	Stone Piles	Culturally sensitive area	Culturally sensitive area	Alignment shift to avoid site
A02504.000054	NYDe44-SP1 to SP4	Unknown	Stone Piles	Culturally sensitive area	Culturally sensitive area	Alignment shift to avoid site
A02504.000050	NYDe46-SP1	Unknown	Stone Piles	Culturally sensitive area	Culturally sensitive area	Alignment shift to avoid site
Pending	NYSc202-SP1 to SP2	Unknown	Stone Piles	Culturally sensitive area	Culturally sensitive area	Alignment shift to avoid site
A09509.000047	NYSc208-Site 1	Historic	Domestic	Not Eligible	Not Eligible	No further work
A09515.000047	NYSc62-SP8	Unknown	Stone Piles	Culturally sensitive area	Culturally sensitive area	Alignment shift to avoid site
A09511.000046	NYSc79-Site1	Historic	Domestic	Potentially Eligible	Potentially Eligible	Phase II testing
A09511.000045	NYSc300-Site1	Prehistoric	Open	Potentially Eligible	Potentially Eligible	Modification of contractor yard to avoid site
A09512.000227	NYSc232-Site1	Prehistoric	Open	Potentially Eligible	Potentially Eligible	Phase II testing
A09512.000232	NYSc61-Site1	Prehistoric	Open	Not Eligible	Needs further testing	--
A09512.000233	NYSc66-Site1	Historic	Domestic	Potentially Eligible	Potentially Eligible	Phase II testing
A09512.000234	NYSc67-Site1	Prehistoric	Open	Potentially Eligible	Potentially Eligible	Phase II testing
A09512.000235	NYSc68-Site1	Historic/ Prehistoric	Domestic/ Open	Potentially Eligible	Potentially Eligible	Phase II testing
A09512.000237	NYSc68-Site3	Prehistoric	Open	Potentially Eligible	Potentially Eligible	Phase II testing
A09512.000228	NYSc235-Site1	Prehistoric	Open	Potentially Eligible	Potentially Eligible	Phase II testing
A09512.000229	NYSc235-Site2	Prehistoric	Open	Potentially Eligible	Potentially Eligible	Phase II testing
A09512.000230	NYSc101-Site1	Prehistoric	Open	Potentially Eligible	Potentially Eligible	Phase II testing
A09512.000238	NYSc75-Site1	Prehistoric	Open	Not Eligible	Needs further testing	--

Constitution has filed minor route variations designed to avoid two potentially eligible archaeological sites and 11 stone pile sites. It has not filed documentation that these route variations avoid the sites and it has not completed surveys of the route variations or filed PHMC's comments on these route variations.

If after consultation with the OPRHP we determine that the other 10 sites within the construction right-of-way are not eligible for listing in the NRHP, the project would not affect those sites and no further work would be required. These consist of six prehistoric sites and four historic sites. The OPRHP has requested additional testing for three of the prehistoric sites.

Constitution has not completed surveys for archaeological resources for property parcels for which access permission has not been granted, aboveground facilities, access roads, contractor yards, other facilities or extra workspace outside the survey corridor, or minor route variations. It has also not provided the results of deep testing of the Schoharie Creek pipeline crossing. The OPRHP has also requested specific site protection plans for each archaeological site and stone pile to be avoided once project design has been finalized.

Historic Aboveground Resources

Constitution has identified 108 historic aboveground resources within the survey corridor for the New York portion of the proposed pipeline route (Zeoli 2013b). The OPRHP has recommended that 15 of these historic aboveground resources (all within the proposed area of impact) are eligible for listing in the NRHP and that 93 resources are not eligible. We concur. Constitution recommends that 2 NRHP-eligible properties would be adversely affected by the project and that the other 13 NRHP-eligible properties would not be adversely affected (table 4.10.1-3). As of November 2013, the OPRHP had not commented on these assessments of effect. Constitution would implement measures to avoid, minimize, or mitigate any anticipated adverse effects to eligible historic aboveground resources. Historic aboveground resources that are determined not eligible for listing in the NRHP would not be affected by the project. Constitution has not completed surveys for historic aboveground resources for 10 parcels for which access permission has not been granted, aboveground facilities, access roads, contractor yards, other facilities or extra workspace outside the survey corridor, or minor route variations. Constitution has also not completed analysis of visual impacts on historic aboveground resources.

TABLE 4.10.1-3
NRHP-Eligible Historic Aboveground Resources Within the Proposed Area of Impact in New York

Survey No.	Location	Resource Type	Preliminary Assessment of Effect
16059	504 Clark Rd., Sanford, NY	Farmstead	No adverse effect
4028	13709 County Hwy. 23,Sidney, NY	Farmstead	No adverse effect
4031	1381 Crane Hill Rd., Sidney, NY	Farm	Adverse effect
4092	10905 and 12679 State Hwy. 357, Franklin, NY	Farm	No adverse effect
4094	State Hwy. 357, Franklin, NY	Farm	No adverse effect
4095	13305 State Hwy. 357, Franklin, NY	Farmstead	No adverse effect
4142.001	2424 MacDougall Rd., Davenport, NY	Farmstead-School	No adverse effect
6149	713 Schoharie Hill Rd., Schoharie, NY	Farm	No adverse effect
6149.001	680 Schoharie Hill Rd., Schoharie, NY	Farm	No adverse effect
21015.002	245 Keyser Rd., Middleburgh, NY	Farmstead	No adverse effect
21017	3354 SR 145, Middleburgh, NY	Farm	Adverse effect
22005	322 Beards Hollow Rd., Summit, NY	Residential	No adverse effect
22006	429 Beards Hollow Rd., Summit, NY	Farmstead	No adverse effect
23021.002	239 SR 30A, Schoharie, NY	Farmstead	No adverse effect
23038	219 Westfall Rd., Wright, NY	Farmstead	No adverse effect

4.10.1.4 Native American Consultation

On April 5, 2102, Constitution initiated Native American consultation by sending a letter to 18 Indian tribes providing them an opportunity to comment on the project. These letters were sent to 15 federally recognized Indian tribes (Absentee-Shawnee Indian Tribe of Indians of Oklahoma, Cayuga Nation, Delaware Nation, Delaware Tribe of Indians, Eastern Shawnee Tribe of Oklahoma, Oneida Nation of New York, Oneida Tribe of Indians of Wisconsin, Onondaga Nation, Seneca Nation of Indians, Seneca-Cayuga Tribe of Oklahoma, Shawnee Tribe, St. Regis Band of Mohawk Indians of New York, Tonawanda Band of Seneca, Stockbridge-Munsee Band of the Mohican Nation of Wisconsin and Tuscarora Nation) and three tribes that are not federally recognized (Nanticoke Lenni-Lenape Indians of New Jersey, New Jersey Sand Hill Band of Lenape and Cherokee Indians, and the Sand Hill Indians).

As of September 2014, Constitution had received responses from seven tribes. The Delaware Tribe of Indians, Oneida Nation of New York, St. Regis Band of Mohawk Indians of New York, Stockbridge-Munsee Band of the Mohican Nation of Wisconsin, and New Jersey Sand Hill Band of Lenape and Cherokee Indians requested to consult on the project and to review cultural resources reports. The Shawnee Tribe requested to be contacted if archaeological materials are discovered. The Seneca Nation of Indians commented that it defers to the Oneida Nation of New York and the Mohawk Tribe for this project. No response has been received from eight tribes and the letter addressed to the Nanticoke Lenni-Lenape Indians of New Jersey was returned unopened. The Mashantucket Pequot Tribe, a federally recognized tribe, has also requested to consult on the project and to review cultural resource reports.

A field meeting was held among representatives of the Oneida Nation, the OPRHP, and Constitution on May 31, 2012. The purpose of the meeting was to allow the Oneida Nation Historic Resources Specialist to familiarize Constitution and the OPRHP with stone piles that the Oneida Nation believes may be Native American in origin. Constitution agreed to record the stone piles as archaeological resources. Constitution held a follow up meeting with the Oneida Nation on October 9, 2012, to discuss the stone features that had been recorded to that time. On April 9, 2013, representatives of the Oneida Nation, the OPRHP, and Constitution met in the field to examine some of the archaeological sites identified to date and to discuss the possible scope of future evaluation and treatment. During June 2012, the St. Regis Band of Mohawk Indians of New York also requested to meet with Constitution representatives to discuss the project.

Constitution has not filed any documentation indicating that they have provided copies of the cultural resources reports to the federally-recognized tribes that requested them. We will defer making any determinations of eligibility and effect for any archaeological sites until we have written confirmation that these tribes have had an opportunity to review and comment on the reports.

On September 7, 2012, the FERC sent copies of the NOI to the federally recognized tribes. On September 26, 2012, the FERC sent letters to the tribes requesting comments on Constitution's project and encouraging attendance at the FERC's public scoping meetings. The Stockbridge-Munsee Tribe responded on November 27, 2012 that while the Constitution project would be within Mohican territory, Mohican cultural sites within the project areas were not likely. The Oneida Nation requested to be a consulting party in their response on November 16, 2012. The Oneida Nation requested on June 3, 2014 to continue to consult on the project to address their concerns. As of September 2014, no other responses have been received.

4.10.2 Wright Interconnect Project

4.10.2.1 Cultural Resources Investigations

Iroquois conducted a Phase I cultural resources field survey for archaeological resources during 2013 (Hartgen Archeological Associates Inc. 2013). The Phase I survey examined three irregularly shaped parcels outside the existing fenced compressor station yard within the 53-acre property owned by Iroquois at the existing Wright Compressor Station. Iroquois also documented a small additional area surveyed during 2006 and 2007 for which the results were not previously fully reported or reviewed. Portions of the area proposed for use during the current project have been previously surveyed and were not resurveyed for the current project.

4.10.2.2 Results of Cultural Resource Investigations

Archaeological Sites

Iroquois identified a single archaeological site during its Phase I survey. The site is a small historic trash scatter that would potentially be impacted by the proposed compressor modification project. Iroquois recommends that the site is not eligible for listing in the NRHP. The OPRHP concluded that no archaeological sites would be affected as a result of Iroquois' project. We concur.

Historic Aboveground Resources

The records search identified three previously recorded historic aboveground resources within 1 mile of Iroquois' project. One of those resources has been determined as not eligible for listing in the NRHP. The other two resources remain unevaluated. Both are 19th-century farmhouses. Iroquois concluded that the proposed modifications to the existing Wright Compressor Station would not be visible from one resource and would not have a significant additional impact on the second resource. We concur.

4.10.2.3 Native American Consultation

Iroquois previously consulted with 10 federally recognized tribes during 2007 for its proposed 08/09 Expansion Project (Expansion Project FERC Docket No. CP07-457). The Expansion Project included pipeline looping within and adjacent to the existing compressor station as well as modifications to the compressor station. The tribes consulted included the Cayuga Nation of New York, Mashantucket Pequot Tribal Nation, Mohegan Tribe, Oneida Indian Nation of New York, Onondaga Nation of New York, Seneca Nation of New York, St. Regis Band of Mohawk Indians of New York, Stockbridge-Munsee Band of the Mohican Indians, Tonawanda Band of Seneca Indians of New York, and Tuscarora Nation of New York. Only the Tuscarora Nation of New York indicated that the portion of the Expansion Project within and adjacent to the compressor facilities was within the lands used by the ancestral Tuscarora Nation but they had no comments on the project or the FERC Environmental Assessment for the Expansion Project.

The FERC sent copies of the NOI to the tribes on July 10, 2013. The NOI requested comments on the proposed compressor facility modifications and invited attendance at the FERC's public scoping meetings. We have not received a response to our NOI from any of the tribes. On March 14, 2014, the Mashantucket Pequot Tribe requested to consult on the project and to review cultural resource reports.

4.10.3 Unanticipated Discovery Plans

The Applicants prepared state-specific plans for unanticipated discoveries that would be implemented in the event that cultural resources or human remains are encountered during construction. The plans provide for the notification of interested parties, including Indian tribes, in the event of any discovery. We requested revisions to the plans which the Applicants made and resubmitted. We find the revised plans to be acceptable.

4.10.4 General Impacts and Mitigation

Construction and operation of the pipeline and associated facilities could affect NRHP-eligible archaeological or historic aboveground resources. Direct effects could include destruction or damage to all, or a portion of an archaeological site, or alteration or removal of a historic aboveground resource. Indirect effects could include the introduction of visual, atmospheric, or audible elements that affect the setting or character of a historic aboveground resource. If NRHP-eligible resources are identified which cannot be avoided, Constitution would prepare treatment plans for review and approval by the appropriate parties, including the FERC, PHMC or the OPRHP, and tribes. The FERC would afford the ACHP an opportunity to comment in accordance with 36 CFR 800.6. Implementation of a treatment plan would only occur after certification of the projects (if they are reviewed and found acceptable by the Commission) and the FERC provides written notification to proceed.

To ensure that required cultural resources studies and consultation are completed for all proposed project components and the FERC's responsibilities under Section 106 of the NHPA are met, **we recommend that:**

- **Constitution should not begin implementation of any treatment plans/measures (including archaeological data recovery); construction of facilities; or use of staging, storage, or temporary work areas and new or to-be-improved access roads <u>until</u>:**

  a. Constitution files with the Secretary outstanding cultural resources survey and evaluation reports, any necessary treatment plans, site specific protection plans, and the PHMC's and OPRHP's comments, as appropriate, on the reports and plans;

  b. Constitution provides documentation that it has provided cultural resources reports to the Native American Tribes which have requested them;

  c. the ACHP is provided an opportunity to comment on the undertaking if historic properties would be adversely affected; and

  d. the FERC staff reviews and the Director of OEP approves all cultural resources survey reports and plans, and notifies Constitution in writing that treatment plans/mitigation measures may be implemented or construction may proceed.

  All material filed with the Secretary containing <u>location, character, and ownership information</u> about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: <u>"CONTAINS PRIVILEGED INFORMATION - DO NOT RELEASE."</u>

4.11 AIR QUALITY AND NOISE

4.11.1 Air Quality

Air quality would be affected by both construction and operation of the pipeline and facilities associated with Constitution's and Iroquois' projects. Iroquois would construct a compressor facility in the Town of Wright, Schoharie County, New York, which would facilitate natural gas deliveries from Constitution's project into the Iroquois and Tennessee Gas Pipeline (TGP) systems. This section describes the potential effects related to air quality that may result from implementation of the projects. In addition, existing laws and regulations relevant to air quality are described.

4.11.1.1 Existing Air Quality

The 1970 Clean Air Act, as amended in 1997 and 1990 (CAA), was enacted by Congress to protect the public from the adverse effects of air pollution. The EPA has developed National Ambient Air Quality Standards (NAAQS) to protect human health and welfare. Primary standards protect human health, including the health of "sensitive" populations, such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings. NAAQS have been developed for sulfur dioxide (SO_2), particulate matter (PM) with a diameter of 10 microns or less (PM_{10}), PM with a diameter of 2.5 microns or less ($PM_{2.5}$), nitrogen dioxide (NO_2), carbon monoxide (CO), ozone (O_3), and lead and are listed as a concentration level based on an averaging period. Ozone, unlike the other substances for which NAAQS have been established, is not a pollutant emitted into the air. It is, however, formed near ground level as a result of a chemical reaction between oxides of nitrogen (NO_X) and volatile organic compounds (VOCs) in the presence of sunlight. Subsequently, emissions of NO_X and VOCs are regulated by the EPA as they are considered "precursors" to the formation of ozone.

The current NAAQS are listed in table 4.11.1-1.

While states can promulgate more stringent standards than the NAAQS, both the PADEP and the NYSDEC have adopted all of the NAAQS as promulgated by the EPA.

Greenhouse gases (GHGs) can occur in the atmosphere naturally and as a result of human activities, such as the burning of fossil fuels. GHGs produced by fossil fuel combustion include carbon dioxide (CO_2), methane (CH_4), and nitrous oxide (N_2O). These GHGs and various fluorinated gases trap heat in the atmosphere and are the primary drivers of the increase in global mean temperature, known as global warming. GHG emissions 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, termed its global warming potential (GWP). Thus CO_2 has a GWP of 1. In comparison CH_4 has a GWP of 25, and N_2O has a GWP of 298[4].

[4] On November 29, 2013 the EPA revised the GWP for CH_4 from 21 to 25, and for N_2O from 310 to 298 to reflect more accurate GWPs from the Intergovernmental Panel for Climate Change's Fourth Assessment Report to better characterize the climate impacts of individual GHGs and to ensure continued consistency with other U.S. climate programs, including the Inventory of U.S. Greenhouse Gas Emissions and Sinks. More information is available in Volume 78 of the Federal Register, Issue 230.

TABLE 4.11.1-1 National Ambient Air Quality Standards			
		NAAQS	
Pollutant	**Averaging Period**	**Primary**	**Secondary**
SO_2	Annual[a,b]	Revoked	--
	24-hour[b,c]	Revoked	--
	3-hour[c]	--	0.5 ppm 1,300 µg/m^3
	1-hour[d,e]	75 ppb	
PM_{10}	24-hour[f]	150 µg/m^3	150 µg/m^3
$PM_{2.5}$	Annual[g]	12 µg/m^3	15 µg/m^3
	24-hour[h]	35 µg/m^3	35 µg/m^3
NO_2	Annual[a]	0.053 ppm (53 ppb) 100 µg/m^3	0.053 ppm (53 ppb) 100 µg/m^3
	1-hour[i]	100 ppb	--
CO	8-hour[c]	9 ppm 10,000 µg/m^3	--
	1-hour[c]	35 ppm 40,000 µg/m^3	--
O_3 (2008 Standard)	8-hour[j,k]	0.075 ppm	0.075 ppm
O_3 (1997 Standard)	8-hour[j,l]	0.080 ppm	0.080 ppm
O_3	1-hour[m,n]	Revoked	Revoked
Pb	Rolling 3-month[a]	0.15 µg/m^3	0.15 µg/m^3
	3-month[a]	1.5 µg/m^3	1.5 µg/m^3

TABLE 4.11.1-1 (continued)
National Ambient Air Quality Standards

Pollutant	Averaging Period	NAAQS Primary	NAAQS Secondary

[a] Not to be exceeded.
[b] The 24-hour and annual average primary standards for SO_2 were revoked in 2010.
[c] Not to be exceeded more than once per year.
[d] Compliance based on 3-year average of 99th percentile of the daily maximum 1-hour average at each monitor within an area.
[e] The 1-hour SO_2 standard was effective August 23, 2010.
[f] Not to be exceeded more than once per year on average over 3 years.
[g] Compliance based on 3-year average of weighted annual mean $PM_{2.5}$ concentrations at community-oriented monitors.
[h] Compliance based on 3-year average of 98th percentile of 24-hour concentrations at each population-oriented monitor within an area.
[i] Compliance based on 3-year average of the 98th percentile of the daily maximum 1-hour average at each monitor within an area.
[j] Compliance based on 3-year average of fourth-highest daily maximum 8-hour average ozone concentrations measured at each monitor within an area.
[k] The EPA is currently reconsidering the 8-hour ozone standard set in March 2008.
[l] The 1997 8-hour ozone standard and associated implementation rules remain in place as the transition to the 2008 standard occurs.
[m] Maximum 1-hour daily average not to be exceeded more than 1 day per calendar year on average.
[n] The 1-hour ozone standard has been revoked in all areas in which project activities would occur.

O_3 = ozone
Pb = lead
ppm = parts per million by volume
ppb = parts per billion by volume
$\mu g/m^3$ = micrograms per cubic meter
Source: EPA 2013d

Air quality control regions (AQCRs) are federally-designated areas with uniform air quality and where federal ambient air quality standards must be met. AQCRs were established by EPA and local agencies in accordance with Section 107 of the CAA as a means to implement the CAA and comply with the NAAQS through State Implementation Plans. Each AQCR develops an implementation plan for how ambient air quality standards would be achieved and maintained. Susquehanna County, Pennsylvania is within the Northeast Pennsylvania – Upper Delaware Valley Interstate AQCR; Broome, Chenango, Otsego, and Delaware Counties, New York are within the Southern Tier East Intrastate AQCR; and Schoharie County, New York is within the Hudson Valley Intrastate AQCR.

The EPA designates an attainment status for each area based on whether or not the area meets the NAAQS for criteria pollutants. Areas meeting the NAAQS are designated as attainment, while those that do not meet the NAAQS are considered as nonattainment. Areas which lack sufficient data to determine attainment are designated as unclassified. Areas previously designated as nonattainment that have since reached attainment are considered maintenance areas.

All areas for the two projects are designated as attainment or unclassified of the NAAQS with the exception of ozone. As Pennsylvania and New York are included in the Ozone Transport Region (OTR), the area is treated as moderate ozone nonattainment for VOCs and NO_X for New Source Review (NSR) permitting activities (EPA 2013e).

The majority of operational emissions from the two projects collectively would result from Iroquois' project. Air quality monitoring data, presented in table 4.11.1-2, characterizes ambient air quality conditions near the existing Wright Compressor Station. Data shows compliance with all ambient air quality standards.

TABLE 4.11.1-2
Wright Compressor Station Ambient Air Quality Monitoring Data[a]

Pollutant	Averaging Period	Maximum Concentration	Percent of NAAQS
SO_2[b]	24-hour	0.003 ppm	2.1
	Annual	NM	NA
PM_{10}[c]	24-hour	18.0 µg/m^3	12
$PM_{2.5}$[b]	24-hour	18.0 µg/m^3	51.4
	Annual	7.0 µg/m^3	50.7
NO_2[d]	1-hour	0.04 ppm	40.0
	Annual	NM	NA
CO[b]	1-hour	1.1 ppm	3.1
	8-hour	0.7 ppm	7.8
Pb[d,e]	3-month	0.063 µg/m^3	42.0
O_3[b]	8-hour	0.073 ppm	97.3

[a] EPA 2012a. Since air monitors are not located in the Schoharie County project area, these 2012 values are from Albany County sites, except as noted below.

[b] Site 360010012, Loudonville Reservoir, Albany, NY

[c] Site 360337003, Hogansburg, Franklin County, NY

[d] Site 360713001, Ball Corporation, Wallkill, Orange County, NY

[e] 3-month average monitoring values currently are not available. The tabulated value represents a maximum 24-hour value.

ppm = parts per million by volume

µg/m^3 = micrograms per cubic meter

NM = not monitored in the State of New York

NA = not applicable

4.11.1.2 Air Quality Regulatory Requirements

The CAA, 42 USC 7401, amended in 1977 and 1990 and codified at 40 CFR 50-99, comprises the basic federal statute and regulation governing air pollution. The provisions of the CAA that are potentially relevant to the proposed projects include the following:

- Prevention of Significant Deterioration and Nonattainment New Source Review;
- Federal Class I Area Protection;
- Title V Permitting;
- Federal Mandatory Greenhouse Gas Reporting Regulations;
- National Emission Standards for Hazardous Air Pollutants;
- New Source Performance Standards;

- Clean Air Act General Conformity; and
- State Air Quality Regulations.

The majority of emissions associated with Constitution's project would be temporary, resulting from construction activities. Emissions during operations would be less than any permit triggers, therefore the only applicable federal regulation is the CAA's general conformity rule.

Iroquois' compressor facility would result in emissions from construction as well as operation activities, therefore the federal and state regulations are discussed below.

Prevention of Significant Deterioration and Nonattainment New Source Review

NSR refers to the pre-construction permitting programs under Parts C and D of the CAA that must be satisfied before construction can begin on new major sources or major modifications are made to existing major sources located in attainment or unclassified areas. A Prevention of Significant Deterioration (PSD) review applies to new major sources or major modifications of existing major sources located in an attainment area. This review process is intended to prevent new air emission sources from causing existing air quality to deteriorate beyond acceptable levels as codified in the federal regulations. For new or modified major sources located in non-attainment areas, the Non-attainment New Source Review (NNSR) program is implemented for the pollutants for which the area is classified as non-attainment.

The PSD regulations apply to proposed new major sources or major modifications to existing major sources. The PSD regulations (40 CFR 52.21) define a major source as any source type belonging to a list of named source categories that emit or have the potential-to-emit (PTE) 100 tons per year (tpy) or more of any regulated pollutant or, for any source not on the list of named source categories, a PTE of any regulated pollutant equal to or greater than 250 tpy. Modifications to existing facilities have lower pollutant thresholds, known as significant emission rates (100 tpy for CO; 40 tpy for NO_x, VOCs, and SO_2 [each]; 15 tpy for PM_{10}; and 10 tpy for $PM_{2.5}$), above which PSD review is triggered. The projects would not include facilities or operations included on the list of named source categories to which the 100-tpy trigger applies; therefore, the 250-tpy threshold applies.

The Wright Compressor Station is located in the Northeast OTR and, therefore, is subject to more stringent NNSR applicability thresholds for ozone precursors (NO_x and VOC). The PSD regulatory thresholds apply to the criteria pollutants in attainment (CO, PM_{10}, $PM_{2.5}$, and SO_2). The facility currently exists as a minor source under the NNSR program because VOC and NO_x emissions are below their respective major source thresholds. The facility is also currently a minor source with respect to the PSD program. The modified Wright Compressor Station would remain a minor source with respect to NNSR and PSD for all criteria pollutants and would therefore not be subject to NNSR or PSD for these pollutants.

On May 13, 2010, the EPA issued the PSD GHG Tailoring Rule. This rule intends to account for facilities that represent an estimated 70 percent of GHG emissions from stationary sources while shielding smaller sources such as apartment buildings and schools. Beginning on July 1, 2011, a new industrial facility is subject to PSD review for GHGs if it: (1) will be a major source for at least one non-GHG pollutant and will have the PTE at least 75,000 tpy of CO2e; or (2) has the PTE 100,000 tpy of CO2e and at least 100 tpy or 250 tpy GHG on a mass basis (depending on whether the facility is a listed source category under PSD). Any existing industrial facility is subject to PSD review for GHGs if: (1) it is already a major source of a non-GHG pollutant and will increase its GHG emissions by 75,000 tpy CO2e or more; (2) the existing potential GHGs emissions are equal to or greater than 100,000 tpy CO2e and

100/250 tpy on a mass basis (depending on the source category) and GHG emissions as a result of the Project will increase by 75,000 tpy or more; or (3) the existing source is minor for PSD (including GHGs) and the modification alone will result in equal to or greater than 100,000 tpy CO2e and 100/250 tpy of GHGs on a mass basis. However, in response to a June 23, 2014 Supreme Court decision on the PSD GHG Tailoring Rule, EPA issued guidance on July 24, 2014, indicating that they will no longer require PSD review for sources that trigger PSD based solely on GHGs (EPA 2014a). NYSDEC regulations still contain the PSD GHG Tailoring Rule requirements as of September 25, 2014.

GHG emissions were evaluated to determine if any of the PSD GHG Tailoring Rule thresholds were triggered requiring a PSD permit. The proposed modification alone would result in 98,306 tpy (including combustion, vented, and fugitive GHG emissions) of CO_2e, below 100,000-tpy threshold. Also shown in table 4.11.1-6, the existing Wright Compressor Station is not a major PSD source for any criteria pollutant, including GHGs. Therefore, PSD permitting for GHG emissions was not triggered for the Wright Compressor Station modification.

Federal Class I Area Protection

The CAA Amendments of 1977 designated certain areas of the United States as Mandatory Federal Class I (Class I) Areas, based on their air quality being considered a special feature of the area (e.g., national parks, wilderness areas, national forests). Class I Areas are protected against several types of pollution, including elevated levels of criteria pollutant concentrations, visibility degradation, and acid deposition. If the new major source or major modification is located within 62 miles (100 kilometers) of a Class I Area, the facility is required to notify the appropriate federal officials and assess potential impacts of that project on the nearby Class I Area. For major sources that are located within 6.2 miles (10 kilometers) from a Class I area, ambient air pollutant impacts must be assessed for any project emission increases.

There are no Class I areas within 62 miles of either project, however, the Lye Brook Wilderness is located approximately 65 miles northeast of the proposed Westfall Road M&R Station and 70 miles northeast of the proposed compressor facility. Because the Wright Compressor Station modification would be below the PSD major modification thresholds and the station is more than 62 miles from the nearest Class I area, additional PSD Class I analysis was not required.

Title V Permitting

Title V of the CAA requires each state to develop an operating permit program. The operating permit program is implemented through Title 40 CFR Part 70 and establishes applicability thresholds for criteria pollutants and HAPs. The major source threshold level for an air emission source is 100 tpy for criteria pollutants. The major source HAP thresholds for a source are 10 tpy of any single HAP or 25 tpy of all HAPs in aggregate. If a facility's PTE exceeds one or more of these thresholds, the facility is considered a "major source." The EPA also promulgated the Title V GHG Tailoring Rule, which established permitting thresholds for GHG emissions under the Title V program.[5] Sources with an existing Title V permit or new sources obtaining a Title V permit for non-GHG pollutants are required to address GHGs. New sources and existing sources not previously subject to Title V that have a PTE equal to or greater than 100,000 tpy CO_2e would become subject to Title V requirements. Similar to the PSD

[5] Iroquois submitted a Minor Source Permit Modification application for the proposed turbines on July 26, 2013. In order to minimize agency review time, Iroquois included in this application the forms, information, statements, and certifications required for Title V review.

GHG Tailoring Rule, EPA issued guidance on July 24, 2014 indicating that they will no longer require Title V review for sources that trigger Title V based solely on GHGs (EPA 2014a).

As shown in Table 4.11.1-6, emissions of CO_2e and CO are above the Title V major threshold. Therefore, operation of the proposed turbines at Iroquois' facility would result in the existing Wright Compressor Station becoming a major source requiring a Title V permit at start-up of the new compressors. As discussed previously, the proposed modifications to the Wright Compressor Station do not trigger PSD or NNSR review, thus the station would still be permitted and regulated as a minor source and minor modification with regard to emission controls and other requirements.[6]

Federal Mandatory Greenhouse Gas Reporting Regulations

On September 22, 2009, the EPA issued the final Mandatory Reporting of GHG Rule. This rule established the following reporting categories that may apply to the Wright Compressor Station modification: general stationary fuel combustion sources (Subpart C), petroleum and natural gas systems (Subpart W), and suppliers of natural gas (Subpart NN). The mandatory GHG reporting threshold for the Wright Compressor Station is 25,000 metric tons of annual CO_2e emissions, not including emergency generator GHG emissions. Iroquois has been reporting GHG emissions since 2011, as required, and would continue to do so with the addition of the proposed compressor facility.

National Emission Standards for Hazardous Air Pollutants

National Emission Standard for Hazardous Air Pollutants (NESHAP), codified in 40 CFR 61 and 63, regulates hazardous air pollutant (HAP) emissions. Part 61 defines requirements for industries that emit specific HAPs. Part 61 was promulgated prior to the 1990 CAA Amendments and may be superseded in Part 63. Natural gas transmission and storage or compressor stations are not among the industries listed in Part 61 and do not emit any pollutants listed in Part 61. Therefore, the Wright Compressor Station modification is not subject to 40 CFR 61 of the NESHAP requirements.

The 1990 CAA Amendments established a list of 189 HAPs (currently 187 HAPs), resulting in the promulgation of Part 63. Part 63, also known as Maximum Achievable Control Technology (MACT) standards, defines major source categories that emit HAPs above Title V major source thresholds. The major source threshold is 10 tpy of any single HAP or 25 tpy for all combined HAP emissions. The Wright Compressor Station is an existing minor source (or area source) for HAPs.

Subpart ZZZZ of 40 CFR 63 NESHAPs applies to the existing Wright Compressor Station's emergency electrical power generator. Iroquois would install a similar generator for the proposed compressor facility. These units are considered emergency generator engines because they would not operate more than 100 hours annually for non-emergency activities. The unit that would be installed as part of the compressor facility would comply with Subpart ZZZZ in the same manner as the existing Wright Compressor Station units.

New Source Performance Standards

The New Source Performance Standards (NSPS), codified in 40 CFR 60, apply to new, modified, or reconstructed stationary sources that meet or exceed specified applicability thresholds.

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[6] Iroquois submitted a Minor Source Permit Modification application for the proposed turbines on July 26, 2013. In order to minimize agency review time, Iroquois included in this application the forms, information, statements, and certifications required for Title V review.

The proposed turbines for the compressor facility would be subject to NSPS Subpart KKKK as their fuel heat input ratings would exceed 10 million Btus per hour, and their manufacturing date would be after February 18, 2005. Subpart KKKK regulates emissions of NO_x and SO_2. The engines would comply with Subpart KKKK based on maximum NO_X concentrations of 15 parts per million (ppm) which is below the 25 ppm Subpart KKKK limit, and because they would be limited to natural gas fuel. NO_X concentrations would be confirmed at least biennially by stack testing as required by Subpart KKKK. Iroquois would comply with the Subpart KKKK SO_2 limit by using pipeline-quality natural gas fuel for the proposed compressor units. Iroquois would meet all applicable Subpart KKKK requirements for monitoring, recordkeeping, and reporting.

Clean Air Act General Conformity

The General Conformity Rule is codified in 40 CFR 93, Subpart B, Determining Conformity of General Federal Actions to State or Federal Implementation Plans. The CAA's general conformity rule was developed to ensure that federal actions in nonattainment and maintenance areas do not impede states' attainment of the NAAQS. The general conformity rule entails both an applicability analysis and a subsequent conformity determination. 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 area is in nonattainment or maintenance. For general conformity purposes, nonattainment designations based solely on being part of an Ozone Transport Region are not applicable. 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. Emissions for criteria pollutant levels from federal actions in a nonattainment or maintenance area are listed in table 4.11.1-3.

TABLE 4.11.1-3
General Conformity Applicability Thresholds

Designated Pollutant	Designation	Threshold (tpy)	Pollutant or Precursor
O_3	Serious nonattainment	50	VOC or NO_X
	Severe nonattainment	25	VOC or NO_X
	Extreme nonattainment	10	VOC or NO_X
	Other nonattainment areas outside an OTR	100	VOC or NO_X
	Other nonattainment areas within an OTR	50	VOC
	Other nonattainment areas within an OTR	100	NO_X
$PM_{2.5}$	Nonattainment	100	$PM_{2.5}$, SO_2 or NO_X
PM_{10}	Serious Nonattainment	70	PM_{10}
	Moderate Nonattainment	100	PM_{10}
CO	All nonattainment areas	100	CO
OTR = Ozone Transport Region			

For Constitution's and Iroquois' projects, Schoharie County, New York requires an applicability analysis because it is designated nonattainment for the 1997 8-hour ozone standard. As the designation is based on the ozone standard, its precursors VOC and NO_X need to be evaluated. Operation of the

modified Wright Compressor Station would be exempt from the General Conformity analysis because the proposed facilities would be subject to minor source NNSR requirements as part of the NYSDEC state Facility Permit. Emissions from construction of Constitution's facilities and Iroquois' compressor station were calculated for comparison with the general conformity *de minimis* emission thresholds, and are provided in table 4.11.1-4. Because the estimated construction emissions for the projects within Schoharie County would be below *de minimis* thresholds, a general conformity determination is not required.[7]

TABLE 4.11.1-4
Schoharie County Construction Emissions and General Conformity Thresholds for the Projects

County, State	Source(s)	NO_X (tons)	VOC (tons)
Schoharie, New York	Projects Construction	69.3	10.0
General Conformity Threshold		100	50
Below Conformity Threshold		Yes	Yes

Should the project construction schedule change, there is a possibility that emissions may exceed the 100 tpy threshold for conformity for a single year. The General Conformity regulations require that, if an agency has originally determined that a General Conformity Determination is not necessary, but changes in the projects' result in the total emissions being above the General Conformity applicability thresholds, then the agency must at that time make a General Conformity Determination. Because the projects' construction emissions are conservatively estimated and only 70 percent of the applicability threshold we conclude that a Construction Emission Plan is not needed.

State Air Quality Regulations

Constitution would apply control measures to minimize fugitive dust emissions where necessary during construction in accordance with title 25 of the Pennsylvania Code, section 123.1. These mitigation measures to minimize fugitive dust emissions would include, but would not be limited to the following:

- use, where possible, of water or chemicals (e.g., magnesium chloride) for dust control during construction operations, the grading of roads, or the clearing of land;
- application of asphalt, oil, water, or suitable chemical on dirt roads, material stockpiles, and other surfaces which may give rise to airborne dusts;
- maintenance of roadways; and
- prompt removal of earth or other material from paved streets onto which earth or other material has been transported by trucking or earth moving equipment, erosion by water, or other means.

Emissions resulting from construction and operation of Iroquois' compressor facility are prohibited from preventing New York State's attainment of the NAAQS, and must adhere to the SIPs. This is demonstrated with the air dispersion modeling results discussed below. New York's SIP is based on federal and state regulations for emissions from stationary sources, mobile construction vehicles and equipment, facility coating, and other potential activities proposed for the compressor facility and the

[7] Construction emissions for Schoharie County were reassessed after Constitution's November 2013 filing to reflect refined construction procedures (i.e., a better model), resulting in lower emissions for all pollutants. Emissions for the remaining counties were not refined and reflect the worst case construction scenario.

portion of Constitution's project in New York. The compressor facility and the New York portion of Constitution's project would comply with the SIP as required by the following regulations, where applicable:

- NYCRR Parts 200 and 201-1 through 201-9: Prevention and Control of Air Contamination and Air Pollution;
- NYCRR Part 202: Emissions Verification;
- NYCRR Part 205: Architectural and Industrial Maintenance Coatings;
- NYCRR Part 211: General Prohibitions;
- NYCRR Part 215: Open Fires;
- NYCRR Part 217: Motor Vehicle Emissions;
- NYCRR Part 218: Emission Standards for Motor Vehicles and Motor Vehicle Engines;
- NYCRR Part 225: Fuel Composition and Use;
- NYCRR Part 227-1: Stationary Combustion Installations;
- NYCRR Part 228: Surface Coating Processes, Commercial and Industrial Adhesives, Sealants and Primers;
- NYCRR Part 231-5: New Major Facilities And Modifications To Existing Non-Major Facilities In Nonattainment Areas, And Attainment Areas Of The State Within The Ozone Transport Region;
- NYCRR Part 231-7: New Major Facilities and Modifications to Existing Non-major Facilities in Attainment Areas (Prevention of Significant Deterioration);
- NYCRR 239: Portable Fuel Container Spillage Control; and
- NYCRR 257: Air Quality Standards.

4.11.1.3 Air Emission Impacts and Mitigation

Construction Emissions

Construction of the projects would result in temporary increases of pollutant emissions from the use of diesel- and gas-fueled equipment, as well as temporary increases in fugitive dust emissions from earth/roadway surface disturbance. Indirect emissions would be generated from delivery vehicles and vehicles associated with construction workers traveling to and from work sites.

The volume of fugitive dust generated would be dependent upon the area disturbed and the type of construction activity, along with the soil's silt and moisture content, wind speed, and the nature of vehicular/equipment traffic. Fugitive particulate matter emissions for PM_{10} and $PM_{2.5}$ were calculated using the EPA AP-42 recommended emission factors for heavy construction equipment, combined with estimates of the extent and duration of active surface disturbance during construction. These emission factors tend to be conservative and can overestimate potential fugitive dust generated by the projects, and demonstrate what is considered the worst-case scenario.

Emissions of NO_X, CO, PM_{10}, $PM_{2.5}$, SO_2, VOC, GHGs, and HAPs from Constitution's construction equipment were calculated based on the proposed non-road and on-road equipment and their use levels. Diesel and gasoline on-road vehicle emission factors used the EPA's Motor Vehicle Emission

Simulator (EPA MOVES 2010b) model, while diesel and gasoline non-road equipment engine emission factors used the EPA's NONROAD model.

Iroquois estimated emissions from equipment as well as construction and worker vehicles using emission factors from appropriate EPA models such as Mobile6.2 and Non-Road Version 2008 and the number of pieces and type of equipment and their hours of operation. Fugitive dust emissions were calculated using the EPA's AP-42 applicable emission factors for construction and paved roads and do not take into account any mitigation applied. Therefore, actual fugitive dust emissions would be expected to be less. The estimated emissions for both projects are listed in table 4.11.1-5 below.

TABLE 4.11.1-5
Estimated Construction Emissions (tons)

Project	NO_X	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	GHGs	HAPs
Constitution Pipeline	336.0	54.8	1,204.1	1.2	1,126.5	182.6	60,856.7	4.8
Modified Wright Compressor Station	0.13	0.01	0.06	0.004	5.01	0.71	25.2	0.001

Emissions resulting from diesel- and gasoline-fueled construction equipment and vehicle engines for both projects would be minimized by federal design standards required at the time of manufacture of the equipment and vehicles, and would comply with the EPA's mobile and non-road emission regulations found in 40 CFR Parts 85, 86, and 89. Dust suppression techniques would be implemented in all construction work areas near residential and commercial areas to reduce potential impacts of fugitive dust emissions. In addition, contractors and employees would be encouraged by Iroquois to minimize vehicle and equipment idling time to the extent practical during construction activities to further minimize emissions.

In order to comply with 6 NYCRR Part 215, no open burning of construction material would take place. Timber would be trimmed, cut, and removed from the area or would be chipped or disposed of according to applicable regulations at commercial facilities or other approved locations.

Mitigation measures that would be used during construction activities are detailed in Constitution's state-specific ECPs and would include:

- proper maintenance of construction equipment;
- covering of open-bodied trucks while transporting materials likely to produce airborne dusts;
- watering construction sites (or use of other approved dust suppressant) for fugitive dust control, if necessary; and
- minimizing soil disturbance to areas necessary for construction.

Constitution and Iroquois would comply with the applicable Pennsylvania and New York regulation regarding construction emissions. Like Constitution's project, the compressor facility emissions during construction would be temporary and would be minimized by mitigation measures described above. Impacts are not expected to result in a significant impact on local or regional air quality.

Operation Emissions

Emissions generated during operation of Constitution's project would be minimal, limited to emissions from maintenance vehicles and equipment and fugitive CO_2e emissions. There are no compressors, dehydrators, line heaters, or other emission-generating combustion equipment or odorization facilities proposed for Constitution's project. Any emissions resulting from operation of Constitution's project would not be expected to have significant impacts on local or regional air quality.

Operation of Iroquois' facility would generate primarily NO_X, CO, GHG, and PM emissions, with lesser amounts of SO_2, VOC, and HAP emissions. Air pollutant emissions were calculated based on manufacturer data, from emission factors obtained from the EPA's Compilation of Air Pollutant Emission Factors, and from engineering mass balance calculations. Table 4.11.1-6 shows the potential emissions for the proposed turbines, combined with emissions from the existing turbines as well as the existing and proposed auxiliary fuel-burning equipment, and compared with major source thresholds.

Potential emissions of the proposed natural gas combustion turbines are based on incorporating $SoLoNO_X$ (i.e., dry low NO_X or lean pre-mix) combustors in continuous service at maximum load conditions, and at a worst case annual average ambient temperature of zero degrees Fahrenheit. Similarly, all other fuel-burning equipment, except for the auxiliary power units, is assumed to operate at full load for 24 hours per day and 365 days per year. The auxiliary power units would be restricted to operating only during periodic testing and maintenance or when purchased electrical power is interrupted. Potential auxiliary power unit emissions represent operations at full load for no more than 500 hours per year each. Manufacturers of the turbines guarantee NO_X and VOC emissions below 15 ppm and CO below 25 ppm, and recommend a PM emission factor of 0.018 pounds per million Btus of fuel heat input. While Best Available Control Technology (BACT) is not required for the proposed turbines, the pollutant emission concentrations and rates are as strict as BACT requirements. Using low NO_X turbine combustors, the emission levels listed would be achieved with normal engine maintenance and operation according to the manufacturer's recommendations while consuming only pipeline quality natural gas fuel. Permitted emission limits would be monitored through performance testing for the turbines following start-up, and at least every other year during operation as required by federal. Like Constitution's project, any emissions resulting from operation of the compressor facility would not be expected to have significant impacts on local or regional air quality.

We received comments regarding fugitive GHG emissions. We calculated that the operation of the existing Wright Compressor station and proposed modifications would potentially result in 28,021 tpy of CO_2e due to venting (i.e., blowdowns for maintenance and emergencies) and fugitive GHG emissions (i.e., to unintended leakage from compressor seals). Similarly, we calculated that operation of Constitution's pipeline (consisting only of vented and fugitive emissions from the pipeline) would potentially result in 4,997 tpy of CO_2e[8].

[8] INGAA 2005

TABLE 4.11.1-6
Combined Existing Wright Compressor Station and Proposed Compressor Station Operations Emissions (tpy)

Emissions Source	NO_X	CO	VOC	PM	$PM_{2.5}$	PM_{10}	SO_2	CO_2e	HAPs
Existing Solar Taurus 60 Turbines (2)	51.6	62.8	0.9	9.3	9.3	0	0.02	62,051	0.269
Existing emergency generator	0.5	0.3	0.1	0.04	0.036	0.004	0.0005	98	1.511
Existing compressor building heat water/glycol boiler	2.2	0.9	0.1	0.2	0.2	0	0.0142	2,557	0.213
Existing office forced air furnace	0.02	0.01	0.002	0.002	0.002	0	0.0002	31	0.003
Existing control room forced air furnace	0.04	0.02	0.002	0.003	0.003	0	0.0002	41	0.003
Existing compressor dry gas seals leakage (2)	NA	NA	2.6	NA	NA	NA	NA	11,702	0.000
Existing domestic water heater	0.02	0.008	0.001	0.001	0.001	0	0.0001	20	0.003
Existing 4 control building unit space heaters	0.11	0.046	0.006	0.009	0.009	0	0.0007	123	0.010
Existing station blowdowns	NA	NA	NA	NA	NA	NA	NA	2,925	NA
Existing station fugitives	NA	NA	NA	NA	NA	NA	NA	1,692	NA
Existing facilities total	**54.5**	**64.1**	**3.9**	**9.6**	**9.6**	**0.0**	**0.0**	**81,240**	**2.0**
Proposed Solar Taurus 70 Turbines (2)	43.7	44.4	8.8	13.1	13.1	0	0.03	86,236	0.361
Proposed emergency generator	1.4	2.8	0.7	0.03	0.027	0.003	0.0004	368	5.681
Proposed compressor dry gas seals leakage (2)	NA	NA	2.6	NA	NA	NA	NA	11,702	0.000
Proposed facilities total	**45.1**	**47.2**	**12.1**	**13.1**	**13.1**	**0.0**	**0.0**	**97,220**	**6.0**
Combined total	**99.6**	**111.3**	**16.0**	**22.7**	**22.7**	**0.0**	**0.1**	**176,945**	**8.1**
"Major" PSD/NNSR thresholds	**100**	**250**	**50**	**250**	**250**	**250**	**250**	**100,000**	**25**
PSD/NNSR Major (Yes/No)	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**	**No**
"Major" Title V thresholds	**100**	**100**	**100**	**100**	**100**	**100**	**100**	**100,000**	**25**
Title V Major (Yes/No)	**No**	**Yes**	**No**	**No**	**No**	**No**	**No**	**Yes**	**No**

Sources: Iroquois' Minor Source Modification/Title V Application, NYSDEC ID Number 4-4350-0008, July 26, 2013; independent calculations of CO2e based on INGAA 2005; and independent calculations of PM2.5/PM10 based on AP-42 guidance on particle size distribution (EPA 1995).

Air Dispersion Modeling

Air dispersion modeling was conducted in support of Iroquois' air permit application and serves to demonstrate compliance with (1) the NAAQS for criteria pollutants; and (2) the NYSDEC's guideline concentrations for toxic and hazardous air pollutants. The modeling analysis adheres to the NYSDEC's "DAR-10: Guidelines for Dispersion Modeling Procedures for Air Quality Impact Analysis" and the EPA's "Guideline on Air Quality Models". The analysis was conducted in accordance with the modeling protocol submitted to the NYSDEC in June 2013 and in accordance with comments provided by the NYSDEC.

The EPA's most recent version of AERMOD (Version 12345) was used in the analysis, with the regulatory default options and 5 years (2008 to 2012) of hourly meteorological surface data and upper air observations collected at Albany County Airport in Albany, New York.

Step 1 of modeling is to demonstrate compliance with the NAAQS by comparing the maximum ambient air quality impacts from new source emissions from the compressor facility with the EPA's Significant Impact Levels (SILs) for SO_2, $PM_{2.5}$, PM_{10}, NO_2, and CO. If the maximum modeled concentrations are below the SILs then compliance with the NAAQS is demonstrated and no further analysis is required. However, if the modeled impact for any pollutant and/or averaging period exceeds the applicable SILs for the pollutant, then the project proponent must take a second step to conduct a cumulative modeling analysis to demonstrate compliance with the NAAQS. Cumulative modeling would require the following to be considered: (1) the proposed compressor turbines and ancillary equipment; (2) existing facility sources; (3) other nearby background sources identified by the NYSDEC; and (4) monitored background concentrations to represent non-modeled sources.

As shown in table 4.11.1-7, the maximum modeled impacts for Iroquois' compressor facility sources exceed SILs for the 1-hour NO_2 and 24-hour $PM_{2.5}$ NAAQS. No further analysis was required for pollutants and/or averaging periods with levels below SILs. Based on the exceedance, a cumulative analysis was conducted using representative background concentrations based on the compressor station's rural location and as approved by the NYSDEC. Iroquois requested off-site source information from the NYSDEC to include in their cumulative modeling. The NYSDEC did not identify any significant off-site sources, pending applications, or permitted but not yet constructed sources for inclusion. As shown in table 4.11.1-8, the cumulative modeling analysis demonstrates that emissions would not cause or contribute to a violation of any NAAQS.

TABLE 4.11.1-7
Air Dispersion Modeling Results for Wright Compressor Station Modification

Pollutant	Averaging Period	Modeled Maximum Concentration[a] ($\mu g/m^3$)	Significant Impact Level ($\mu g/m^3$)
NO_2	1-hour	11.20	7.5
	Annual	0.40	1
CO	1-hour	359.73	2,000
	8-hour	51.65	500
PM_{10}	24-hour	3.13	5
	Annual	0.10	1
$PM_{2.5}$	24-hour	1.70	1.2
	Annual	0.10	0.3
SO_2	24-hour	0.01	5
	Annual	0.001	1

[a] All concentrations are the maximum modeled over the 5-year period with the exception of the 24-hour $PM_{2.5}$ and 1-hour NO_2 & SO_2 concentrations which are the maximum 5-year average values.

$\mu g/m^3$ = micrograms per cubic meter

TABLE 4.11.1-8 Air Dispersion Modeling Results for Cumulative Impacts – Wright Compressor Station Modification						
Pollutant	**Averaging Period**	**Modeled Maximum Concentration[a] (μg/m^3)**	**Background Concentration (μg/m^3)**	**Total (μg/m^3)**	**NAAQS (μg/m^3)**	**Percent of NAAQS**
NO_2	1-hour	20.07	97.20	117.27	188	62%
$PM_{2.5}$	24-hour	1.65	21.13	22.78	35	65%

[a] 1-hour NO_2 is the 98th percentile (8th-highest) of daily distribution of maximum 1-hour modeled concentrations. 24-hour $PM_{2.5}$ is conservatively based on the 99th percentile (4th highest) 5-year average 24-hour concentration.

μg/m^3 = micrograms per cubic meter

Modeling of air toxics emissions was also conducted for the compressor facility's proposed combustion turbines and emergency generator in accordance with the NYSDEC's Air Guide-1 procedures using short-term and annual guideline concentrations to assess impacts. The initial screening level approach for modeling air toxics used an emission rate of 1 gram per second in AERMOD for individual runs and combined the greatest impacts over the five years of meteorology data for all sources. This approach is extremely conservative as the highest impacts for each source do not occur at the same receptor or during same time period. All short-term and annual guideline concentrations were below screening levels and further analysis was not required (table 4.11.1-9).

TABLE 4.11.1-9 Short-term and Annual Guideline Concentrations Analysis for Hazardous Air Pollutants				
Hazardous Air Pollutants	**Modeled 1-hour Concentration (μg/m^3)**	**Short-term Guideline Concentrations (μg/m^3)**	**Modeled Annual Concentration (μg/m^3)**	**Annual Guideline Concentrations (μg/m^3)**
1,1 Dichloroethane	0.005	N/A	0.00001	0.63
1,1,2 Trichloroethane	0.006	N/A	0.00002	1.4
1,1,2,2 Tetrachloroethane	0.010	N/A	0.00003	16
1,2 Dichloroethane	0.005	N/A	0.00001	0.038
1,2 Dichloropropane	0.005	N/A	0.00001	3,000
1,3 Dichloropropene	0.005	N/A	0.00001	0.25
1,3 butadiene	0.271	N/A	0.001	0.033
Acetaldehyde	1.152	4,500	0.003	0.45
Acrolein	1.075	2.5	0.003	0.35
Benzene	0.649	1,300	0.002	0.13
Butyr/isobutyraldehyde	0.020	86	0.0001	N/A
Carbon Tetrachloride	0.007	1,900	0.00002	0.17
Chlorobenzene	0.005	N/A	0.00001	110
Chloroform	0.006	150	0.00001	0.043
Ethane	28.731	N/A	0.075	2,900
Ethylbenzene	0.020	54,000	0.0002	1,000
Ethylene Dibromide	0.009	N/A	0.00002	0.0017
Formaldehyde	8.596	30	0.026	0.06

TABLE 4.11.1-9 (continued) Short-term and Annual Guideline Concentrations Analysis for Hazardous Air Pollutants				
Hazardous Air Pollutants	**Modeled 1-hour Concentration (μg/m^3)**	**Short-term Guideline Concentrations (μg/m^3)**	**Modeled Annual Concentration (μg/m^3)**	**Annual Guideline Concentrations (μg/m^3)**
Methanol	1.249	33,000	0.003	4,000
Methylene Chloride	0.017	None	0.00004	29
Napthalene	0.040	7,900	0.0001	3
Polycyclic Aromatic Hydrocarbons	0.058	N/A	0.0002	0.02
Propylene Oxide	0.009	3,100	0.0002	0.02
Styrene	0.005	17,000	0.00001	1,000
Toluene	0.270	37,000	0.001	5,000
Vinyl Chloride	0.003	180,000	0.00001	0.11
Xylenes	0.100	4,300	0.001	100

N/A = No Short-term and Annual Guideline Concentrations listed.

Conclusion

Because pipeline construction moves through an area relatively quickly, air emissions are typically intermittent and short term. Once construction activities in an area are completed, fugitive dust and construction equipment emissions would subside and the impact on air quality would diminish. Further, construction emissions for both projects would be minimized by mitigation measures described above. Therefore, we conclude that the projects' construction-related impacts are not expected to result in a significant impact on local or regional air quality.

Emissions generated during operation of Constitution's proposed project would be minimal, limited to emissions from maintenance vehicles and equipment and fugitive emissions (considered negligible for the pipeline). Iroquois submitted a State Facility Permit to the NYSDEC application to construct and operate the proposed turbines at their compressor facility. Operation of the new turbines results in the existing Wright Compressor Station becoming a major source of CO and CO_2e GHGs which requires a Title V permit, although the proposed turbines would still be permitted and regulated as minor sources and minor modifications with regard to emission controls and other requirements. While BACT is not required for the proposed turbines, the pollutant emission concentrations and rates proposed by Iroquois are as strict as BACT requirements. Using low NO_X turbine combustors, low emission levels would be achieved with normal engine maintenance and recommended operation using pipeline quality natural gas. Permitted emission limits would be monitored through performance testing for the turbines. Like Constitution's project, any emissions resulting from operation of the compressor facility would not be expected to have significant impacts on local or regional air quality.

The GHG emissions for both construction and operation of the pipeline are very small (about 0.001 percent) when compared with the U.S. Greenhouse Gas Inventory of 6.63 billion metric tons of CO_2e (EPA 2009). The GHG emissions for both construction and operation of the compressor facility are also very small (about 0.003 percent) when compared with the U.S. Greenhouse Gas Inventory.

Modeled impacts for SO_2, $PM_{2.5}$, PM_{10}, NO_2, and CO at Iroquois' compressor facility sources were below SILs with the exception of the 1-hour NO_2 and 24-hour $PM_{2.5}$ NAAQS. A cumulative analysis was then conducted and demonstrated that emissions would not cause or contribute to a violation

of any NAAQS. In addition, Iroquois conducted modeling of air toxics emissions for the proposed emission sources using short-term and annual guideline concentrations, and results showed all short-term and annual concentrations were below screening levels.

4.11.1.4 Radon Exposure

We received comments about the potential exposure to released radon gas. The downstream use of natural gas in the market areas, including the effects of burning natural gas and exposure to radon in homes, is beyond the scope of this EIS. Although the impacts of transportation of natural gas to downstream users is outside the scope of the EIS and beyond our jurisdiction, we have provided general background and a review of the literature on radon. Radon is one of many naturally occurring radioactive substances found in natural gas. Natural gas extracted from Pennsylvania that is expected to supply Constitution's project would be located in the EPA's Zone 1 or Zone 2 rated areas, which has been determined to have the highest potential and a moderate potential, respectively, for radon to exist. Recent studies by the Responsible Natural Gas Resource Development Group in August 2012 presents information concerning radon levels when natural gas is extracted, and the deterioration/reduction of radon in the gas during transmission, processing, and at combustion. Information compiled shows that, when radon concentrations are detected, levels at upstream gas wells are relatively higher than downstream points, due to radon's deterioration half-life of less than four days. Additionally, the longer the transportation distance and subsequent time prior to combustion, the lower the levels of radon in the natural gas. Breakdown of the radon begins in the ground and continues during extractions and transport. Radon removal also occurs in a gas processing plant during the removal of liquefied petroleum gases (LPG), (such as ethane and propane), which rapidly reduces radon levels. Radon gas that reaches the processing plant also undergoes further processing to reduce radon before it is burned. The time needed to gather, process, store, and deliver natural gas to residences allows a portion of the entrained radon to decay, which decreases the amount of radon in the gas before it is used in a residence. The required venting of appliance exhausts from water heaters, furnaces, and other appliances also limits potential exposure pathways to radon emissions.

As mentioned previously, radon concentrations are reduced when a natural gas stream undergoes upstream processing to remove LPG. This is because radon and the two major components of LPG, propane and ethane, have similar boiling points. According to a study of health effects from radon (Johnson et al. 1973), processing can remove an estimated 30 to 75 percent of the radon from natural gas. Research by Gogolak (1980) suggests that the cumulative decay of radon from wellhead to burner tip is on the order of 60 percent. Gogolak concluded that indoor radon concentrations resulting from the use of natural gas in the home are unlikely to pose a radiological hazard to domestic users. Johnson et al. reached a similar conclusion. While the number of deaths due to increased indoor radon concentrations could potentially be higher now than in 1973 due to the growth in the U.S. population over the last 40 or more years, and changes to dose and risk calculation methods, there is no reason to determine that the conclusions by Johnson et al. and Gogolak regarding the risks of radon in natural gas would be any different. In fact, radon exposure associated with the combustion of natural gas may be lower now due to the improved ventilation and increased energy efficiency of modern boilers, furnaces and hot water heaters, as well as new building codes requiring venting of gas-fired stoves and ovens. Other more recent studies also support the conclusions of Johnson et al. and Gogolak. A study performed by Van Netten et al. (1998) found that the radon exposure risk to domestic users in U.S. and British Columbia households was virtually nonexistent. Another more recent study completed in the United Kingdom reached a similar conclusion and found that individual exposure to radon associated with domestic gas use is small, and radon is not likely to be of concern to suppliers or customers due to the small quantity that is released into buildings from burning natural gas (Dixon 2001).

In the United States, the EPA has set the indoor action level for radon at 4 picocuries per liter (pCi/L). If concentrations of radon are high enough to exceed these activity levels, the EPA recommends remedial actions, such as improved ventilation, be implemented to reduce levels below this threshold. The average home in the United States has a radon activity level of 1.3 pCi/L, while outdoor levels average approximately 0.4 pCi/L. The radiation given off by the decay of radon is not strong enough to penetrate the skin. However, when radon is inhaled, its radiation can cause deleterious effects on the sensitive tissues in the lungs. At the range of 4 pCi/L the EPA estimates that prolonged exposures would result in approximately 21,000 deaths per year due to lung cancer, nationwide.

The burning of natural gas in homes can release radon into the air depending on the manner in which it used. In certain closed burning systems such as water heaters, boilers, and furnaces, radon is not released into the air as these appliances generally have ventilation systems that exhaust the radon and combusted materials outside the home. Range top cooking, however, can directly vent radon into living spaces and has been identified as the main contributor of radon into homes via natural gas.

The Dixon and Almaskut papers discussed the human exposure to radon from stove-top cooking (RSI 2012). They found that by accounting for the dilution within the space of a residence and air exchange rates that radon levels are reduced to below the EPA action level. We received comments that the radon content at the wellhead is higher than any of the levels reported in these papers, and that the subsequent levels present in residences would be much higher.

It is known that the radon content of natural gas pipelines is highly variable and contingent upon the mixing of many gas sources. Johnson notes that radon activity in producing wells have found between 0.2 to 1,450 pCi/L (the highest ranges were found in the central United States). In July of 2012, Spectra Energy conducted an analysis of the radon content of its pipeline in several locations in Pennsylvania and New Jersey, and found that it had a radon activity of 16.9 to 44.1 pCi/L. (Anspaugh 2012). Subsequently, the USGS completed similar testing on gas producing wells in Pennsylvania and found radon activity between 1 to 79 pCi/L with a median of 37 pCi/L (Rowan 2012).

Using the activity level of 37 pCi/L at the wellhead, and a dilution factor[9,10] of 7,111, Johnson determined that natural gas consumption in a residence would account for an incremental 0.005 pCi/L, above background levels and well below the EPA action level. We also note that residences with existing natural gas service for heating, cooking, and other uses may not experience an incremental increase of 0.005 pCi/L, and it could very well be less, as gas provided to the residence (regardless of the formation in which it was produced) is likely to carry some low residual levels of radon. These findings are consistent with literature on the subject, and that the radon present in natural gas does not introduce new adverse health risks.

While the FERC has no regulatory authority to set, monitor, or respond to indoor radon levels, many local, state, and federal entities establish and enforce radon exposure standards for indoor air. We expect that the combustion of gas delivered by local delivery companies would comply with all applicable air emission standards. In the unlikely event that these standards are exceeded, we would expect that the necessary modifications would be implemented to ensure public safety.

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[9] The dilution factor used to determine the effective activity was based upon an air exchange rate of 1.0 change per hour, and a home volume of 226.6 m^3.

[10] Resnikoff (2012) challenged this dilution factor and presented instead a value of 4,053 that was presented as being representative of New York City apartments. Using this factor instead results in an incremental activity contribution of 0.009 pCi/l, still well below the EPA action level.

4.11.2 Noise

Both projects would contribute to noise in their vicinities area during both construction and operation. The magnitude and frequency of environmental noise varies considerably during the day, week, season, and based on weather conditions as well as seasonal vegetative cover, along with the activities occurring. Two standard measures that relate the time-varying quality of environmental noise to its known effect on people are the 24-hour equivalent sound level (L_{eq}) and day-night sound level (L_{dn}). The L_{eq} is the level of steady sound with the same total (equivalent) energy as the time-varying sound of interest, averaged over a 24-hour period. The L_{dn} is the L_{eq} plus 10 decibels (dB) on the A-weighted scale (dBA) added to account for people's greater sensitivity to nighttime sound levels (typically considered between the hours of 10:00 PM and 7:00 AM). The A-weighted scale is used to assess noise impacts as human hearing is less sensitive to low and high frequencies than mid-range frequencies. The human ear's threshold of perception for noise change is considered to be 3 dB; a change of 6 dB is clearly noticeable to the human ear, and a change of 10 dB is perceived as a doubling of noise.

4.11.2.1 Existing Noise Levels

Constitution conducted acoustical assessments to establish baseline noise conditions near its two proposed M&R stations, MLV sites, and Direct Pipe entry and exit points. Nearby noise-sensitive areas (NSAs), which include residences, hospitals, or schools, were identified in the vicinity of the M&R, MLV, Direct Pipe sites, to determine the Constitution Pipeline project's potential sound contribution.

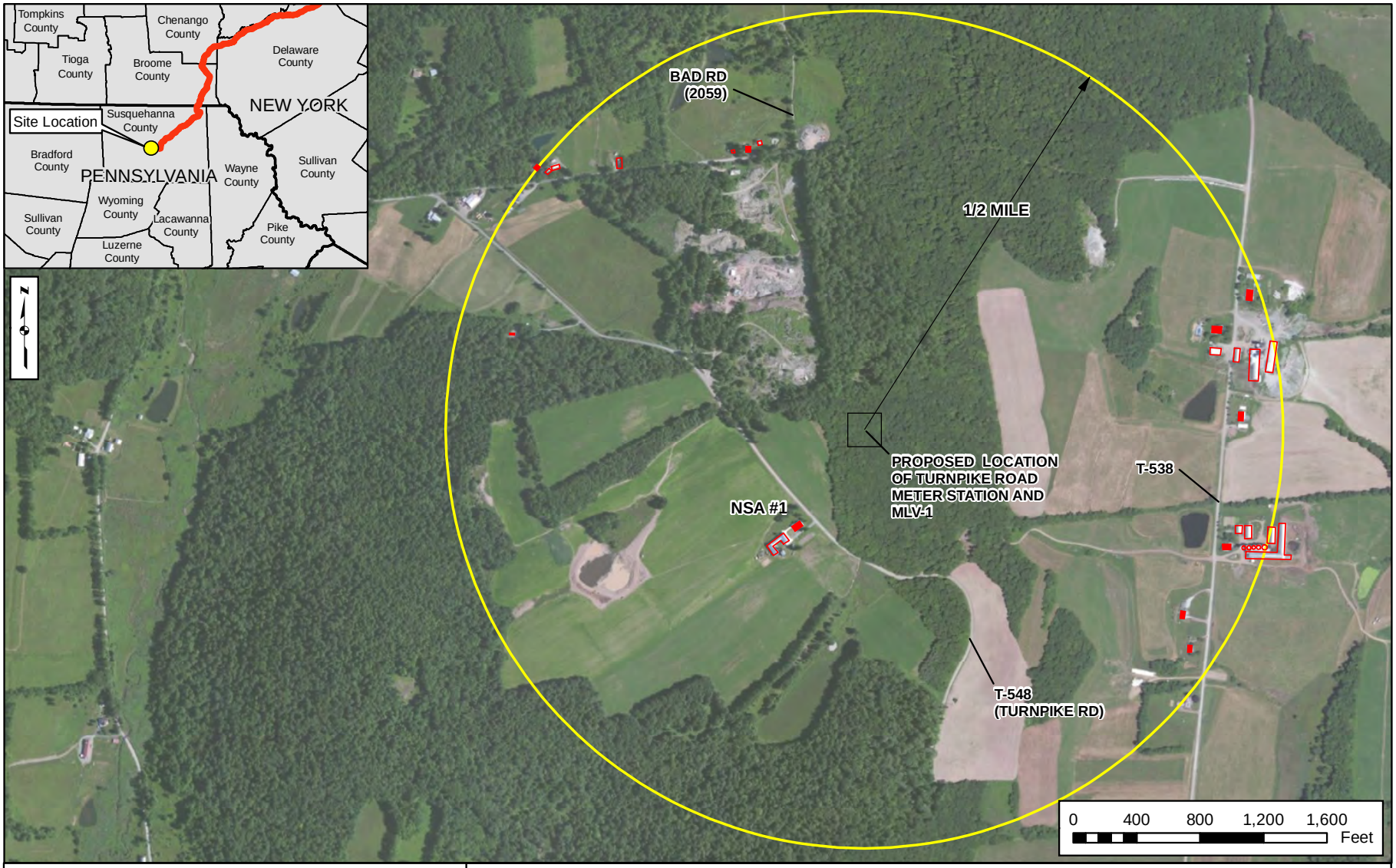
Constitution's Aboveground Facilities and Direct Pipe Sites

Constitution conducted ambient sound levels measurements at the nearby NSAs within 0.5 mile of each M&R station, MLV site, and Direct Pipe entry and exit sites. The L_{eq} and unweighted octave-band sound pressure levels were measured at each sound measurement location. The measurements attempted to exclude extraneous sound such as a nearby vehicles passing by the measurement equipment. Table 4.11.2-1 lists the closest NSAs to each aboveground facility site, along with the calculated ambient sound levels collected during the noise survey. Figures 4.11.2-1 and 4.11.2-2 show the Turnpike Road and Westfall Road M&R Stations and the nearby NSAs, respectively.

Iroquois Wright Compressor Station

Iroquois' project, adjacent to the existing Wright Compressor Station, would include two gas compressor turbines, a control building, gas coolers, and other associated equipment. Each gas turbine would be housed in a separate building.

TABLE 4.11.2-1 Background Noise Levels at the Nearby (within 0.5 miles) NSAs to the Proposed Aboveground Facilities and Drill Sites			
Project Feature	**Nearby NSAs**	**Distance and Direction to NSA**	**Ambient L_{dn} (dBA)**
Turnpike Road M&R Station	NSA #1	800 feet SSW	48.1
MLV-1 (at Turnpike Rd M&R)	NSA #1	800 feet SSW	48.1
MLV-2	NSA #1	740 feet SW	45.0
	NSA #2	1,090 feet SSE	45.0
MLV-3	NSA #1	300 feet NNE	45.0
	NSA #2	1,000 feet S	45.0
MLV-4	NSA #1	710 feet W	45.0
	NSA #2	750 feet E	45.0
MLV-5	NSA #1	1,680 feet SW	45.0
	NSA #2	1,750 feet NW	45.0
MLV-6	NSA #1	1,140 feet S	45.0
	NSA #2	1,150 feet NE	45.0
MLV-7	NSA #1	500 feet N	45.0
	NSA #2	650 feet E	45.0
MLV-8	NSA #1	610 feet S	45.0
	NSA #2	660 feet E	45.0
MLV-9	NSA #1	1,020 feet ESE	45.0
	NSA #2	1,150 feet S	45.0
MLV-10	NSA #1	270 feet S	45.0
	NSA #2	450 feet ENE	45.0
MLV-11 (at Westfall Rd M&R)	NSA #1	1,620 feet NNE	47.4
	NSA #2	1,820 feet WNW	47.6
Westfall Road M&R Station	NSA #1	1,620 feet NE	47.4
Direct Pipe #1 Entry	NSA #1	600 feet SSW	50.8
Direct Pipe #1 Exit	NSA #1	1,350 feet S	47.3
Direct Pipe #2 Entry	NSA #1	925 feet E	51.3
Direct Pipe #2 Exit	NSA #1	850 feet E	58.0
Direct Pipe #3 Entry	NSA #1	625 feet SE	49.7
Direct Pipe #3 Exit	--	No NSA within 0.5 mile	N/A
Direct Pipe #4 Entry	NSA #1	1,575 feet NNW	35.5
Direct Pipe #4 Exit	NSA #1	2,000 feet NE	35.5
Direct Pipe #5 Entry	NSA #1	750 feet NE	53.5
Direct Pipe #5 Exit	NSA #1	200 feet E	57.5
Direct Pipe #6 Entry	NSA #1	250 feet N	50.3
Direct Pipe #6 Exit	NSA #1	500 feet E	52.6
Direct Pipe #7 Entry	NSA #1	150 feet SSE	57.2
Direct Pipe #7 Exit	NSA #1	850 N	57.7



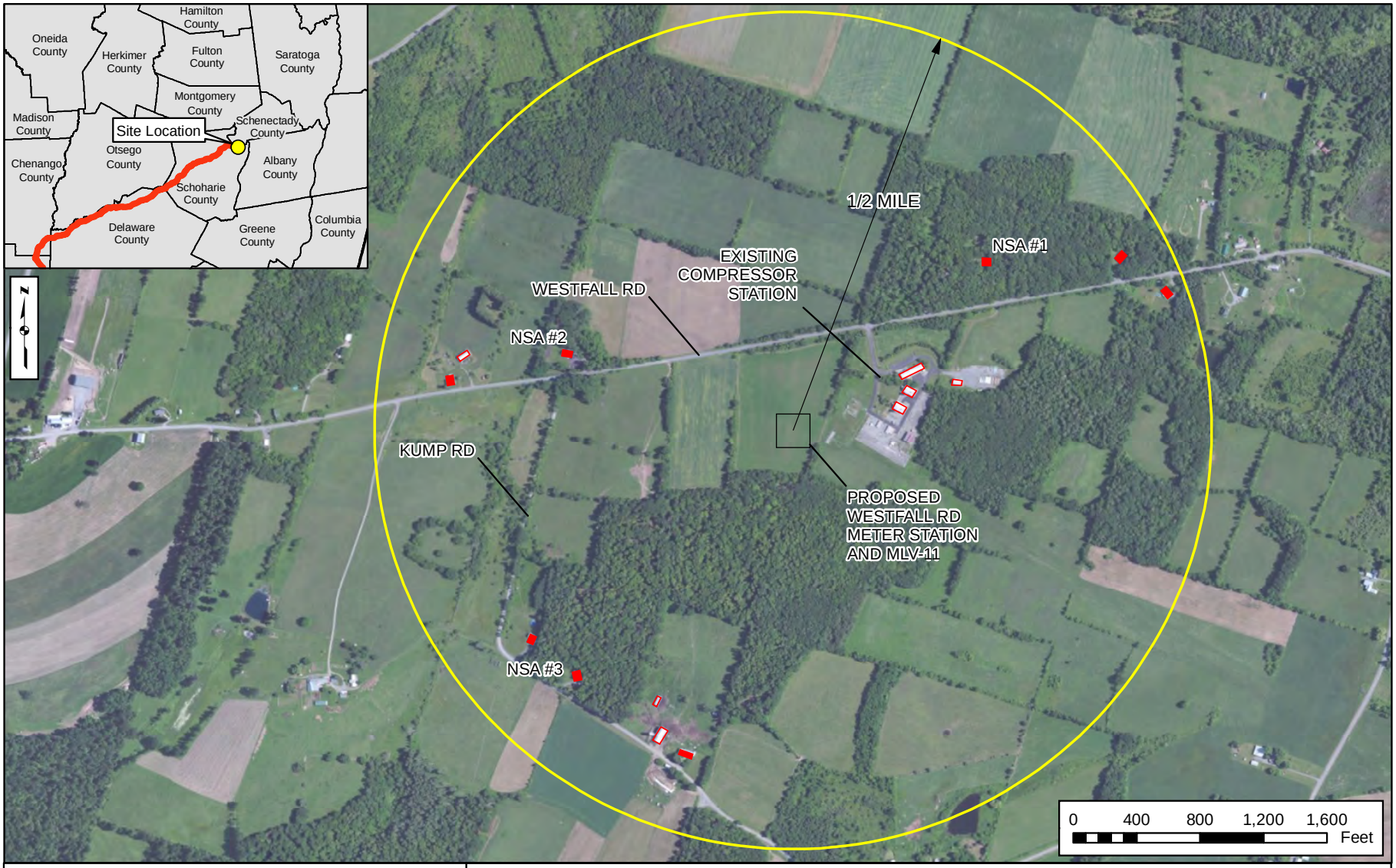
Non-Residential Building

House or Mobile Home

Figure 4.11.2-1

Constitution Pipeline

NSAs Nearest to Turnpike Road M&R Station



Non-Residential Building

House or Mobile Home

Figure 4.11.2-2

Constitution Pipeline

NSAs Nearest to Westfall Road M&R Station

Iroquois conducted ambient noise level measurements at the nearby NSAs to the existing Wright Compressor Station, which include six residences within a 0.5-mile radius of the station. Table 4.11.2-2 lists the NSAs, along with the calculated ambient sound levels. Figure 4.11.2-3 shows the nearby NSAs.

TABLE 4.11.2-2
Background Noise Levels at the Nearby (within 0.5 miles) NSAs to the Existing Wright Compressor Station

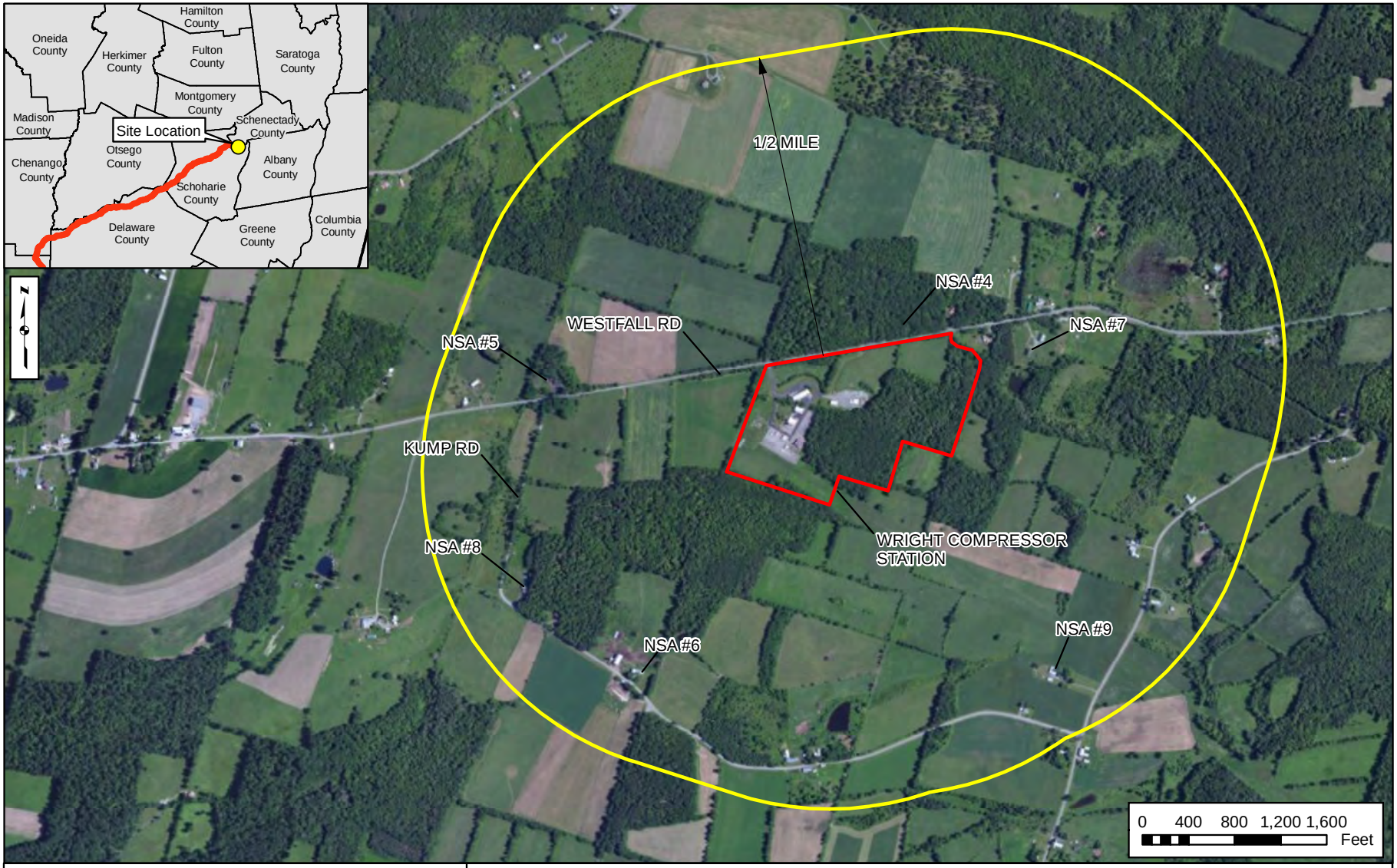
NSA[a]	Direction to NSA	Distance to NSA (feet)	Calculated Ambient L_{dn} (dBA)
NSA #4	NNE	900	44
NSA #5	NW	2,250	47
NSA #6	S	2,800	41
NSA #7	NE	1,400	39
NSA #8	SW	2,600	41
NSA #9	SE	3,000	40

4.11.2.2 Noise Regulatory Requirements

Federal Noise Regulations

The EPA published *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin on Safety* in 1974, which evaluated the effects of environmental noise on health and safety. The EPA determined an L_{dn} of 55 dBA as the maximum sound level not adversely affecting public health and welfare by interfering with speech or other outdoor activities. We have adopted this criterion for new compression and associated facilities, and it is used here to assess the potential noise impact during operation of Constitution and Iroquois' projects. The Commission's regulations (18 CFR Section 380.12(k)(4)(v)(A)) require that the noise attributable to any new compressor station, compression added to an existing station, or any modification, upgrade, or update of an existing station not exceed a L_{dn} of 55 dBA at any pre-existing NSA. With the steady sound source adjustments of an additional 6.4 dBA, an L_{dn} of 55 dBA corresponds to an L_{eq} of 48.6 dBA. This criterion was used as guidance relative to the proposed M&R sites. The M&R stations would comply with the required noise limit in the Commission's regulations (55 dBA sound pressure level).

Our criterion for noise regulation of 55 dBA L_{dn} is the controlling noise regulation for Constitution's project and in many cases is more stringent than the local noise regulations. Compliance with the state local noise ordinances is discussed below. Additionally, Section 380.12(k)(4)(v)(B) indicates new compressor stations or modifications of existing stations shall not result in a perceptible increase in vibration at any NSA.



Existing Compressor Station Boundary

Figure 4.11.2-3

NSAs nearest to Wright Interconnect Project

State and Local Noise Regulations

No state noise regulations have been identified in either Pennsylvania or New York that would apply to Constitution's project. Susquehanna County, Pennsylvania has a land development ordinance ("Article VII – Commercial & Industrial" of the "Susquehanna County Subdivision and Land Development Ordinance") that includes a quantitative sound level requirement that is potentially applicable to the Turnpike Road M&R Station. Section 707.4 (Noise) of the Ordinance states that audible sound from a Commercial or Industrial development shall not exceed 50 dBA as measured at the exterior of any occupied building on a neighboring landowner's property. The Susquehanna County Planning Commission would require Constitution to establish and certify the required decibel level prior to their approval of the project.

No applicable county noise regulations have been identified in Broome, Chenango, or Delaware counties (where MLV sites would be located), or in Schoharie County, New York, or Wright Township, New York (where the Westfall Road M&R Station would be located).

No other applicable state, county, or local noise ordinances or requirements have been identified for Iroquois' facility with the exception of the NYSDEC Policy Document described above.

4.11.2.3 Noise Level Impacts and Mitigation

Construction Noise

Noise would be generated during construction and operation of the projects. Construction would consist of multiple work crews at various locations along the pipeline route. Each crew's work rate would vary based on specific activities, but in general work along the pipeline route would progress between 100 to 1,000 or more feet per day. Direct Pipe activities would be stationary and restricted to areas surrounding the entry and exit points. Depending on the crossing length and the composition of the earth being drilled, the activity could last for weeks or months. Nearby receptors would be subject to noise disturbances for the duration of the drills. Construction equipment would be operated on an as-needed basis and receptors near the construction areas may experience an increase in perceptible noise, but the effect would be temporary and local. Noise mitigation measures employed during construction include the use and maintenance of manufacturer-installed sound muffling devices on each piece of equipment. If necessary, additional noise mitigation measures could be implemented during construction to reduce construction noise disturbances at NSAs.

Nighttime noise is not expected to increase during construction because most construction activities would be limited to daytime hours. Blasting would likely be required along the Constitution right-of-way, but blasting is not anticipated for construction of Iroquois' compressor facility. Blasting plans, including mitigation measures, are included in Constitution's state-specific ECPs and are discussed in section 4.1. An exception to daytime construction may be certain Direct Pipe activities, which are proposed at seven locations. Direct Pipe activities use a wide variety of equipment, with the majority of equipment at the Direct Pipe entry point. Equipment may include a microtunneling machine, pipe thrusters, a slurry circuit transfer machine, a separation and recycling unit, backhoes, forklifts, cranes, boom trucks, and loaders. Based on the equipment, noise levels at the Direct Pipe exit points are generally lower than at the entry points.

As mentioned in section 2.3.2.2, Constitution changed its HDD crossings to Direct Pipe crossings. Constitution has not provided updated noise level estimates attributable to the Direct Pipe activities at locations 1, 2, 3, 4, and 5. Table 4.11.2-3 remains unchanged and includes the estimated

HDD noise levels; however, for comparison purposes we note that the estimated noise levels attributable to the Direct Pipe activities would typically be 6 to 8 dB lower than that of HDD activities.

TABLE 4.11.2-3
Calculated HDD and Direct Pipe Noise Levels at the Nearest NSAs

HDD/Direct Pipe Site	Calculated Ambient L_{dn} (dBA)	HDD/Direct Pipe noise – L_{dn} (dBA) unmitigated	Estimated HDD/Direct Pipe+ ambient L_{dn}(dBA) (unmitigated)	Exceeds FERC Criterion?	HDD/ Direct Pipe Noise – L_{dn} (dBA) mitigated	Estimated HDD/ Direct Pipe+ ambient (dBA) (mitigated)	Potential Noise Increase (dB)	Mitigation Measures Proposed for Sites Exceeding FERC Criterion
Direct Pipe #1 Entry	50.8	64.2	64.4	Yes	52.1	54.5	3.7	A
Direct Pipe #1 Exit	47.3	45.4	49.5	No	N/A	N/A	2.2	N/A
Direct Pipe #2 Entry	51.3	59.9	60.4	Yes	52.7	55.0	3.7	A
Direct Pipe #2 Exit	58.0	51.4	58.9	No	N/A	N/A	0.9	N/A
Direct Pipe #3 Entry	49.7	63.8	63.9	Yes	51.8	53.9	4.2	A
Direct Pipe #3 Exit[a]	**N/A**	**N/A**	**N/A**	**N/A**	N/A	**N/A**	**N/A**	N/A
Direct Pipe #4 Entry	35.5	50.1	50.3	No	N/A	N/A	14.8	N/A
Direct Pipe #4 Exit	35.5	36.3	39.0	No	N/A	N/A	3.5	N/A
Direct Pipe #5 Entry	53.5	62.0	62.5	Yes	52.8	56.1	2.6	A
Direct Pipe #5 Exit	57.5	62.8	63.9	Yes	53.8	59.1	1.6	B
Direct Pipe #6 Entry	50.3	66.2	66.3	Yes	52.3	54.4	4.1	C

TABLE 4.11.2-3 (continued)
Calculated HDD and Direct Pipe Noise Levels at the Nearest NSAs

Direct Pipe Site	Calculated Ambient L_{dn} (dBA)	Direct Pipe noise – L_{dn} (dBA) unmitigated	Estimated Direct Pipe+ ambient L_{dn}(dBA) (unmitigated)	Exceeds FERC Criterion?	Direct Pipe Noise – L_{dn} (dBA) mitigated	Estimated Direct Pipe+ ambient (dBA) (mitigated)	Potential Noise Increase (dB)	Mitigation Measures Proposed for Sites Exceeding FERC Criterion
Direct Pipe #6 Exit	52.6	54.0	56.4	No	N/A	N/A	3.8	N/A
Direct Pipe #7 Entry	57.2	62.4	69.7	Yes	54.5	59.1	1.9	C
Direct Pipe #7 Exit	57.7	49.2	58.3	No	N/A	N/A	0.6	N/A

[a] No NSAs within 0.5 mile from Direct Pipe #3 exit point

NSA = Noise Sensitive Area

L_{dn} = day-night sound level

dBA = A-weighted decibel

N/A = not applicable

Mitigation Measures:

A = Install a partial noise barrier (i.e., open top system) around the hydraulic power units, around any engine-driven pumps (e.g., mud pump) and any engine-driven generators (unless already factory-installed); temporary noise barrier would be constructed of plywood panels or sound absorptive/barrier material installed around three sides of the equipment (including the engine cooler); the generator associated with the mud cleaning/system would be a "lownoise" generator (i.e., has a factory-installed acoustical enclosure).

B = Install a temporary noise barrier along the north and south sides of the Direct Pipe exit site workspace (between the site workspace and nearest NSAs to the north and south); temporary noise barrier would be constructed of plywood panels or sound absorptive/barrier material.

C = Due to proximity of residences to Direct Pipe site, prior to drilling activities, discuss temporary housing or equivalent monetary compensation with nearby landowner; if temporary housing or monetary compensation is not a viable option, cover the workspace with a noise-reducing tent with sound-absorptive/barrier liner material designed with a septum mass layer. In addition, engine-driven pumps (even if located inside the tent) would be necessary and low-noise generators (i.e., factory-installed acoustical enclosures) would be required.

As originally proposed, the noise levels attributable to the Direct Pipe activities at locations 6 and 7 would meet our noise criteria of an L_{dn} of 55 dBA with the mitigation proposed. All engines used for the originally proposed Direct Pipe activities would be fitted with residential-grade exhaust silencers to reduce noise. In addition, Constitution has proposed site-specific mitigation measures as outlined in table 4.11.2-3 for the originally proposed Direct Pipe locations. The noise mitigation listed above would be expected to reduce the noise from Direct Pipe activity to below 55 dBA L_{dn} at the originally proposed Direct Pipe locations.

Because Constitution has not provided updated noise level estimates or proposed noise mitigation measures, as appropriate, for the newly proposed Direct Pipe crossing locations 1 through 5, **we recommend that:**

- **Constitution should file with its Implementation Plan for review and written approval of the Director of OEP, updated acoustical analysis for the Direct Pipe crossing locations 1 through 5 including site-specific plans detailing any noise**

mitigation measures Constitution would use to ensure that the noise levels attributable to the Direct Pipe activities do not exceed an L_{dn} of 55 dBA and/or increase noise over ambient conditions greater than 10 dB at any NSA.

Based on the analyses conducted and the mitigation measures proposed, and our recommendation, we conclude that Constitution's project would not result in significant noise impacts on residents, and the surrounding communities, for Direct Pipe activity or any other construction activity required.

Construction of Iroquois' compressor facility would include clearing and grading of the site using a backhoe, bulldozer, pneumatic rock hammer, and potential blasting activity (although the need for blasting is not anticipated). Construction would also include laying concrete building foundations, erecting compressor buildings, and installing high-pressure piping.

The most prevalent noise-generating equipment during construction of the proposed compressor facility would be internal combustion engines of construction equipment (up to 85 dBA at 50 feet). Site earth work would be expected to result in the highest construction noise due to multiple pieces of equipment operating simultaneously. While blasting is not anticipated, if blasting were required, mitigation measures would be implemented to minimize impacts from both noise and vibration. The noise levels experienced at NSAs would depend on the type of equipment used, the mode of operation of the equipment, the length of time the equipment is in use, the amount of equipment used simultaneously, and the distance between the noise generation source and the receptor. Iroquois would limit construction to daylight hours to prevent nighttime noise impacts. Increased noise levels during construction would occur for the duration of the approximate 9-month construction period. Sound levels would be reduced a minimum of 6 dBA for each doubling of distance between the source and the receiver. While construction could produce noise levels that would be perceptible above the ambient noise conditions, the noise increment would be temporary and local.

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

Operational Noise

Constitution's sources of operational noise would include daily operation of the proposed M&R stations and infrequent blowdown events at the MLV sites. Potential noise impacts associated with the operation of these aboveground facilities would be limited to the vicinity of the facilities. The noise levels and potential impact at the nearest NSAs are described below.

An acoustical analysis was conducted to estimate the noise levels at the nearest NSAs from Constitution's project and to determine if any noise control measures would be needed to ensure compliance with any applicable federal and local noise regulations.

The noise generated by an M&R station is generally a result of the flow-control valves from the aboveground piping, where the pipe noise is a direct result of the pressure drop and gas flow across the valves for the required regulator runs. For the acoustical assessment, the operating condition with the highest potential for noise was evaluated for the nearest NSA (as further NSAs would experience lower sound levels), and assumed that the valve-generated noise would be equal to or less than 85 dBA for the "worst case" operating condition (i.e., measured A-weighted sound level at 3 feet from the piping; downstream of the regulator valve during operation of the respective regulator run).

TABLE 4.11.2-3 (continued)
Calculated HDD and Direct Pipe Noise Levels at the Nearest NSAs

Direct Pipe Site	Calculated Ambient L_{dn} (dBA)	Direct Pipe noise – L_{dn} (dBA) unmitigated	Estimated Direct Pipe+ ambient L_{dn}(dBA) (unmitigated)	Exceeds FERC Criterion?	Direct Pipe Noise – L_{dn} (dBA) mitigated	Estimated Direct Pipe+ ambient (dBA) (mitigated)	Potential Noise Increase (dB)	Mitigation Measures Proposed for Sites Exceeding FERC Criterion
Direct Pipe #6 Exit	52.6	54.0	56.4	No	N/A	N/A	3.8	N/A
Direct Pipe #7 Entry	57.2	62.4	69.7	Yes	54.5	59.1	1.9	C
Direct Pipe #7 Exit	57.7	49.2	58.3	No	N/A	N/A	0.6	N/A

[a] No NSAs within 0.5 mile from Direct Pipe #3 exit point

NSA = Noise Sensitive Area

L_{dn} = day-night sound level

dBA = A-weighted decibel

N/A = not applicable

Mitigation Measures:

A = Install a partial noise barrier (i.e., open top system) around the hydraulic power units, around any engine-driven pumps (e.g., mud pump) and any engine-driven generators (unless already factory-installed); temporary noise barrier would be constructed of plywood panels or sound absorptive/barrier material installed around three sides of the equipment (including the engine cooler); the generator associated with the mud cleaning/system would be a "lownoise" generator (i.e., has a factory-installed acoustical enclosure).

B = Install a temporary noise barrier along the north and south sides of the Direct Pipe exit site workspace (between the site workspace and nearest NSAs to the north and south); temporary noise barrier would be constructed of plywood panels or sound absorptive/barrier material.

C = Due to proximity of residences to Direct Pipe site, prior to drilling activities, discuss temporary housing or equivalent monetary compensation with nearby landowner; if temporary housing or monetary compensation is not a viable option, cover the workspace with a noise-reducing tent with sound-absorptive/barrier liner material designed with a septum mass layer. In addition, engine-driven pumps (even if located inside the tent) would be necessary and low-noise generators (i.e., factory-installed acoustical enclosures) would be required.

As originally proposed, the noise levels attributable to the Direct Pipe activities at locations 6 and 7 would meet our noise criteria of an L_{dn} of 55 dBA with the mitigation proposed. All engines used for the originally proposed Direct Pipe activities would be fitted with residential-grade exhaust silencers to reduce noise. In addition, Constitution has proposed site-specific mitigation measures as outlined in table 4.11.2-3 for the originally proposed Direct Pipe locations. The noise mitigation listed above would be expected to reduce the noise from Direct Pipe activity to below 55 dBA L_{dn} at the originally proposed Direct Pipe locations.

Because Constitution has not provided updated noise level estimates or proposed noise mitigation measures, as appropriate, for the newly proposed Direct Pipe crossing locations 1 through 5, **we recommend that:**

- **Constitution should file with its Implementation Plan for review and written approval of the Director of OEP, updated acoustical analysis for the Direct Pipe crossing locations 1 through 5 including site-specific plans detailing any noise**

mitigation measures Constitution would use to ensure that the noise levels attributable to the Direct Pipe activities do not exceed an L_{dn} of 55 dBA and/or increase noise over ambient conditions greater than 10 dB at any NSA.

Based on the analyses conducted and the mitigation measures proposed, and our recommendation, we conclude that Constitution's project would not result in significant noise impacts on residents, and the surrounding communities, for Direct Pipe activity or any other construction activity required.

Construction of Iroquois' compressor facility would include clearing and grading of the site using a backhoe, bulldozer, pneumatic rock hammer, and potential blasting activity (although the need for blasting is not anticipated). Construction would also include laying concrete building foundations, erecting compressor buildings, and installing high-pressure piping.

The most prevalent noise-generating equipment during construction of the proposed compressor facility would be internal combustion engines of construction equipment (up to 85 dBA at 50 feet). Site earth work would be expected to result in the highest construction noise due to multiple pieces of equipment operating simultaneously. While blasting is not anticipated, if blasting were required, mitigation measures would be implemented to minimize impacts from both noise and vibration. The noise levels experienced at NSAs would depend on the type of equipment used, the mode of operation of the equipment, the length of time the equipment is in use, the amount of equipment used simultaneously, and the distance between the noise generation source and the receptor. Iroquois would limit construction to daylight hours to prevent nighttime noise impacts. Increased noise levels during construction would occur for the duration of the approximate 9-month construction period. Sound levels would be reduced a minimum of 6 dBA for each doubling of distance between the source and the receiver. While construction could produce noise levels that would be perceptible above the ambient noise conditions, the noise increment would be temporary and local.

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

Operational Noise

Constitution's sources of operational noise would include daily operation of the proposed M&R stations and infrequent blowdown events at the MLV sites. Potential noise impacts associated with the operation of these aboveground facilities would be limited to the vicinity of the facilities. The noise levels and potential impact at the nearest NSAs are described below.

An acoustical analysis was conducted to estimate the noise levels at the nearest NSAs from Constitution's project and to determine if any noise control measures would be needed to ensure compliance with any applicable federal and local noise regulations.

The noise generated by an M&R station is generally a result of the flow-control valves from the aboveground piping, where the pipe noise is a direct result of the pressure drop and gas flow across the valves for the required regulator runs. For the acoustical assessment, the operating condition with the highest potential for noise was evaluated for the nearest NSA (as further NSAs would experience lower sound levels), and assumed that the valve-generated noise would be equal to or less than 85 dBA for the "worst case" operating condition (i.e., measured A-weighted sound level at 3 feet from the piping; downstream of the regulator valve during operation of the respective regulator run).

The flow control valves associated with each M&R station would be designed to achieve a noise level of 85 dBA for the full range of potential operating conditions. If necessary, Constitution would utilize acoustical insulation to cover the aboveground gas piping or use an acoustic building to encompass the regulator skid if the noise level at the control valves exceeds 85 dBA for the entire range of operating conditions.

Table 4.11.2-4 shows the results of the acoustical assessment for the operation of the M&R stations, and indicated that with the implementation of noise control measures described above, noise from the operation of the M&R stations would not result in a perceptible noise increase (below a 3 dB increase) or exceed our thresholds.

TABLE 4.11.2-4 Calculated Operational Noise Levels at the Nearest NSAs to the Proposed Constitution Pipeline M&R Station and Mainline Valve Sites

Project Feature	Nearest NSAs	Calculated Ambient L_{dn} (dBA)	Calculated M&R Station Ldn (dBA)	Calculated M&R Station Plus Ambient L_{dn} (dBA)	Potential Noise Increase (dB)
Turnpike Road M&R Station	NSA #1	48.1	47.6	50.9	2.8
Westfall Road M&R Station	NSA #1	47.4	39.7	48.1	0.7
Project Feature	**Nearest NSAs**	**Calculated Ambient L_{dn} (dBA)**	**Calculated Blowdown Ldn (dBA)**	**Blowdown Event Plus Ambient L_{dn} (dBA)**	**Potential Noise Increase (dB)**
MLV-1 (at Turnpike Rd M&R Station)	NSA #1	48.1	55.5	56.2	8.1
MLV-2	NSA #1	45.0	55.7	56.1	11.1
	NSA #2	45.0	52.0	52.8	7.8
MLV-3	NSA #1	45.0	65.2	65.2	20.2
	NSA #2	45.0	52.1	52.9	7.9
MLV-4	NSA #1	45.0	56.8	57.1	12.1
	NSA #2	45.0	55.7	56.1	11.1
MLV-5	NSA #1	45.0	46.1	48.6	3.6
	NSA #2	45.0	46.0	48.5	3.5
MLV-6	NSA #1	45.0	51.9	52.7	7.7
	NSA #2	45.0	51.9	52.7	7.7
MLV-7	NSA #1	45.0	61.1	61.2	16.2
	NSA #2	45.0	57.9	58.1	13.1
MLV-8	NSA #1	45.0	58.7	58.9	13.9
	NSA #2	45.0	57.6	57.9	12.9
MLV-9	NSA #1	45.0	54.0	54.6	9.6
	NSA #2	45.0	50.8	51.8	6.8
MLV-10	NSA #1	45.0	68.7	68.8	23.8
	NSA #2	45.0	63.2	63.2	18.2
MLV-11 (at Westfall Rd M&R Station)	NSA #1	47.4	47.2	50.3	2.9
	NSA #2	47.6	45.9	49.9	2.3

In addition to the operational noise discussed above for the M&R stations, blowdown events would also generate noise at the MLV sites. Planned blowdown events can happen during commission/decommissioning of a compressor station or maintenance, and are conducted between MLVs for the latter scenario. Unplanned blowdown events are necessary in the event of an emergency and could occur at any time. The frequency and length of the blowdown events depend upon the extent of the maintenance activity or type of emergency release. Pipeline blowdown events are typically infrequent and of short duration.

A noise assessment was conducted for each of the MLV sites due to the distance of the nearest NSAs (see table 4.11.2-4), and incorporated the use of a blowdown silencer with the exception of any emergency blowdown events which would prohibit the use of a silencer. The noise assessment used the operating condition with the greatest potential for noise (the expected 'peak' blowdown condition which typically occurs for only 5 to 20 minutes). The noise levels were calculated for only the closest NSAs near each MLV site as noise levels for further NSAs would be lower.

For blowdown events, Constitution would notify local Police and Fire Departments, the Non-Emergency 911 system, and landowners in advance, if feasible.

As shown in table 4.11.2-4, the maximum estimated noise attributable to a blowdown event would be 68.7 dBA at NSA#1 to MLV 10. Although the noise levels associated with planned or unplanned blowdown events may exceed an L_{dn} of 55 dBA at some of the MLV sites, the relative infrequency and short duration of these events would not result in a significant noise impact on nearby residents.

Based on the analyses conducted and mitigation measures proposed, we conclude that operation of Constitution's project would not result in significant noise impacts on residents and the surrounding communities.

Preliminary noise modeling was conducted for Iroquois' project based on the current design in order to determine the noise levels at the nearest NSAs. These noise sources would include (1) two gas turbines with gas compressors and cooling; (2) one emergency back-up auxiliary power unit; and (3) turbine, compressor, and control building service equipment. Following final engineering, the compressor facility would be designed so that the total noise at both the existing Wright Compressor Station and the proposed Constitution Transfer Station, operating at full capacity, would not exceed our requirements, resulting in noise levels at an L_{dn} of 55 dBA or lower, at the nearest NSA. In addition, Iroquois would implement the following noise control measures to reduce noise impacts:

- All buildings would include:
  - wall and roof panels with perforated lining, a mineral wool layer, and steel exterior panel;
  - acoustically-treated doors; windows, skylights, and louvers that are fixes and cannot be opened; patched and well-sealed voids and openings; construction consistent with a high performance acoustical compressor building; and a double rollup, insulated, weather-stripped door; and
  - a ventilation system designed to ventilate, heat, and cool with all doors closed, with a maximum sound level at each ventilation inlet and exhaust outlet of 40 dBA at 50 feet, with a 36-inch silencer on each roof exhaust vent installed between the surface and vent/hood, and a metal boot enclosing the fan where applicable.

- Turbine systems would include:
  - turbine air intake silencer;
  - turbine combustion exhaust stack silencer; and
  - turbine compartment cooling intake and discharge silencers.
- Additional measures would include:
  - rooftop and grade level noise barriers for transformers and air handling equipment;
  - acoustical lagging for gas scrubbers, filter separators, valves and other exposed piping;
  - a station gas aftercooler designed to not exceed 55 dBA at 50 feet, equipped with V-Belt drive and Moore Class 10000 MAG style fans, with a maximum fan tip speed not exceeding 6,000 feet per minute; and
  - buried (to the extent possible) high pressure gas piping, valves, and headers, or covered with acoustical material such as blankets if not buried.

Iroquois calculated the maximum allowed noise level for the compressor station equipment, using the preliminary site layout, the noise specification data for the proposed turbine equipment, the station's general equipment list, and an acoustical design goal of 49 dBA L_{eq} at the nearest NSA. Due to attenuation by distance, NSAs further from the equipment would experience lower noise levels. Table 4.11.2-5 shows the predicted compressor station noise levels for the compressor facility.

TABLE 4.11.2-5
Calculated Operational Noise Levels at the Nearest NSA to Iroquois' Project

		Western Property Line		NSA #4		
Equipment	**Maximum dBA at 300 feet**	**Approx. Distance (feet)**	**Calculated Equipment Noise L_{dn} (dBA)**	**Approx. Distance (feet)**	**Existing Ambient Noise L_{dn} (dBA)**	**Calculated Equipment Noise L_{dn} (dBA)**
Solar T70 Compressor Building	42	365	40	960	44	30
Gas Coolers	41	570	36	560	44	30
Calculated Total Expected Day-Night, Ldn Sound Level, dBA						47

As shown in table 4.11.2-5, predicted noise levels are expected to be below our 55 dBA L_{dn} requirement. However, to ensure that the actual noise produced as a result of Iroquois' modifications to its compressor station meets our criteria, **we recommend that**:

- **Iroquois should file a noise survey with the Secretary <u>no later than 60 days</u> after placing the authorized units at the Wright Compressor Station in service. If a full load condition noise survey is not possible, Iroquois should provide an interim survey at the maximum possible horsepower load and provide the full load survey <u>within 6 months</u>. If the noise attributable to the operation of all of the equipment at the Wright Compressor Station under interim or full horsepower load conditions exceeds an L_{dn} of 55 dBA at any nearby NSAs, Iroquois should file a**

report on what changes are needed and should install the additional noise controls to meet the level <u>within 1 year</u> of the in-service date. Iroquois should confirm compliance with the above requirement by filing a second noise survey with the Secretary <u>no later than 60 days</u> after it installs the additional noise controls.

In addition, the operation of the new Constitution Transfer Compressor Station is not expected to result in a perceptible increase in vibration at any NSA, because gas turbines do not produce as high of levels of vibration compared to reciprocating engines. Iroquois would install a vibration monitoring system on the turbines to shut down the turbines if unsafe vibration levels are measured.

Based on potential noise impacts on NSAs that could result from a combination of both existing and proposed facilities in this area, we requested that Iroquois perform a cumulative noise analysis. Iroquois' cumulative acoustical analysis was performed to determine noise levels resulting from combined operation of the existing Wright Compressor Station, the proposed Westfall Road M&R Station, the proposed Wright interconnect project facilities, and the proposed TGP crossover piping. TGP's crossover piping would connect TGP's system with the Iroquois' proposed facilities. To determine combined noise levels for both projects, unweighted sound pressure levels for each individual noise source were identified based on 1) actual sound measurements where possible/available; 2) known levels for similar equipment; or 3) information provided by the equipment manufacturer. The individual sound pressure levels were corrected for A-weighting, which correlates to a person's perception of how loud a sound is, and logarithmically summed and corrected again for A-weighting to provide the estimated A-weighted sound level contribution for the combination of sources at the nearest NSAs. Results of the analysis are shown in table 4.11.2-6. Predicted noise levels are expected to be below our 55 dBA L_{dn} requirement at the NSAs which range in distance from 900 feet to 3,000 feet.

TABLE 4.11.2-6
Calculated Operational Noise Levels for the Westfall Road M&R Station, Iroquois' Compressor Facilities, and the Existing Wright Compressor Station

NSA	Existing Ambient Noise L_{dn} (dBA)	Existing Wright CS dBA L_{dn}	Proposed Iroquois CS dBA L_{dn}	Proposed Westfall Rd M&R Station dBA L_{dn}	TGP Crossover Piping dBA L_{dn}	Projects Total dBA L_{dn}	Potential Noise Increase (dB)
NSA #4	44	44.0	52.0	39.7	33.2	52.9	8.9
NSA #5	47	47.0	44.4	39.0	31.9	49.4	2.4
NSA #6	41	41.0	41.4	38.5	29.4	45.4	4.4
NSA #7	39	39.0	47.0	39.6	32.6	48.4	9.4
NSA #8	41	41.0	41.4	41.9	32.7	46.4	5.4
NSA #9	40	40	39.8	34.3	26.0	43.6	3.6

CS = compressor station
M&R = meter and regulation
dBA = A-weighted decibel
L_{dn} = day-night sound level
TGP = Tennessee Gas Pipeline

Conclusion

As stated previously, construction equipment for Constitution's project would be operated on an as-needed basis and receptors near the construction areas may experience an increase in perceptible noise, but the effect would be temporary and local. Noise mitigation measures employed during construction

include manufacturer-installed sound muffling devices on equipment, and additional noise mitigation measures could be implemented to further reduce construction noise disturbances at NSAs. Generally, nighttime noise is not expected to increase during construction with the exception of DP activity. Proposed mitigation would reduce noise levels from Direct Pipe activity to below 55 dBA L_{dn} and our recommendation would ensure that Direct Pipe-related noise does not increase noise over ambient conditions greater than 10 dB at NSA #1 to the Direct Pipe locations 1 through 5.

Based on modeled noise levels, mitigation measures proposed, and our recommendation, we conclude that Constitution's project would not result in significant noise impacts on residents and the surrounding communities, for Direct Pipe activity or any other construction activity required.

The most prevalent noise-generating equipment during construction of Iroquois' compressor facility would be construction equipment engines operating during site earth work. Use of construction equipment could produce noise levels that would be perceptible above the ambient noise conditions during construction. Iroquois would limit construction to daylight hours to prevent nighttime noise impacts. Because construction would be temporary and limited to the station site, we conclude that construction of Iroquois' project would not significantly impact nearby residents.

Operation of the Constitution project's M&R stations would not result in a perceptible noise increase or exceed our criteria. Noise from planned or unplanned blowdown events could exceed our noise criteria but would be infrequent and of relative short duration. Based on the analyses conducted and mitigation measures proposed, we conclude that operation of Constitution's project would not result in significant noise impacts on residents and the surrounding communities.

Operation of the Iroquois project would result in noise impacts associated with the Wright Compressor Station modification. Based on the analyses conducted, the mitigation measures proposed, and our recommendation we conclude that Iroquois' project would not result in significant noise impacts on residents, and the surrounding communities during operation as noise levels attributable to the proposed modification are expected to be below our 55 dBA L_{dn} criteria at the nearest NSAs. In addition, the operation of Iroquois' project is not expected to result in a perceptible increase in vibration at any NSA, as gas turbines do not produce as high of levels of vibration as compared to reciprocating engines. Finally, noise levels from combined operation of the Westfall Road M&R Station, the Wright Interconnect Project facilities, and the existing Wright Compressor Station were modeled and are expected to be below our 55 dBA L_{dn} criteria.

4.12 RELIABILITY AND SAFETY

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

Methane, the primary component of natural gas, is colorless, odorless, and tasteless. It is not toxic, but is classified as a simple asphyxiate, possessing a slight inhalation hazard. If breathed in high concentration, oxygen deficiency can result in serious injury or death. Constitution has indicated that a chemical odorant would not be added to the natural gas to produce the familiar "natural gas smell." The proposed compressor facility does include modification of odorization equipment, but this process would not be observable along the proposed pipeline route. We received comments concerning the toxicity of methane if there was a release of natural gas to the atmosphere. Methane is inactive biologically and essentially nontoxic. It is not listed in the International Agency for Research on Cancer, National Toxicology Program, or by the Occupational Safety and Health Administration as a carcinogen or potential carcinogen.

Methane has an auto-ignition temperature of 1,000°F and is flammable at concentrations between 5 percent and 15 percent in the air. Unconfined mixtures of methane in air are not explosive; however it may ignite if there is an ignition source. However, a flammable concentration within an enclosed space in the presence of an ignition source can explode. It is buoyant at atmospheric temperatures and disperses rapidly in air.

4.12.1 Safety Standards

The DOT is mandated to provide pipeline safety under Title 49, USC Chapter 601. The Pipeline and Hazardous Materials Safety Administration (PHMSA), Office of Pipeline Safety administers the national regulatory program to ensure the safe transportation of natural gas and other hazardous materials by pipeline. It develops safety regulations and other approaches to risk management that ensure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities. Many of the regulations are written as performance standards that set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve the required safety standard.

The PHMSA ensures that people and the environment are protected from the risk of pipeline incidents. This work is shared with state agency partners and others at the federal, state, and local 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. A state may also act as the DOT's agent to inspect interstate facilities within its boundaries; however, the DOT is responsible for enforcement action. For the proposed projects, Pennsylvania and New York have delegated authority to inspect interstate pipeline facilities.

The DOT pipeline standards are published in Parts 190-199 of Title 49 of the CFR. Part 192 specifically addresses natural gas pipeline safety issues. Under a *Memorandum of Understanding on Natural Gas Transportation Facilities* dated January 15, 1993 between the DOT and the FERC, the DOT is recognized as having 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 will 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, or shall 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. The FERC accepts this certification and does not impose additional safety standards other than the DOT standards. If the Commission becomes aware of an existing or potential safety problem, there is a provision in the memorandum to promptly alert the DOT. The memorandum also provides instructions for referring complaints and inquiries made by state and local governments and the general public involving safety matters related to pipelines under the Commission's jurisdiction.

The FERC also participates as a member of the DOT's Technical Pipeline Safety Standards Committee, which determines if proposed safety regulations are reasonable, feasible, and practicable.

The pipeline and aboveground facilities associated with the projects would be designed, constructed, operated, and maintained in accordance with or to exceed the DOT *Minimum Federal Safety Standards* in 49 CFR 192. These regulations, which are intended to protect the public and to prevent natural gas facility accidents and failures, include specifications for material selection and qualification; minimum design requirements; and protection of the pipeline from internal, external, and atmospheric corrosion. Many commenters expressed concern about how the pipeline would be maintained over time and the long-term safety of operations. As stated previously, any natural gas facility has some degree of risk and, although any structure will eventually degrade, the DOT rules require regular inspection and

maintenance, including repairs as necessary, to ensure the pipeline has adequate strength to transport the natural gas safely.

The Pipeline Safety, Regulatory Certainty and Job Creation Act of 2011 (H.R. 2845), was passed by Congress and signed into law on January 3, 2012 by President Barack Obama. Among other requirements, this Act mandates that no later than 2 years of the date of enactment, after considering factors specified in the Act, the DOT Secretary, if appropriate, shall require by regulation the use of automatic or remote control shut-off valves, or equivalent technology, where economically, technically, and operationally feasible on transmission pipeline facilities constructed or entirely replaced after the date on which the Secretary issues the final rule containing such requirement. Constitution would use remote control shut-off valves on the proposed pipeline as discussed in section 2.2.2.

The DOT defines area classifications, based on population density in the vicinity of the pipeline, and specifies more rigorous safety requirements for populated areas. Pipe wall thickness and pipeline design pressures, hydrostatic test pressures, MAOP, inspection and testing of welds, and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas. The class locations 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; and
- Class 4 – Location where buildings with four or more stories aboveground are prevalent.

In accordance with federal standards, class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. Pipelines constructed on land in Class 1 locations must be installed with a minimum depth of cover of 30 inches in normal soil and 18 inches in consolidated rock. Class 2, 3, and 4 locations, as well as drainage ditches of public roads and railroad crossings, require a minimum cover of 36 inches in normal soil and 24 inches in consolidated rock. All pipelines installed in navigable rivers, streams, and harbors must have a minimum cover of 48 inches in soil or 24 inches in consolidated rock. Class locations also specify the maximum distance to sectionalized block valves (that is 10.0 miles in Class 1, 7.5 miles in Class 2, 4.0 miles in Class 3, and 2.5 miles in Class 4).

The new 30-inch-diameter pipeline would stretch 124.4 miles from Brooklyn Township, Susquehanna County, Pennsylvania and proceed across Broome, Chenango, and Delaware Counties before terminating in the Town of Wright, Schoharie County, New York. The pipeline would receive gas at a pressure of 1,190 to 1,250 psig from the Turnpike Road M&R Station and Sutton Road M&R Station both located in Susquehanna County, Pennsylvania. The pipeline system would deliver gas at a pressure of 800 to 850 psig to the Westfall Road M&R Delivery Station in Schoharie County, New York. Approximately 1.0 mile (about 1 percent) of the proposed 30-inch-diameter pipeline would be located in Class 3 areas (three segments located in Schoharie County, New York), 22 miles (about 18 percent) would be located in Class 2 areas, and 101 miles (about 81 percent) would be located in Class 1 areas. A summary of class locations based on current population density along the proposed pipeline route is provided in table 4.12.1-1.

TABLE 4.12.1-1 Area Classifications along Constitution's Project			
State/Start Milepost	**End Milepost**	**Length (miles)**	**Class Location**
Pennsylvania			
0.0	4.4	4.4	1
4.4	4.7	0.3	2
4.7	5.0	0.3	1
5.0	6.0	1.1	2
6.0	6.5	0.4	1
6.5	7.0	0.5	2
7.0	10.3	3.3	1
10.3	10.5	0.3	2
10.5	10.7	0.1	1
10.7	11.3	0.7	2
11.3	11.4	0.1	1
11.4	11.7	0.3	2
11.7	21.1	9.4	1
21.1	21.5	0.4	2
21.5	21.6	0.1	1
21.6	22.1	0.6	2
22.1	22.5	0.4	1
22.5	22.8	0.3	2
22.8	25.2	2.5	1
New York			
25.2	34.3	9.1	1
34.3	35.2	0.9	2
35.2	35.3	0.2	1
35.3	35.6	0.3	2
35.6	35.7	0.2	1
35.7	36.0	0.3	2
36.0	36.2	0.2	1
36.2	37.0	0.8	2
37.0	37.1	0.1	1
37.1	37.3	0.3	2
37.3	40.7	3.4	1
40.7	41.0	0.3	2
41.0	41.3	0.3	1
41.3	42.1	0.9	2
42.1	42.2	0.1	1
42.2	42.2	0.0	2
42.2	42.5	0.2	2

TABLE 4.12.1-1 (continued) Area Classifications along Constitution's Project			
State/Start Milepost	**End Milepost**	**Length (miles)**	**Class Location**
42.5	42.6	0.1	1
42.6	43.0	0.4	2
43.0	50.5	7.6	1
50.5	50.7	0.2	1
50.7	51.0	0.3	2
51.0	51.0	0.0	1
51.0	51.3	0.3	2
51.3	51.5	0.2	1
51.5	51.9	0.5	2
51.9	55.1	3.2	1
55.1	56.3	1.2	2
56.3	56.3	0.0	1
56.3	56.7	0.3	2
56.7	60.5	3.9	1
60.5	60.8	0.3	2
60.8	61.0	0.2	1
61.0	61.8	0.8	2
61.8	74.8	13.0	1
74.8	75.4	0.6	2
75.4	75.4	0.0	1
75.4	75.9	0.6	2
75.9	76.7	0.8	1
76.7	76.9	0.3	2
76.9	77.0	0.1	1
77.0	77.9	0.9	2
77.9	77.9	0.0	1
77.9	78.5	0.6	2
78.5	87.7	9.3	1
87.7	88.4	0.6	2
88.4	88.4	0.1	1
88.4	88.8	0.4	2
88.8	93.5	4.7	1
93.5	96.2	2.6	1
96.2	97.2	1.0	2
97.2	97.3	0.1	1
97.3	97.5	0.3	2
97.5	97.6	0.1	1
97.6	97.9	0.3	2
97.9	99.3	1.4	1
99.3	99.6	0.3	2

TABLE 4.12.1-1 (continued) Area Classifications along Constitution's Project			
State/Start Milepost	**End Milepost**	**Length (miles)**	**Class Location**
99.6	99.6	0.0	1
99.6	100.9	1.3	2
100.9	100.9	0.0	1
100.9	101.8	0.9	2
101.8	101.9	0.1	1
101.9	102.3	0.4	2
102.3	102.4	0.0	1
102.4	102.8	0.4	2
102.8	116.3	13.6	1
116.3	117.6	1.3	2
117.6	119.4	1.9	1
119.4	119.8	0.4	3
119.8	119.8	0.0	1
119.8	120.2	0.4	3
120.2	120.7	0.5	1
120.7	121.0	0.3	3
121.0	121.0	0.0	1
121.0	121.3	0.3	2
121.3	124.4	3.2	1

If Constitution's project is approved, the regulations require that the pipeline be designed, at a minimum, to the appropriate Class location standards and that the spacing between the mainline valves meets the DOT requirements. Constitution proposed a more robust design than is required. Specifically, Constitution has committed to several measures that exceed the specified DOT requirements. These additional measures would include:

- installation of Class 2 design pipe in all Class 1 locations;
- installation of the pipeline deeper than required for Class 1 locations with a minimum depth of 36 inches in normal soils and 24 inches in consolidated rock (a level suitable for Class 2, 3, and 4 locations);
- inspection of 100 percent of mainline pipeline welds;
- hydrostatic testing of the entire pipeline at a higher level suitable for Class 3 locations; and
- spacing of MLVs at closer intervals to meet Class 2 requirements in all areas.

During operation of the pipeline, the operating company is required to periodically reassess the class locations along its pipelines. If a subsequent increase in population density adjacent to the right-of-way indicates a change in class location for the pipeline, Constitution would be required to reduce the MAOP or replace the segment with pipe of sufficient grade and wall thickness, if required, to comply with the DOT code of regulations for the new class location.

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

We received several comments about the potential effects of a pipeline rupture and natural gas ignition (the area of potential effect is sometimes referred to as the potential impact radius[11]). It should be noted that a pipeline rupture does not necessarily ignite. However, the DOT published rules that define HCAs where a gas pipeline accident could do considerable harm to people and their property and requires an integrity management program to minimize the potential for an accident. This definition satisfies, in part, the Congressional mandate for the DOT to prescribe standards that establish criteria for identifying each gas pipeline facility in a high-density population area.

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

- current Class 3 and 4 locations;
- any area in Class 1 or 2 locations where the potential impact radius is greater than 660 feet and there are 20 or more buildings intended for human occupancy within the potential impact circle[12]; or
- any area in Class 1 or 2 locations where the potential impact circle includes an identified site.

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

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

- 20 or more buildings intended for human occupancy; or
- an identified site.

Constitution is still in the process of determining HCAs for the proposed pipeline project.

Once a pipeline operator has determined the HCAs on its pipeline, it must apply the elements of its integrity management plan to those segments of the pipeline within the HCAs. The DOT regulations specify the requirements for the integrity management plan at Part 192.911. The pipeline integrity management rule for HCAs requires inspection of the pipeline every 7 years. Constitution would add the Constitution Pipeline to their current overall comprehensive integrity management plan that meets these regulations.

As previously discussed, the proposed projects would be designed and constructed in accordance with or to exceed the DOT *Minimum Federal Safety Standards* in 49 CFR 192. In constructing the pipeline, Constitution would use specified welding protocol and hydrostatic testing to ensure the integrity

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

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

of the pipeline, and pipeline coating and cathodic protection systems[13] to meet requirements established by the DOT for protection of metallic facilities from external, internal, and atmospheric corrosion. Constitution would inspect all welds and use a non-destructive method such as radiographic or ultrasonic inspections to ensure pipeline structural integrity and compliance with the applicable the DOT regulations. Those welds that do not meet established specifications would be repaired or replaced. Once the welds are approved, the welded joints would be coated with a protective coating and the entire pipeline would be visually inspected for any faults, scratches, or other coating defects. Any damage would be repaired before the pipeline is installed. Upon completion of construction, the integrity of the pipelines would be verified by hydrostatic testing as described in section 4.3.2. During operation, the pipelines would be protected by a cathodic protection system, which would impress a low voltage current on the pipelines to offset natural soil and groundwater corrosion potential during operation. After its installation, the functional capability of the cathodic protection system would be inspected frequently to ensure proper operating conditions for corrosion mitigation.

After construction and as required by the DOT regulations, the pipeline facilities would be marked at line-of-sight intervals and at crossings of roads, railroads, and other key points. The markers would indicate the presence of the pipeline and provide a telephone number and address where a company representative could be reached in the event of an emergency or before any excavation in the area of the pipeline by a third party. Constitution participates in the "Call Before You Dig" and "One Call" programs and other related pre-excavation notification organizations in the states in which they operate. In addition, if there is excavation occurring near one of Constitution's pipelines, operational personnel would be on site during the work near the pipeline to ensure there is no risk of damage to Constitution's facilities.

The DOT prescribes the minimum standards for operating and maintaining pipeline facilities, including the requirement to establish a written plan governing these activities. Each pipeline operator must establish an emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency. Key elements of Constitution and Iroquois' emergency procedures would include but are not limited to the following:

- receiving, identifying, and classifying emergency events such as gas leakage, fires, explosions, and natural disasters;
- establishing and maintaining communications with local fire, police, and public officials, and coordinating emergency response;
- emergency shutdown of system and safe restoration of service;
- making personnel, equipment, tools, and materials available at the scene of an emergency; and
- protecting people first and then property, and making them safe from actual or potential hazards, including evacuating individuals and rerouting traffic as necessary to avoid any area that is deemed to be unsafe.

Constitution and Iroquois would incorporate the projects into their existing gas monitoring and control systems. Constitution would maintain a monitoring system that includes a gas control center that monitors system pressures, flows, and customer deliveries on its entire system. The center is staffed 24 hours a day, 7 days a week, and 365 days a year from Houston, Texas. The compressor facility would be

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

monitored by Iroquois Supervisory Control and Data Acquisition System, which is also monitored 7 days a week, and 365 days a year.

Constitution's pipeline systems (which would include the proposed facilities) would also be equipped with remote control valves that can be operated remotely by the gas control center. In the event of an emergency, usually evidenced by a sudden loss of pressure, the gas control center would send a command signal to the remote control valves to initiate the closure of the valves.

In accordance with the regulations, the pipeline would be patrolled on a routine basis. Constitution committed to walking and visually inspecting the pipeline corridor. These patrols would identify soil erosion that may expose the pipe, dead vegetation that may indicate a leak in the line, conditions of the vegetative cover and erosion control measures, unauthorized encroachment on the right-of-way such as buildings and other substantial structures, and other conditions that could present a safety hazard or require preventive maintenance or repairs. Constitution would also perform (generally) weekly fly-over inspections of the right-of-way and annual leak detection surveys of the proposed pipeline facilities. Constitution would also inspect valves twice a year, inspect rectifiers six times a year, and verify the cathodic protection system annually. These surveys would provide early detection of leaks and would reduce the likelihood for pipeline failure. Constitution would also use both caliper and smart pigs to identify pipeline defects, corrosion, and other areas in need of repair.

Constitution representatives have already met with emergency services departments in four of the counties that would be affected by the proposed projects and they would continue to meet with the departments in all of the counties along the proposed pipeline route annually. Constitution would provide these departments with emergency numbers and emergency response plans. Affected public landowners, emergency responders, public officials, and excavators would receive annual updates about the pipeline. Additionally, Constitution has already provided and would continue to provide financial assistance for selected emergency responders via their Community Grant Program. This program evaluates specific requests for noteworthy community projects. Constitution provided grants to six emergency responder groups in Delaware and Schoharie Counties, New York, in December 2012. In June 2013, six grants were awarded to emergency responder groups in Susquehanna, Broome, Delaware, and Schoharie counties. In February 2014, 8 grants were awarded to emergency responder groups in Susquehanna, Broome, Delaware, and Schoharie counties. In July 2014, 7 grants were awarded to emergency responder groups in Susquehanna, Broome, Delaware, and Otsego counties.

We received comments regarding who would be financially responsible should there be a pipeline incident. Constitution has stated that they would reimburse the landowner for any loss or damage to their property as a result of an incident with the operation of the proposed pipeline. According to Constitution, compensation would include but is not limited to, replacement, repair, rental, or straight compensation of the damage. Constitution would implement various public safety measures during construction in residential areas including but not limited to: safety fencing the construction work area boundary to ensure equipment, materials, and spoil remain in the construction right-of-way and that the public is excluded from hazardous areas; ensuring piping is welded and installed as quickly as reasonably possible consistent with prudent pipeline construction practices to minimize the duration of construction within a neighborhood; backfilling the trench as soon as the pipe is laid or temporarily installing a steel plate over the open trench; and completing final cleanup and installation of permanent erosion control measures within 10 days after the trench is backfilled, weather conditions permitting.

Constitution would prepare site-specific traffic closure and detour plans if the proposed projects are approved. Sections 4.8.3 and 4.9.4 provide additional discussions regarding potential impacts on traffic.

We also received comments from residents who were concerned about the construction and operational impacts, as well pipeline rupture impacts on vulnerable populations such as children, the elderly, or the infirm. Constitution has routed the pipeline, and is continuing to evaluate route modifications, to minimize risks to local residents and vulnerable locations. The DOT regulations summarized in Section 4.12.1 are designed to ensure minimum requirements for safety of all populations.

Pipeline Accident Data

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

- cause a death or personal injury requiring hospitalization; or
- involve property damage of more than $50,000 in 1984 dollars.[14]

During the 20-year period from 1994 through 2013, a total of 1,238 significant incidents were reported on the more than 300,000 total miles of natural gas transmission pipelines nationwide.

Additional insight into the nature of service incidents may be found by examining the primary factors that caused the failures. Table 4.12.1-2 provides a distribution of the causal factors, as well as the number of each incident by cause. The dominant incident cause is corrosion and pipeline material, weld or equipment failure constituting 48.5 percent of all significant incidents. The pipelines included in the data set in table 4.12.1-2 vary widely in terms of age, pipe diameter, and level of corrosion control. Each variable influences the incident frequency that may be expected for a specific segment of pipeline. The frequency of significant incidents is strongly dependent on pipeline age. Older pipelines have a higher frequency of corrosion incidents, since corrosion is a time-dependent process.

TABLE 4.12.1-2
Natural Gas Transmission Pipeline Significant Incidents by Cause (1994-2013) [a]

Cause	Number of Incidents	Percentage[b]
Corrosion	293	23.6
Excavation[c]	211	17.0
Pipeline Material, Weld, Equipment Failure, or Incorrect Operation	343	27.7
Natural Force Damage	143	11.5
Other Outside Force Damage[d]	74	5.9
All Other Causes[e]	174	14.0
TOTAL	**1,238**	**--**

[a] PHMSA 2014a.
[b] Due to rounding, column may not total 100 percent.
[c] Includes third-party damage.
[d] Fire, explosion, vehicle damage, previous damage, intentional damage.
[e] Miscellaneous causes or unknown causes.

[14] $50,000 in 1984 dollars is approximately $114,698 as of June 2014 (U.S. Department of Labor, Bureau of Labor Statistics 2014).

The use of both an external protective coating and a cathodic protection system, required on all pipelines installed after July 1971, significantly reduces the corrosion rate compared to unprotected or partially protected pipe.

Outside forces, including excavations and natural events are the cause in 34.6 percent of significant pipeline incidents. Table 4.12.1-3 presents information on the outside forces incidents by cause. These mostly result from the encroachment of mechanical equipment such as bulldozers and backhoes; earth movements due to soil settlement, washouts, or geologic hazards; weather effects such as winds, storms, and thermal strains; and willful damage.

Older pipelines have a higher frequency of outside forces incidents partly because their location may be less well known and less well marked than newer lines. In addition, the older pipeline systems contain a disproportionate number of smaller diameter pipelines, which have a greater rate of outside forces incidents. Small diameter pipelines are more easily crushed or broken by mechanical equipment or earth movements.

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

TABLE 4.12.1-3
Outside Forces Incidents by Cause (1994-2013)[a]

Cause	Number of Incidents	Percent of all Incidents [b]
Third-party excavation damage	176	14.2
Operator excavation damage	25	2.0
Unspecified equipment damage/previous damage	10	0.7
Heavy rain/floods	72	5.8
Earth movement	35	2.8
Lightning/temperature/high winds	21	1.7
Other/Unspecified natural force	15	1.2
Vehicle (not engaged with excavation)	45	3.6
Maritime equipment, vessel adrift, fishing or maritime activity	7	0.6
Fire/explosion	8	0.6
Electrical arcing from other equipment/facility	1	0.0
Previous mechanical damage	5	0.4
Intentional damage	1	0.0
Other/unspecified outside force	7	0.6
TOTAL	**428**	**--**

[a] Excavation, Outside Forces, and Natural Force Damage from table 4.12.1-2. PHMSA 2014a.
[b] Due to rounding, column does not equal 34.6 percent.

Impact on Public Safety

The service incident data summarized in table 4.12.1-2 include pipeline failures of all magnitudes with widely varying consequences.

Table 4.12.1-4 presents the average annual injuries and fatalities that occurred on natural gas transmission lines between 2009 and 2013. The data have been separated into employees and nonemployees, to better identify a fatality rate experienced by the general public. Fatalities among the public averaged 1.6 per year over the 5 year period from 2009-2013.

TABLE 4.12.1-4
Annual Average Fatalities - Natural Gas Transmission Pipelines

	Injuries		Fatalities	
Year	**Employees**	**Public**	**Employees**	**Public**
2009	4	7	0	0
2010[a]	10	51	2	8
2011	1	0	0	0
2012	3	4	0	0
2013	0	2	0	0

[a] All of the public injuries and fatalities in 2010 were due to the Pacific Gas and Electric pipeline rupture and fire in San Bruno, California on September 9, 2010.

Source: PHMSA 2014c

The majority of fatalities from pipelines involve local distribution pipelines. These are natural gas pipelines that are not regulated by the FERC and that distribute natural gas to homes and businesses after transportation through interstate natural gas transmission pipelines. In general, these distribution lines are smaller diameter pipes, often made of plastic or cast iron rather than welded steel, and tend to be older pipelines that are more susceptible to damage. In addition, distribution systems do not have large rights-of-way and pipeline markers common to the FERC-regulated natural gas transmission pipelines.

The nationwide totals of accidental fatalities from various manmade and natural hazards are listed in table 4.12.1-5 in order to provide a relative measure of the industry-wide safety of natural gas transmission pipelines. Direct comparisons between accident categories should be made cautiously, however, because individual exposures to hazards are not uniform among all categories. Furthermore, the fatality rate is more than 25 times lower than the fatalities from natural hazards such as lightning, tornados, floods, earthquakes, etc.

The available data show that natural gas transmission pipelines continue to be a safe, reliable means of energy transportation. The number of significant incidents over the more than 300,000 miles of natural gas transmission lines indicates the risk is low for an incident at any given location. The operation of the projects would represent a slight increase in risk to the nearby public.

TABLE 4.12.1-5 Nationwide Accidental Deaths[a]	
Type of Accident	**Annual Number of Deaths**
All accidents	123,706
Motor Vehicle	43,945
Poisoning	29,846
Falls	22,631
Drowning	3,443
Fire, smoke inhalation, burns	3,286
Floods[b]	82
Lightning[b]	51
Tornado[b]	75
Natural gas distribution lines[c]	14
Natural gas transmission pipelines[c]	2

[a] U.S. Census Bureau 2012.
[b] NWS 2013.
[c] PHMSA 2014b.

Terrorism

Safety and security concerns have changed the way pipeline operators as well as regulators must consider terrorism, both in approving new projects and in operating existing facilities. The Office of Homeland Security is tasked with the mission of coordinating the efforts of all executive departments and agencies to detect, prepare for, prevent, protect against, respond to, and recover from terrorist attacks within the United States. Among its responsibilities, the Office of Homeland Security oversees the Homeland Infrastructure Threat and Risk Analysis Center, which analyzes and implements the National Critical Infrastructure Prioritization Program that identifies and lists Tier 1 and Tier 2 assets. The Tier 1 and Tier 2 lists are key components of infrastructure protection programs and are used to prioritize infrastructure protection, response, and recovery activities. The Commission, in cooperation with other federal agencies, industry trade groups, and interstate natural gas companies, is working to improve pipeline security practices, strengthen communications within the industry, and extend public outreach in an ongoing effort to secure pipeline infrastructure.

Unfortunately, we are unable to provide more details in this analysis. The Commission is faced with a dilemma in how much information can be offered to the public while still providing a significant level of protection to the facility. Consequently, energy facility design plans and location information have been removed from its website to ensure that sensitive information filed under Critical Energy Infrastructure Information is not readily available (RM02-4-000 and PL02-1-000 issued February 20, 2003).

The likelihood of future acts of terrorism or sabotage occurring at the proposed facilities, or at any of the myriad natural gas pipeline or energy facilities throughout the United States, is unpredictable given the disparate motives and abilities of terrorist groups. The continuing need to construct facilities to support the future natural gas pipeline infrastructure is not diminished from the threat of any such future acts.

4.13 CUMULATIVE IMPACTS

In accordance with NEPA, we considered the cumulative impacts of Constitution's and Iroquois' projects and other projects or actions in the area. Cumulative impacts represent the incremental effects of a proposed action when added to impacts associated with past, present, or reasonably foreseeable future projects, regardless of what agency or person undertakes such other actions. Although the individual impact of each separate project may be minor, the additive or synergistic effects of multiple projects could be significant. The direct and indirect impacts of Constitution's and Iroquois' projects are discussed in other sections of this EIS.

The purpose of this analysis is to identify and describe cumulative impacts that would potentially result from implementation of the Constitution and Iroquois projects. This cumulative impacts analysis uses an approach consistent with the methodology set forth in relevant guidance (CEQ 1997b, 2005; EPA 1999). Under these guidelines, inclusion of actions within the analysis is based on identifying commonalities of impacts from other actions to potential impacts that would results from Constitution's and Iroquois' projects. In order to avoid unnecessary discussions of insignificant impacts and projects and to adequately address and accomplish the purposes of this analysis, the cumulative impacts analysis for the proposed projects was conducted using the following guidelines:

- A project must impact a resource category potentially affected by the proposed projects. For the most part, these projects are located in the same general area that would be directly affected by construction of the proposed projects. The effects of more distant projects are in most cases not assessed, because their impacts would tend to be localized and not contribute significantly to the impacts of the proposed projects. Potential cumulative impacts on air quality and watersheds, however, were considered on a broader, more regional basis.
- The distance into the past and future which other projects could potentially cumulatively impact the area of the proposed projects was based on whether the impacts are short-term, long-term, or permanent. Most of the impacts related to the proposed projects would occur during the construction phase. As part of their applications, Constitution and Iroquois originally proposed an in-service date of March 2015. However, we acknowledge this date is no longer feasible. Constitution now proposes to start construction in February of 2015 and continue through the end of 2015, pending receipt of all applicable federal authorizations. The Applicants would request to place the facilities into service following a determination that restoration is proceeding satisfactorily. We expect an in-service request would follow shortly after the end of construction. For projects where the impacts are long-term or permanent, the temporal range was extended.
- Where a potential for cumulative impacts was indicated, those impacts were quantified to the extent practicable; however, in some cases the potential impacts can only be described qualitatively. This is particularly the case for projects that are in the planning stages; are contingent on economic conditions, availability of financing, and/or the issuance of permits; or for which there is a lack of comprehensive information available.

Projects meeting one or more of the criteria listed below were considered in this cumulative analysis. These criteria define the projects' region of influence, which will be used in this analysis to describe the general area for which the proposed projects could potentially contribute to cumulative impacts. The region of influence varies depending on the resource being discussed. Specifically, we included:

- minor projects, such as residential development, small commercial development, and small transportation projects within 0.25 mile of the proposed area for both Constitution's and Iroquois' projects;
- major projects, such as large commercial, industrial, transportation and energy development projects within 10 miles of the proposed area for both projects. This includes natural gas well permitting and development projects;
- major projects within watersheds crossed by the proposed projects; and
- projects with potential to result in longer term impacts on air quality (for example, natural gas pipeline compressor stations) located within an AQCR crossed by the proposed projects.

We have identified four types of projects that would potentially cause a cumulative impact when considered with the proposed projects. These are: 1) Marcellus Shale development (wells and gathering systems); 2) natural gas facilities that are not under the Commission's jurisdiction [non-jurisdictional project-related facilities]; 3) other FERC jurisdictional natural gas pipelines; and 4) other actions (see table 4.13-1). We identified these projects through scoping and independent research, as well as information provided by the Applicants.

When considering natural gas infrastructure projects that are not yet proposed but could be developed in the future (and are therefore not listed in table 4.13-1) and the potential for associated cumulative impacts, it's important to note that with an increase in pressure of 1,400 psig, the Constitution pipeline's maximum capacity would be 850,000 Dth/d, which is 200,000 Dth/d (31 percent) greater than the currently proposed level. In the context of interstate natural gas transportation, available supply, and regional demand, this is a relatively modest allowance for increased capacity that would likely preclude the use of the Constitution line as a major conduit for newly emerging gas supplies, should they occur. The potential cumulative impacts related to the use of the Constitution line for this purpose, while uncertain, are described in general below.

TABLE 4.13-1
Existing or Proposed Projects Evaluated for Potential Cumulative Impacts

Project	Location (County, State)	Description	Approximate Closest Distance to Project (miles)	Watershed [a]	Project Status[b]	Air Quality Control Region (AQCR)
Marcellus Shale Development						
Wells[c]						
PA Wells	Susquehanna and Wayne, PA	Between 2009 and October 2013, the PADEP has issued 1,545 unconventional natural gas well permits in Susquehanna County and 19 in Wayne County.	Varied	Upper Susquehanna-Tunkhannock, Upper Susquehanna	Ongoing	Northeast Pennsylvania-Upper Delaware Valley Interstate
NY Wells	Broome, Chenango, Delaware (horizontal drilling permits only) and Otsego, NY	Between 2009 and October 2013, the NYSDEC has issued 68 well permits (24 vertical natural gas well permits and 44 horizontal natural gas well permits (unconventional natural gas drilling is currently suspended pending New York state review).	Varied	Upper Susquehanna, Upper Delaware, Schoharie	Ongoing	Southern Tier East Intrastate
Gathering Systems[d]						
Williams Field Services Company, LLC (Williams), Multiple Natural Gas Gathering Lines	Susquehanna, PA	Various locations throughout Susquehanna County	>0.0-10.0	Upper Susquehanna,-Tunkhannock, Upper Susquehanna	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Intrastate
Williams Blanding Pipeline Project	Susquehanna, PA	Natural gas gathering line located in Harford	3.9	Upper Susquehanna-Tunkhannock	In service	Northeast Pennsylvania – Upper Delaware Valley Interstate
Williams Grasavage Well Connect Pipeline	Susquehanna, PA	Natural gas gathering line located in Jessup	7.0	Upper Susquehanna-Tunkhannock	In service	Northeast Pennsylvania – Upper Delaware Valley Interstate
Williams Castrogiovanni Pipeline	Susquehanna, PA	Natural gas gathering line located in Bridgewater	1.1	Upper Susquehanna-Tunkhannock	In service	Northeast Pennsylvania – Upper Delaware Valley v
Williams Hop Bottom	Susquehanna, PA	Natural gas gathering line located in Brooklyn	1.7	Upper Susquehanna-Tunkhannock	In service	Northeast Pennsylvania – Upper Delaware Valley Interstate

TABLE 4.13-1 (continued)
Existing or Proposed Projects Evaluated for Potential Cumulative Impacts

Project	Location (County, State)	Description	Approximate Closest Distance to Project (miles)	Watershed [a]	Project Status[b]	Air Quality Control Region (AQCR)
Williams Lackawanna Pipeline	Susquehanna, PA	Natural gas gathering line located in Hop Bottom	7.5	Upper Susquehanna-Tunkhannock	In service	Northeast Pennsylvania – Upper Delaware Valley Interstate
Williams Lucy Pipeline	Susquehanna, PA	Natural gas gathering line located in Springville and Auburn Township	9.4	Upper Susquehanna-Tunkhannock	In service	Northeast Pennsylvania – Upper Delaware Valley Interstate
Williams Diamond Pipeline	Susquehanna, PA	Natural gas gathering line located in Bridgewater Township	1.7	Upper Susquehanna-Tunkhannock	In service	Northeast Pennsylvania – Upper Delaware Valley Interstate
Williams Newton Pipeline	Susquehanna, PA	16-inch-diameter natural gas gathering line located in Brooklyn and Bridgewater Townships	0.2	Upper Susquehanna-Tunkhannock	In service	Northeast Pennsylvania – Upper Delaware Valley Interstate
Williams Vandermark Pipeline	Susquehanna, PA	16-inch-diameter natural gas gathering line located between Route 29 and Martins Creek in Bridgewater, Brooklyn, and Dimock Townships	1.0	Upper Susquehanna-Tunkhannock	In service	Northeast Pennsylvania – Upper Delaware Valley Interstate
Williams Wells Pipeline	Susquehanna, PA	16-inch-diameter natural gas gathering line located in Brooklyn and Bridgewater Townships	0.2	Upper Susquehanna-Tunkhannock	In service	Northeast Pennsylvania – Upper Delaware Valley Interstate
Williams Williams Pipeline	Susquehanna, PA	12-inch-diameter natural gas gathering line located in Brooklyn Township	1.8	Upper Susquehanna-Tunkhannock	In service	Northeast Pennsylvania – Upper Delaware Valley Interstate
Williams Teddick Pipeline	Susquehanna, PA	8-inch-diameter natural gas gathering line located in Brooklyn Township	0.07	Upper Susquehanna-Tunkhannock	In service	Northeast Pennsylvania – Upper Delaware Valley Interstate
Williams Tingley Pipeline	Susquehanna, PA	Natural gas supply/discharge line that would connect to the Miller Compressor Station	2.0	Upper Susquehanna-Tunkhannock	Unknown	Northeast Pennsylvania – Upper Delaware Valley Interstate
Williams Zaverton Pipeline	Susquehanna, PA	12-inch-diameter natural gas gathering line located in Bridgewater Township	1.7	Upper Susquehanna-Tunkhannock	In service	Northeast Pennsylvania – Upper Delaware Valley Interstate

TABLE 4.13-1 (continued)
Existing or Proposed Projects Evaluated for Potential Cumulative Impacts

Project	Location (County, State)	Description	Approximate Closest Distance to Project (miles)	Watershed [a]	Project Status[b]	Air Quality Control Region (AQCR)
Williams Springville Gathering	Susquehanna, Wyoming, and Luzerne, PA	33.5 miles of 24-inch-diameter natural gas gathering line interconnecting to Transco pipeline	7.3	Upper Susquehanna-Tunkhannock, Upper Susquehanna	In service (2012)	Northeast Pennsylvania – Upper Delaware Valley Interstate
WPX Energy Marcellus Gathering, LLC (WPX), Hayes Gathering Pipeline	Susquehanna, PA	Natural gas gathering line located in Bridgewater and Silver Lake Townships	6.6	Upper Susquehanna	In service	Northeast Pennsylvania – Upper Delaware Valley Interstate
WPX Snake Creek Gathering Line	Susquehanna, PA	Natural gas gathering line located southwest of Hallstead, PA	8.3	Upper Susquehanna-Tunkhannock	In service	Northeast Pennsylvania – Upper Delaware Valley Interstate
WPX, Multiple Natural Gas Gathering Pipelines	Susquehanna, PA	Natural gas gathering lines located throughout Susquehanna County	>0.0-10.0	Upper Susquehanna, Upper Susquehanna-Tunkhannock	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Interstate
Angelina Gathering Company, LLC (Angelina), NW Clemmer Gathering Line	Susquehanna, PA	Natural gas gathering line northwest of New Milford, PA	5.2	Upper Susquehanna	In service	Northeast Pennsylvania – Upper Delaware Valley Interstate
Angelina FF Gathering Line	Susquehanna, PA	Natural gas gathering line in New Milford, PA	2.0	Upper Susquehanna	In service	Northeast Pennsylvania – Upper Delaware Valley Interstate
Angelina NW Sienko Gathering Line	Susquehanna, PA	1.1-mile-long natural gas gathering line west of Great Bend, PA	8.0	Upper Susquehanna	In service	Northeast Pennsylvania – Upper Delaware Valley Interstate
Angelina, Multiple Natural Gas Gathering Pipelines	Susquehanna, PA	Natural gas gathering lines located near New Milford, PA	>0.0-10.0	Upper Susquehanna	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Interstate
PVR Partners, Kerr to Nobel Natural Gas Pipeline	Susquehanna, PA	Natural gas gathering line located in Brooklyn and Lathrop Townships	6.7	Upper Susquehanna-Tunkhannock	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Interstate
Carrizo, LLC, Frystak to Bush Gathering Line	Susquehanna, PA	Natural gas gathering line located in Bridgewater Township	6.7	Upper Susquehanna-Tunkhannock	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Interstate

TABLE 4.13-1 (continued)
Existing or Proposed Projects Evaluated for Potential Cumulative Impacts

Project	Location (County, State)	Description	Approximate Closest Distance to Project (miles)	Watershed [a]	Project Status[b]	Air Quality Control Region (AQCR)
Laser Northeast Gathering Co. (Laser Northeast), Ivey-Hayes Pipeline	Susquehanna, PA	Natural gas gathering line located in Bridgewater, Forest Lake and Silver Lake Townships	9.9	Upper Susquehanna-Tunkhannock, Upper Susquehanna-	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Interstate
Laser Northeast, Susquehanna Gathering System I	Susquehanna, PA; Broome, NY	42-mile-long, 16-inch-diameter or less outside diameter natural gas gathering line that connects to the Millennium project	9.7	Upper Susquehanna-Tunkhannock, Upper Susquehanna, Upper Delaware	In service (2011)	Northeast Pennsylvania – Upper Delaware Valley Interstate , Southern Tier East Intrastate
Laser Northeast, Susquehanna Gathering System II	Susquehanna and Wyoming, PA	9-mile-long, 24-inch outside diameter natural gas gathering line in Susquehanna County to interconnect with the Tennessee project. 9-mile-long, 16-inch-diameter outside diameter pipeline in Wyoming County to connect to the Tennessee project. Project also includes a new compressor station.	>10.0	Upper Susquehanna-Tunkhannock	Unknown	Northeast Pennsylvania – Upper Delaware Valley Interstate
Marcellus Midstream Energy, LLC, Susquehanna Gathering Pipeline Montrose Extension	Susquehanna and Wyoming, PA	Natural gas gathering line located in Dimock, Jessup, Bridgewater, and Lemon Townships	8.4	Upper Susquehanna-Tunkhannock	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Interstate
Susquehanna Gathering Co. 1, (Susquehanna), Well Connect 49 Pipeline	Susquehanna, PA	Natural gas well interconnect gathering line	1.8	Upper Susquehanna-Tunkhannock, Upper Susquehanna	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Interstate
Susquehanna Well Connect 57/43 Bluestone AMI Pipeline	Susquehanna, PA	Natural gas well interconnect pipeline located in Jackson Township	1.5	Upper Susquehanna	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Interstate
Susquehanna Well Connect 67 Pipeline	Susquehanna, PA	Natural gas well interconnect gathering line located in Jackson Township	3.2	Upper Susquehanna-Tunkhannock, Upper Susquehanna	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Interstate
Susquehanna Well Connect 69 Pipeline	Susquehanna, PA	Natural gas well interconnect gathering line located in Jackson and Thompson Townships	3.1	Upper Susquehanna-Tunkhannock, Upper Susquehanna	Pending	Northeast Pennsylvania – Upper Delaware Valley Interstate

TABLE 4.13-1 (continued)
Existing or Proposed Projects Evaluated for Potential Cumulative Impacts

Project	Location (County, State)	Description	Approximate Closest Distance to Project (miles)	Watershed [a]	Project Status[b]	Air Quality Control Region (AQCR)
Susquehanna Well Pad 45 Lateral	Susquehanna, PA	Natural gas well interconnect gathering line located in Jackson Township	1.6	Upper Susquehanna-Tunkhannock, Upper Susquehanna	Pending	Northeast Pennsylvania – Upper Delaware Valley Interstate
Susquehanna Compressor Station	Susquehanna, PA	Natural gas compression and dehydration facility in New Milford Township	0.4	Upper Susquehanna-Tunkhannock	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Interstate
EmKey Gathering LLC, EmKey Pipeline	Broome, Chenango, and Madison, NY	75-mile-long, 16- to 24-inch-diameter natural gas gathering line to connect with Millennium and Dominion Pipelines	1.1	Upper Susquehanna, Upper Delaware	Ongoing	Southern Tier East Intrastate
EmKey Gathering LLC, EmKey Expansion Pipeline	Broome, Chenango, and Madison, NY	Approximately 40 miles of natural gas gathering line.	Unknown	Upper Susquehanna, Upper Delaware	Unknown	Southern Tier East Intrastate
Chesapeake Energy Marketing, LLC and Statoil Natural Gas, LLC, Meter Station Upgrades	Bradford, Susquehanna, PA	Meter station upgrades to deliver natural gas from Tennessee's Northeast Upgrade project	Unknown	Unknown	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Interstate
Southwestern TNT Compressor and Dehydration Facility	Susquehanna, PA	Natural gas compression and dehydration facility located in New Milford Township	0.2	Upper Susquehanna-Tunkhannock, Upper Susquehanna	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Interstate
Southwestern/ Boardwalk Field Services, Southwestern Gathering System	Susquehanna, Lackawanna, PA	26-mile-long, 12-inch outside diameter natural gas gathering line that would interconnect with the Tennessee project	Unknown	Unknown	Unknown	Northeast Pennsylvania – Upper Delaware Valley Interstate
Southwestern, Martin's Creek Water Conveyance Line	Susquehanna, PA	1,210-foot-long, 8-inch-diameter steel water pipeline located in Brooklyn and Harford Townships	0.4	Upper Susquehanna-Tunkhannock	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Interstate
DTE Energy (DTE), Bluestone Gathering System	Susquehanna, PA; Broome, NY	44-mile-long, 16- to 20-inch outside diameter natural gas gathering line that gas to both the Millennium and Tennessee pipelines	0.0	Upper Susquehanna-Tunkhannock, Upper Susquehanna, Upper Delaware	In service (2012)	Northeast Pennsylvania – Upper Delaware Valley Interstate, Southern Tier East Intrastate AQCR
DTE, Bluestone Gathering System – Dehydration Facility	Susquehanna, PA	Natural gas dehydration facility located in New Milford Township	0.2	Upper Susquehanna-Tunkhannock, Upper Susquehanna	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Interstate

TABLE 4.13-1 (continued)
Existing or Proposed Projects Evaluated for Potential Cumulative Impacts

Project	Location (County, State)	Description	Approximate Closest Distance to Project (miles)	Watershed [a]	Project Status[b]	Air Quality Control Region (AQCR)
DTE, Bluestone Gathering System Pipe Yard	Susquehanna, PA	Pipe yard facility in New Milford Township	2.8	Upper Susquehanna-Tunkhannock	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Interstate
Appalachia Midstream, Multiple Gathering Pipeline Systems	Susquehanna, PA	Various locations	>0.0-10.0	Upper Susquehanna-Tunkhannock, Upper Susquehanna	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Interstate
Carrizo LLC, Ricci to Bonnice Pipeline	Susquehanna, PA	Natural gas gathering line located in Montrose	3.2	Upper Susquehanna-Tunkhannock	In service	Northeast Pennsylvania – Upper Delaware Valley Interstate
Leatherstocking	Susquehanna, PA; Broome, Chenango, Delaware, Otsego, NY	Four taps of the proposed Constitution pipeline to develop various local distribution gas pipelines. We estimated approximately 4 miles of pipeline may be needed to supply the Amphenol plant.	0.0	Upper Susquehanna-Tunkhannock, Upper Susquehanna, Upper Delaware, Schoharie	Proposed	Northeast Pennsylvania – Upper Delaware Valley Interstate, Southern Tier East Intrastate
Non-jurisdictional Project-related Facilities						
Williams Field Services Co., LLC (Williams), Central Compressor Station[e]	Susquehanna, PA	Expansion of an existing compressor station located in Brooklyn Township	0.0	Upper Susquehanna	In service (2013)	Northeast Pennsylvania – Upper Delaware Valley Interstate
Williams Miller Compressor Station[e]	Susquehanna, PA	Natural gas compressor station located in Harford Township that is proposed for use by multiple natural gas gathering systems.	2.0	Upper Susquehanna-Tunkhannock	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Interstate
Williams Reynolds Pipeline[e]	Susquehanna, PA	Approximate 2-mile-long discharge line from the proposed Miller Compressor Station to a proposed interconnect with the Constitution project	0.0	Upper Susquehanna-Tunkhannock, Upper Susquehanna	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Interstate
Williams White Road M&R Station[e]	Susquehanna, PA	Proposed M&R station to facilitate delivery of natural gas to the Constitution pipeline	0.0	Upper Susquehanna-Tunkhannock, Upper Susquehanna	Proposed	Northeast Pennsylvania – Upper Delaware Valley Interstate

TABLE 4.13-1 (continued)
Existing or Proposed Projects Evaluated for Potential Cumulative Impacts

Project	Location (County, State)	Description	Approximate Closest Distance to Project (miles)	Watershed [a]	Project Status[b]	Air Quality Control Region (AQCR)
Southwestern, Sutton Road M&R Facility and Lateral[e]	Susquehanna, PA	M&R facility and associated lateral pipeline that would be the point of receipt of natural gas for delivery to the Constitution project	0.0	Upper Susquehanna-Tunkhannock	Ongoing	Northeast Pennsylvania – Upper Delaware Valley Interstate
FERC – Jurisdictional Natural Gas Pipeline Projects						
TGP, 300 Line (CP09-444-000)	Potter, Tioga, Bradford, Susquehanna, Wayne, Pike, PA; Sussex, NJ	127-mile-long, 30-inch outside diameter pipeline loop with two new compressor stations in western PA and other compressor station modifications in PA and NJ	6.2	Upper Susquehanna-Tunkhannock,	In service (2011)	Northeast Pennsylvania-Upper Delaware Valley Interstate
TGP, Northeast Supply Diversification (NSD) Project (CP11-30)	Bradford, Tioga, PA; Niagara, Erie, NY	Approximately 7 miles of 30-inch- diameter pipeline loop and compressor station modifications along the existing TGP 300 Line	>10.0	NA	In service (2012)	Northeast Pennsylvania-Upper Delaware Valley Interstate
TGP, Northeast Upgrade Project (CP11-161-000)	Bradford, Wayne, Pike, Susquehanna, PA; Sussex, NJ	40.9 miles of 30-inch-diameter pipeline loop and the modification of four existing compression stations	>10.0	Upper Susquehanna - Tunkhannock	In service (2013)	Northeast Pennsylvania-Upper Delaware Valley Interstate
Millennium, Minisink Compressor Station Project (CP11-515-000)	Orange County, NY	One new compressor station	>10.0	NA	In service (2013)	Hudson Valley Intrastate
Williams, Transco Northeast Supply Link (NSL) Project (CP12-30-000)	Lycoming, Monroe, PA; Richmond, Kings, NY; Hunterdon, Essex, Passaic, Bergen, Hudson, Somerset, NJ	12.0 miles of new 42-inch-diameter pipeline loop; modifications of two existing compressor stations; and construction of one new compressor station	>10.0	NA	In service (2013)	Northeast Pennsylvania-Upper Delaware Valley Interstate

TABLE 4.13-1 (continued)
Existing or Proposed Projects Evaluated for Potential Cumulative Impacts

Project	Location (County, State)	Description	Approximate Closest Distance to Project (miles)	Watershed [a]	Project Status[b]	Air Quality Control Region (AQCR)
Spectra, Texas Eastern Appalachia to Market 2014 (TEAM 2014) (CP13-84-000)	Fayette, Perry, Dauphin, Lebanon, Berks, Westmoreland, Indiana, Huntingdon, PA; various counties in WV, OH, KY, TN, AL, and MS	33.6 miles of new 36-inch-diameter pipeline loop and construction of associated aboveground facilities, including four new compressor stations; abandonment of compressor units; and modifications and maintenance work at 41 existing aboveground facilities	>10.0	NA	Under Construction	Northeast Pennsylvania-Upper Delaware Valley Interstate
Williams, Transco Leidy Southeast Expansion Project (CP13-551-000)	Proposed major project components would be in Luzerne, Monroe, Lycoming, and Columbia Counties, PA; and Hunterdon, Somerset, and Mercer Counties, NJ	30.0 miles of 42-inch-diameter pipeline looping and modifications to four existing compressor stations along the existing Transco Pipeline	>10.0	NA	Proposed	Northeast Pennsylvania-Upper Delaware Valley Interstate
Dominion Transmission Incorporated (DTI) New Market Project (CP14-497-000)	Madison, Chemung, Montgomery, NY	Addition of 33,000 horsepower of compression to DTI's existing interstate pipeline system, which would require the construction of two new compressor stations, modification of an existing compressor station, and other existing facility upgrades	>10.0	Mohawk	Proposed	Hudson Valley Intrastate
Williams Atlantic Sunrise (PF14-8)	Susquehanna, Wayne, Wyoming, Luzerne, Columbia, Northumberland, Schuylkill, Lebanon, Lancaster, Clinton, Lycoming, Lackawanna, PA; Prince William, VA; Howard, MD; NC, SC	Expansion of existing Transco system. 190 miles of pipeline, 2.5 miles of pipeline replacement, two new compressor stations, and other facility additions or modifications in PA, MD, VA, NC, and SC	3.3	Upper Susquehanna - Tunkhannock	Proposed	Northeast Pennsylvania-Upper Delaware Valley Interstate, Northwest Pennsylvania-Youngstown Interstate

TABLE 4.13-1 (continued)
Existing or Proposed Projects Evaluated for Potential Cumulative Impacts

Project	Location (County, State)	Description	Approximate Closest Distance to Project (miles)	Watershed [a]	Project Status[b]	Air Quality Control Region (AQCR)
TGP Northeast Energy Direct (NED) (PF14-22)	Susquehanna, Bradford, PA; Broome, Chenango, Delaware, Schoharie, Albany, Columbia, Greene, Dutchess, Montgomery, Herkimer, Oneida, Lewis, St. Lawrence, Bronx, Suffolk, NY; Fairfield, Litchfield, Hartford, CT; Berkshire, Franklin, Worcester, Middlesex, Essex, MA; Hillsborough, NH	Upgrade of an existing TGP pipeline system that includes over 300 miles of pipeline in PA, NY, CT, lateral construction and modifications of existing laterals, and compressor station construction and modifications	0.0	Upper Susquehanna - Tunkhannock	Proposed	Northeast Pennsylvania-Upper Delaware Valley Interstate, Southern Tier East Intrastate
Iroquois South-to-North (SoNo)	Montgomery, Schoharie, NY; Fairfield, CT	Reverse flow transport of up to 300,000 Dth/day from existing interconnects with Dominion in Canajoharie, NY, Algonquin Gas in Brookfield, CT, and the proposed Iroquois Project in Wright, NY to the US/Canada border	0.0	Schoharie	Proposed	Hudson Valley Intrastate
Other Projects						
Electric Generation and Transmission						
New York Transco, Oakdale - Frasier 345 kV Line Upgrade	Broome and Delaware, NY	57 miles of new 345-kV line from Union Township to Delhi Township	0.0	Upper Susquehanna, Upper Delaware	Proposed	Southern Tier East Intrastate
New York Transco, Delhi-Colliers 115 kV Line Reconductoring	Otsego, NY, Delaware, NY	17.5 miles of Reconductoring of an existing 115-kV line from Colliersville Township to Delhi Township	0.0	Upper Delaware	Proposed	Southern Tier East Intrastate
Horizon Wind Energy, Franklin Wind Farm	Delaware, NY	500- MW, 5,000 to 7,000-acre located in Franklin	1.4	Upper Delaware	Proposed	Southern Tier East Intrastate

TABLE 4.13-1 (continued)
Existing or Proposed Projects Evaluated for Potential Cumulative Impacts

Project	Location (County, State)	Description	Approximate Closest Distance to Project (miles)	Watershed [a]	Project Status[b]	Air Quality Control Region (AQCR)
Moresville Energy, L.L.C. (Invenergy LLC), Moresville Wind Energy Center	Delaware, NY	99-MW wind energy facility that would consist of 33 turbines located in Stamford and Roxbury	9.3	Upper Delaware	Ongoing	Southern Tier East Intrastate
Ridgeline Energy, Bruce Hill Wind Farm	Delaware, NY	Community-scale wind project located in Walton	5.1	Upper Delaware	Proposed	Southern Tier East Intrastate
Ridgeline Energy, Smokey Avenue Wind Farm	Otsego, NY	Community-scale wind project located in Maryland, NY	6.8	Upper Delaware	Proposed	Southern Tier East Intrastate
Ridgeline Energy South Mountain Wind Project	Delaware, NY	Community-scale wind project located in Walton, NY	12.9	Upper Delaware	Proposed	Southern Tier East Intrastate
Gulf Oil Great Bend LNG Facility	Susquehanna, PA	Natural gas liquefaction and storage facility in Great Bend, PA	6.0	Upper Susquehanna	Proposed	Northeast Pennsylvania – Upper Delaware Valley Interstate
Transportation						
NYSDOT, multiple minor projects	Broome, Chenango, Delaware, Otsego, and Schoharie, NY	Proposed infrastructure inspection, maintenance, and repair projects (such as road resurfacing, bridge repairs, road improvements, and culvert repairs) at various locations	0.3	Upper Delaware, Schoharie	Future projects (2013-2021)	Southern Tier East Intrastate; Hudson Valley Intrastate
NYSDOT, Route 357 Resurfacing Project	Delaware, NY	Resurface Route 357 from Route 7 to Merrickville Road	0.0	Upper Delaware	Proposed	Southern Tier East Intrastate
NYSDOT, Bridge Painting – Route 17	Broome, NY	Bridge painting at multiple locations along Route 17	0.0	Upper Delaware	Complete	Southern Tier East Intrastate
NYSDOT, Bridge Painting	Broome, NY	Preventative maintenance project to paint 11 bridges at various locations in Broome and Tioga Counties	0.0	Upper Delaware	Under Construction	Southern Tier East Intrastate
NYSDOT, Bridge Painting	Broome, Delaware, NY	Painting of 24 bridges on Route 17 in Broome, Delaware, and Sullivan Counties	0.0	Upper Delaware	Complete	Southern Tier East Intrastate

TABLE 4.13-1 (continued)
Existing or Proposed Projects Evaluated for Potential Cumulative Impacts

Project	Location (County, State)	Description	Approximate Closest Distance to Project (miles)	Watershed [a]	Project Status[b]	Air Quality Control Region (AQCR)
NYSDOT, Minor Repairs	Broome, NY	Minor repairs to the structures (BIN 1013311 and 1013312) that carry Route 17 over the Norfolk Southern Railroad in the Town of Sanford, Broome County.	0.0	Upper Delaware	Complete	Southern Tier East Intrastate
NYSDOT, Culvert Repairs	Broome, NY	Repair or replacement of 20 deficient culverts in the Towns of Barker, Colesville, Kirkwood, Triangle, Union and Vestal in Broome County, and the Towns of Nichols in Tioga County	0.0	Upper Delaware	Proposed	Southern Tier East Intrastate
NYSDOT, Scour Repairs	Broome, Chenango, Delaware, Schoharie	Perform Scour Repairs to 11 structures in Broome, Chenango, Delaware, Schoharie, and Tioga Counties	0.0	Upper Delaware, Schoharie	Under Construction	Southern Tier East Intrastate
NYSDOT, Roadside Drainage	Otsego, NY	Addresses roadside drainage issues to eliminate the need for guiderail where appropriate, by extending existing small culverts or installing a drainage structure, Various locations, Otsego County	0.0	Upper Delaware	Complete	Southern Tier East Intrastate
NYSDOT, Surface Treatment	Otsego, NY	Project will apply High Friction Surface Treatment on the Route 23 approach at Interstate 88 Exit 15 Westbound ramps to reduce skid accidents, City of Oneonta, Otsego County	0.0	Upper Delaware	Complete	Southern Tier East Intrastate
NYSDOT, Culvert Repairs	Broome, Chenango, Delaware, Otsego, Schoharie, NY	Repair of 6 deficient culverts at various locations in Broome, Chenango, Delaware, Otsego, and Schoharie counties.	0.0	Upper Delaware, Schoharie	Under Construction	Southern Tier East Intrastate

TABLE 4.13-1 (continued)
Existing or Proposed Projects Evaluated for Potential Cumulative Impacts

Project	Location (County, State)	Description	Approximate Closest Distance to Project (miles)	Watershed [a]	Project Status[b]	Air Quality Control Region (AQCR)
NYSDOT, Bridge Repairs	Broome, Schoharie, NY	General bridge repairs to the decks and approaches of 3 structures. Routes 26, 97, and 992L in the Village of Whitney Point/Town of Triangle, Tusten and Richmondville, Broome, Schoharie, and Sullivan Counties.	0.0	Upper Delaware, Schoharie	Complete	Southern Tier East Intrastate
NYSDOT, Maintenance	Chenango, Delaware, Otsego, Schoharie, NY	Maintenance project to paint 16 bridges at various locations in Chenango, Delaware, Otsego, Schoharie, and Sullivan Counties	0.0	Upper Delaware, Schoharie	Under Construction	Southern Tier East Intrastate
NYSDOT, Resurfacing	Otsego, NY	Improve surfaces of 6 bridges on Interstate 88 in the Town of Milford, in Otsego County	0.0	Unadilla River	Under Construction	Southern Tier East Intrastate
Pennsylvania Department of Transportation (PennDOT), multiple minor projects	Susquehanna, PA	Proposed repair projects (such as road resurfacing, bridge repairs, road improvements, and culvert repairs) at various locations	0.3	Upper Susquehanna-Tunkhannock, Upper Susquehanna	Proposed, Ongoing, & Complete	Northeast Pennsylvania – Upper Delaware Valley Interstate
PennDOT, District Bridge Group # 12	Susquehanna, PA	Bridge work for SR 1009	0.0	Upper Susquehanna	Unknown	Northeast Pennsylvania – Upper Delaware Valley Interstate
PennDOT, Susquehanna County Flood Repairs	Susquehanna, PA	Emergency flood repairs along SR 492 in Jackson Township	0.0	Upper Susquehanna	Complete	Northeast Pennsylvania – Upper Delaware Valley Interstate
PennDOT, Bridge Replacement	Susquehanna, PA	Bridge replacement over Deep Hollow Brook, State Route 1011, Harmony Township	0.0	Upper Susquehanna	Under Construction	Northeast Pennsylvania – Upper Delaware Valley Interstate
Commercial/Residential Development						
Town of Cobleskill, New York State Route 7/Howe Caverns Water and Sewer Line Infrastructure	Schoharie, NY	Construction of a new potable water system and sanitary sewer system	1.4	Schoharie	Under Construction	Hudson Valley Intrastate

TABLE 4.13-1 (continued)
Existing or Proposed Projects Evaluated for Potential Cumulative Impacts

Project	Location (County, State)	Description	Approximate Closest Distance to Project (miles)	Watershed [a]	Project Status[b]	Air Quality Control Region (AQCR)
Susquehanna County Housing and Redevelopment Authority, Sustainable Streets, Phase 3	Susquehanna, PA	Construction of sidewalks and curbing; and landscaping activities located in Susquehanna Depot	1.7	Upper Susquehanna	Complete	Northeast Pennsylvania – Upper Delaware Valley Interstate
Subdivision	Broome, NY	Four residential subdivisions located in Sanford	0.1	Upper Delaware	Complete	Southern Tier East Intrastate
Area Variance	Schoharie, NY	Construction of a front porch on an existing residence	0.6	Schoharie	Complete	Hudson Valley Intrastate
Subdivision	Schoharie, NY	Application to subdivide a parcel located in Summit. The parcel has since been subdivided.	0.0	Upper Delaware	Complete	Hudson Valley Intrastate
Area Variance	Schoharie, NY	Approval of variance request for parcel size requirements	0.02	Schoharie	Complete	Hudson Valley Intrastate
Subdivision	Schoharie, NY	Four lot subdivision	0.0	Schoharie	Approved	Hudson Valley Intrastate
Subdivision	Schoharie, NY	Oak Meadows Subdivision. 27-lot residential subdivision	0.1	Schoharie	Approved	Hudson Valley Intrastate
Subdivision	Schoharie, NY	Carolina-Catapano Estates. 11-lot residential subdivision	0.2	Schoharie	Ongoing	Hudson Valley Intrastate
Rental Apartments	Schoharie, NY	Two 4-unit rental apartments	0.4	Schoharie	Approved, construction delayed	Hudson Valley Intrastate
Town Houses	Schoharie, NY	Donats Brow Townhomes. 9-lot townhome community	2.4	Schoharie	Under construction	Hudson Valley Intrastate

TABLE 4.13-1 (continued)
Existing or Proposed Projects Evaluated for Potential Cumulative Impacts

Project	Location (County, State)	Description	Approximate Closest Distance to Project (miles)	Watershed [a]	Project Status[b]	Air Quality Control Region (AQCR)

[a] Watersheds listed are National Hydrography Datasets (NHD) Hydrologic Unit Code (HUC) -8 watersheds that are crossed both by the project listed in the table and the proposed projects.

[b] Proposed = Project has been identified but applications have not been submitted; Pending = Permit applications have been submitted but regulatory approvals have not been obtained; Ongoing = Regulatory permits have been issued; Approved = the action has been approved by the regulating agency; Under Construction = construction has commenced; In service/Complete = Construction has been completed and the project is in operation; TBD = to be determined; Unknown = Project details and/or status are not available.

[c] Proposed well drilling activity located in counties within 10 miles of the proposed projects; see text for additional information.

[d] Projects recently completed, under construction, or expected to be under construction in the same timeframe as and located within 10 miles of Constitution's and Iroquois' projects.

[e] This project is a non-FERC-jurisdictional project that is related to the Constitution and Iroquois projects; see text for additional information.

Sources: DTE Energy 2012; EPA 2012b; Kinder Morgan 2013; Leatherstocking 2014; O&G 2013; PADEP 2013d; NYSDEC 2013l; Schoharie County Planning and Development Agency (SCPDA) 2013; Williams 2013; DTI 2014; Kinder Morgan 2014; NGI 2014; Spectra 2014; The Times Tribune 2014; Town of Richmondville 2014; Town of Summit 2014; Town of Wright 2014; TSPB 2014a; TSPB 2014b; Village of Cobleskill 2014; Williams 2014a; Williams 2014b; Town of Cobleskill 2014.

4.13.1 Marcellus Shale Development

4.13.1.1 Background

The Marcellus Shale is an approximately 385-million-year-old, organic-rich shale formation that exists beneath 93 million acres of Pennsylvania, southern New York, eastern Ohio, and northern West Virginia. Over geologic time and with the pressure and temperature associated with deep burial, oil and natural gas can be generated within organic-rich shale formations. However, because shale is generally impermeable (that is, fluids do not readily flow through the formation), the oil and natural gas contained in these types of rocks cannot be economically produced using conventional well drilling and completion methods. Within the last 20 years, however, the petroleum industry has developed the horizontal drilling technique in conjunction with hydraulic fracturing (fracking), which has been in use for over 50 years, to recover natural gas from shale reservoirs. Fracking involves the injection of fluids and sand under high pressure to fracture the shale around the wellbore, thus enabling the flow of natural gas to the well.

Using these techniques, the first natural gas production from the Marcellus Shale in Pennsylvania began in 2005. Prior to 2005, Pennsylvania was producing approximately 0.5 billion cubic feet per day (bcf/d) of natural gas from conventional reservoirs. With development of the Marcellus Shale, Pennsylvania is forecast to produce approximately 7.5 bcf/d by 2015 and 13.4 bcf/d by 2020 (Governor's Marcellus Shale Advisory Commission 2011). The USGS recently estimated that the Marcellus Shale contains a technically recoverable mean of 84 trillion cubic feet of natural gas (Coleman et al. 2011). For comparison, in 2012, the United States consumed approximately 25.5 trillion cubic feet of natural gas (EIA 2013b); thus, the Marcellus Shale represents a significant natural gas deposit in close proximity to the high population centers of the northeastern United States.

Natural gas production from the Marcellus Shale involves the drilling and completion of wells and construction of gathering systems and consequent rights-of-way. We received comments concerning the FERC's jurisdiction over these "upstream" production activities. The FERC's authority under the NGA review requirements relate only to natural gas facilities that are involved in interstate commerce. Thus, the facilities associated with the production of natural gas are not under FERC jurisdiction.

We received comments during scoping concerning the development of natural gas reserves in the Marcellus Shale. Development of the Marcellus Shale natural gas resource is not the subject of the EIS nor is the issue directly related to the proposed projects. Production and gathering activities, and the pipelines and facilities used for these activities, are not regulated by the FERC but are overseen by the affected region's state and local agencies with jurisdiction over the management and extraction of the Marcellus Shale gas resource. The FERC's jurisdiction is further restricted to facilities used for the transportation of natural gas in interstate commerce, and does not typically extend to facilities used for intrastate transportation.

Although we do not examine the impacts of Marcellus Shale upstream facilities to the same extent as Constitution's and Iroquois' projects in this EIS, we considered the general development of the Marcellus Shale in proximity to the projects within the context of cumulative impacts in the area of both projects. A more specific analysis of Marcellus Shale upstream facilities is outside the scope of this analysis because the exact location, scale, and timing of future facilities are unknown.

4.13.2 Natural Gas Production

4.13.2.1 Wells

Marcellus Shale production wells involve improvement or construction of roads, preparation of a well pad, and drilling and completion of the well. Between 2009 and October 2013, 1,564 unconventional gas wells were permitted in Pennsylvania counties within 10 miles of the proposed projects (1,545 in Susquehanna County and 19 in Wayne County) (PADEP 2013d). During the same time period the NYSDEC issued 68 natural gas well permits in New York counties within 10 miles of the proposed projects (2 in Broome County, 63 in Chenango County, and 3 in Otsego County) (NYSDEC 2013l). As of October 1, 2013, companies reported drilling 760 (almost 50 percent) of the aforementioned permitted wells in Pennsylvania; 27 (approximately 40 percent) of the permitted wells in New York were listed as active (PADEP 2013d; NYSDEC 2013l). Less gas production occurs in New York due to current horizontal well drilling and high-volume hydraulic fracturing method restrictions in the state. It is likely that drilling would continue through the construction of the proposed projects, but the exact extent of such drilling is unknown.

As discussed in section 1.0, in order for the Commission to approve a project, it must determine whether a project is in the public convenience and necessity. This in part entails identifying whether a) there is a market demand in the delivery area for the gas, and b) there are supplies in the production that area can supply the capacity of the project. In presenting its project to the Commission, Constitution has asserted that both of these factors have been met. The proposed projects are not reliant on other projects to meet Constitution's stated objectives.

Constitution has shippers that have committed to the pipeline; however, as discussed in section 1.0, if Constitution were to increase the delivery pressure of its pipeline it could increase the pipeline's capacity by 200,000 Dth/d. Therefore, (and only after obtaining additional FERC review and approval) Constitution could potentially deliver additional natural gas supplies if they were to become available and the shipper has reached an agreement with Constitution. These additional supplies could be developed in any general area (not necessarily Susquehanna, Pennsylvania) or would not even have to be the result of additional development, but the freeing of supplies in other areas that could be redirected towards markets in the Northeast.

A typical gas producing well can provide between 0.3 to 8.7 Mmcf/d (304 to 8,830 Dth/d) of natural gas per day (NYSDEC 2011). Therefore, in order to supply the gas to Constitution's project (650,000 Dth/d), and assuming all the gas supply was strictly from shale production, we estimate that depending on the individual productivity of the well, 74 to 2,135 wells have been developed. Additionally, we estimate that the excess capacity of the pipeline (200,000 Dth/d) could be completed with the equivalent of an additional 23 to 657 wells. According to NYSDEC (2011), a newly drilled well has a lifespan of 30 years. Since 2009, 7,536 unconventional wells have been drilled in Pennsylvania (904 of these in Susquehanna County). Assuming that an average well requires approximately 4.8 acres during construction and 0.5 acre during operation, transportation of 650,000 Dth/d would involve or have already involved the disturbance of 355 to 10,248 acres during construction/drilling, and 37 to 1,068 acres as part of permanent production operations. Production of additional wells to provide 200,000 Dth/d could involve or have already involved the additional disturbance of 110 to 3,154 acres during construction/drilling and 12 to 329 acres as part of permanent well operations. Due to the complexities of natural gas within the interstate pipeline, gas may enter and exit anywhere within the contiguous United States, making any specific identification or analysis of individual wells beyond the scope of this EIS.

4.13.2.2 Pipeline Gathering Systems

Multiple non-jurisdictional FERC intrastate natural gas well interconnect and gathering facilities are either proposed, under construction, or have been constructed within 10 miles of the proposed projects. These non-jurisdictional pipeline systems gather natural gas from Marcellus Shale wells for transport to local customers or the interstate natural gas transmission system.

At least 13 companies own multiple natural gas gathering system projects within the region of influence for both projects. At least seven of these projects are or would be within 0.25 mile of the proposed projects, and two of these intersect Constitution's project (see table 4.13-1). The Williams Field Services Company's (Williams's) Squire Pipeline project, which is currently in the permitting and review process, is an 8-inch-diameter natural gas pipeline that would intersect Constitution's project at MP 1.8. DTE Energy's (DTE's) Bluestone Gathering System project is a 44-mile-long, 16- to 20-inch-diameter gathering pipeline that extends from Susquehanna County, Pennsylvania to Broome County, New York. The Bluestone Gathering System was placed into service in November 2012 and intersects Constitution's proposed route in multiple locations.

The Leatherstocking Project involves constructing four interconnects with the Constitution pipeline in Susquehanna, Delaware, and Otsego Counties, in order to potentially bring a new supply of natural gas to communities in northern Pennsylvania and New York. The delivery locations may include communities currently without natural gas service, but any final determinations are at the discretion of Leatherstocking, and no decisions have been made at this time. Leatherstocking has, however, indicated that it intends to provide natural gas service to the existing Amphenol facility in Sidney, New York.

Leatherstocking entered into an agreement with Constitution in 2014 to construct the four aforementioned interconnects. However, at this time no finalized construction and design plans for the Leatherstocking Project are available (Leatherstocking 2013). If the Leatherstocking Project were completed, it would likely consist of small diameter pipelines (2 to 6 inches), and various appurtenant facilities such as meter and pressure regulation stations. New compressor stations would be unlikely, as the high operating pressures of interstate natural gas lines can generally support delivery needs of most small diameter pipelines for a short distance. Construction and operational procedures for a distribution pipeline would be similar to those of Constitution's, although they would be on a smaller scale, and rights-of-way would likely be smaller. We estimated that a pipeline from the existing Amphenol facility would be approximately 4 miles long. Assuming a 50 foot construction right-of-way width (30 foot permanent) for a 6-inch-diameter pipeline, Leatherstocking's pipeline for the Amphenol plant could impact 24.2 acres during construction and 14.6 acres during operation. The locations of the other three proposed endpoints are unknown. However, as discussed in section 1.1, Leatherstocking has agreements with the following towns/villages: Delhi, Bainbridge, Windsor, Unadilla, and Sidney. We estimate that Leatherstocking's pipeline would need to be approximately 30 miles to reach the Village of Delhi, 6 miles for the Town/Village of Bainbridge, 17 miles for the Town/Village of Windsor, and 2 miles each for the Town/Village of Unadilla and Sidney. Assuming a 50 foot construction right-of-way width (30 foot permanent) Leatherstocking's pipeline could impact 182 acres during construction and 109 acres during operation to reach the Village of Delhi, 36 acres during construction and 22 acres during operation to reach the Town/Village of Bainbridge, 103 acres during construction and 62 acres during operation to reach the Town/Village of Windsor, 12 acres during construction and 7 acres during operation each to reach the Town/Villages of Unadilla and Sidney.

Three additional projects would intersect the Constitution pipeline corridor and would contribute to the infrastructure providing natural gas volumes to the Constitution pipeline. These projects include Williams's Central Compressor Station adjacent to Constitution's project at MP 0.0, William's White

Road M&R Station at MP 3.3, and Southwestern's Sutton Road M&R Station at MP 9.4, all in Susquehanna County. These facilities are discussed further in section 4.13.2.

All projects located within Constitution's region of influence are, or would be, within the Northeast Pennsylvania – Upper Delaware Valley AQCR as well as within at least one of the watersheds crossed by the Constitution project. Construction of the gathering systems would involve activities similar to construction of interstate natural gas transmission facilities, although land requirements for construction would typically be less for gathering systems due to the installation of smaller diameter pipe.

4.13.2.3 Hydraulic Fracturing in New York

We received over 340 comments on the draft EIS and at our comment meetings suggesting that the proposed pipeline would act as a facilitator to hydraulic fracturing in New York. We have no reason to conclude that the mere presence of a pipeline would incentivize legislation to allow for high volume hydraulic fracturing in New York, where it is currently disallowed. In addition, there are 5,018 miles of existing natural gas pipelines across New York State, including the Tennessee Gas, Dominion, and Millennium pipelines in southern New York (EIA 2008). The presence of these pipelines has not resulted in the authorization of hydraulic fracturing in New York. If it were to be allowed in New York, any of these pipelines could serve to transport newly developed supplies, should these pipelines have capacity at the time. Furthermore Constitution's pipeline would represent approximately 2.5 percent of the total miles of interstate pipeline in New York. In addition, we also note that in June 2014, the New York Supreme Court ruled that local governments, such as towns, can ban high volume hydraulic fracturing through zoning ordinances. Therefore, we conclude that the proposed project would not facilitate the use of high volume hydraulic fracturing in New York.

4.13.3 Non-jurisdictional Project-related Facilities

Southwestern would construct the Sutton Road M&R Station on a 2.0-acre parcel of land in New Milford Township, Pennsylvania. The land is collocated with the proposed Constitution pipeline corridor and is currently associated with agricultural/open land cover types. Access to the Sutton Road M&R Station would be acquired by Southwestern via a gravel road. An associated approximately 900-foot-long, 12.75-inch outside diameter lateral pipeline would be constructed by Southwestern to deliver gas to the Sutton Road M&R Station from its planned TNT Compressor and Dehydration Facility, which would be located north of Sutton Road, also in New Milford Township. Southwestern has indicated that its proposed TNT Compressor Station and connecting lateral pipeline are in the planning phases, but Southwestern anticipates that the TNT Compressor Station would disturb approximately 12 acres of land.

Williams would expand its existing Central Compressor Station located at MP 0.0 in Brooklyn Township, Pennsylvania. This facility was placed into service in 2013 to accommodate the needs of the Williams Springville Pipeline gathering system.

Williams's Miller Compressor Station and associated Reynolds Pipeline are currently under development and would result in the disturbance of 29.7 acres of primarily forested land in Harford Township, Pennsylvania. The Miller Compressor Station would be used to support multiple gathering line systems in the region; therefore, it would have been constructed regardless of whether or not Constitution's project is built. Gas would be discharged from the Miller Compressor Station to the proposed Constitution pipeline via the 20-inch outside diameter Reynolds Pipeline. Construction of the Reynolds Pipeline would result in approximately 2 miles of linear impacts on agricultural/forested/open lands.

Williams's planned White Road M&R Station would be adjacent to the proposed Constitution pipeline corridor in Harford Township, Pennsylvania and would house the necessary equipment to facilitate the delivery of gas from the Miller Compressor Station to the Constitution pipeline. Formal site plans for this station have not been finalized, but it is currently proposed to be sited on 2.2 acres of agricultural and open land adjacent to an existing well drill pad site. Because the Miller Compressor Station, Reynolds Pipeline, and White Road M&R Station are either in the planning or development phases, the extent of the potential impacts that could occur as a result of their construction and operation is unknown; however, certain impacts can be estimated.

We anticipate that the expansion activities planned at the Williams Central Compressor Station would occur within existing fence lines and that the shippers would use existing access roads. We also anticipate that shippers would obtain all environmental permits and approvals required for the modifications. Land use types that would be impacted by the non-jurisdictional project-related facilities are generally the same land use types that would be impacted by the proposed projects. Impacts from the non-jurisdictional pipelines and compressor stations would be similar to the proposed projects except on a smaller scale due to smaller diameter pipe and smaller compressor station parcels. Further, the proposed/ongoing activities at the Central Compressor Station and Miller Compressor Station would be completed whether or not the proposed projects are constructed. Therefore, we conclude that construction and operation of the non-jurisdictional project-related facilities would result in negligible cumulative impacts in the region.

4.13.4 FERC-Jurisdictional Natural Gas Pipeline Projects

There are 11 planned, proposed, or existing FERC-jurisdictional natural gas transmission projects within 10 miles of the proposed projects. A description of each project is included in table 4.13-1, and additional details regarding each project can be obtained through our website at www.ferc.gov by utilizing the docket number given for each project. At the time of issuance of this final EIS the SoNo project has not entered into the pre-filing process with the FERC; therefore, a docket number has not been assigned.

TGP's 300 Line Project, which was put into service in 2011, is 6.2 miles from Constitution's proposed project at its closest point. The 300 Line Project is a 127-mile-long, 30-inch-diameter pipeline loop with two new compressor stations and compressor station modifications in Pennsylvania and New Jersey.

TGP's Northeast Supply Diversification (NSD) Project was placed into service in 2012 and adds transportation capacity to TGP's 300 Line. The NSD Project includes approximately 7 miles of 30-inch-diameter pipeline that loops the 300 Line in Bradford and Tioga Counties, Pennsylvania, as well as compressor station modifications and upgrades in Erie and Niagara Counties, New York (Kinder Morgan 2014). The pipeline looping segment in Bradford County is the project component closest to Constitution's proposed project. This segment is more than 10 miles from the proposed projects. The portion of the NSD Project located in Bradford County, is within one of the same AQCRs (Northeast Pennsylvania-Upper Delaware Valley Interstate) as the proposed Constitution project.

TGP's Northeast Upgrade Project, which was put into service in 2013, is 13.0 miles from Constitution's proposed project at its closest point. The Northeast Upgrade project consisted of a 40.9-mile-long, 30-inch-diameter pipeline loop and modifications to four existing compressor stations.

Dominion Transmission Incorporated's (DTI) proposed New Market Project would add approximately 33,000 horsepower of compression to DTI's existing interstate pipeline transmission system. The project, which DTI anticipates to be in service by November 2016, includes the construction

of two new compressor stations in Madison and Chemung Counties, New York; adding 11,000 horsepower of additional compression at an existing compressor station in Montgomery County, New York; the addition or modification of M&R facilities; and the addition of gas coolers at existing compressor stations in Tompkins, Herkimer, and Montgomery Counties, New York (DTI 2014). The New Market Project would be more than 10 miles from Constitution's proposed project. A portion of the New Market Project in Montgomery County would be within one of the same AQCRs (Hudson Valley Intrastate) as the proposed Constitution project.

Williams' Leidy Southeast Expansion Project is a proposed looping and compression addition project that would increase the existing Transco Pipeline's natural gas capacity by 525,000 Dth/d. The project includes the construction of new 42-inch-diameter pipeline that would be looped with portions of the existing Transco Pipeline in Luzerne and Monroe Counties in Pennsylvania and Somerset, Hunterdon, and Mercer Counties in New Jersey. The Leidy Southeast Expansion Project would also include modifications to existing compressor stations in Luzerne, Lycoming, and Columbia Counties, Pennsylvania and Mercer County, New Jersey (Williams 2014a). This project would be over 10 miles from Constitution and Iroquois' projects. However, portions of the project in Luzerne and Monroe Counties in Pennsylvania and Hunterdon County in New Jersey would be within one of the same AQCRs (Northeast Pennsylvania – Upper Delaware Valley Interstate) as the proposed projects.

Williams' Atlantic Sunrise Project would involve an expansion of its existing Transco pipeline, which transports natural gas to endpoints in the northeastern and southeastern United States. The project, currently under FERC's pre-filing review, would add new pipeline infrastructure in Pennsylvania and modify existing Transco facilities in Pennsylvania, Maryland, Virginia, North Carolina, and South Carolina to allow gas to flow bi-directionally. The project's anticipated construction start date is the summer of 2016, and Williams' target in-service date is in the second half of 2017 (Williams 2014b). The Atlantic Sunrise Project would be approximately 3 miles from the southern terminus of Constitution's project. Therefore, the projects would be separated by distance and time.

Spectra Energy Corporation's TEAM 2014 Project is under construction with an anticipated completion date of November 2014. The TEAM 2014 Project is in Pennsylvania, West Virginia, Ohio, Kentucky, Tennessee, Alabama, and Mississippi. This project will increase capacity of the existing Texas Eastern pipeline system by approximately 600 million cubic feet per day. In Pennsylvania, the TEAM 2014 project involves the installation of 33.6 miles of new 36-inch-diameter pipeline loop and related aboveground facilities in Fayette, Perry, Dauphin, Lebanon, and Berks Counties, as well as the installation of four new compressor stations and associated facilities at existing compressor stations in Westmoreland, Indiana, and Huntingdon Counties. The project also includes modifications and maintenance work at various existing facilities throughout the other six states in which it is sited (Spectra 2014). This project is located more than 10 miles from Constitution's project. The portion of the TEAM 2014 Project in Berks County is within one of the same AQCRs (Northeast Pennsylvania – Upper Delaware Valley Interstate) as the proposed Constitution project.

Williams' Transco Northeast Supply Link (NSL) Project, which was placed into service in 2013, adds 250,000 Dth/d to the existing Transco Pipeline's incremental firm natural gas transportation capacity (Williams 2013). The NSL Project resulted in 12.0 miles of new 42-inchdiameter pipeline loop in Lycoming and Monroe Counties, Pennsylvania and Hunterdon County, New Jersey; replacement of a 0.05-mile-long segment of 36-inch-diameter pipeline in Essex County, New Jersey; uprating of 25.6 miles of existing 36-inch-diameter pipeline in Essex, Passaic, Bergen, and Hudson Counties, New Jersey; construction of a new 25,000 horsepower compressor station in Essex County, New Jersey; modification of two existing compressor stations in Somerset County, New Jersey and Luzerne County, Pennsylvania; and modification of other existing aboveground facilities in Pennsylvania, New Jersey, and New York (EPA 2012b). The NSL Project is more than 10 miles from the proposed Constitution project. The

portion of the NSL Project in Monroe County is within one of the same AQCRs (Northeast Pennsylvania – Upper Delaware Valley Interstate) as the proposed Constitution project.

Millennium's Minisink Compressor Station Project was placed into service in 2013. The Minisink Compressor Station Project involved the construction of a compressor station and maintenance building in the town of Minisink, Orange County, New York. The project was implemented as part of Millennium's plan to increase its capacity by 300 million cubic feet per day between 2011 and 2012 (O&G 2013). The Minisink Compressor Station Project is more than 10 miles from the proposed Constitution project and is within one of the same AQCRs (Hudson Valley Intrastate).

The NED Project is currently under development and began the FERC's pre-filing process on October 2, 2014[15]. TGP's Northeast Energy Direct (NED) Project would involve upgrading its existing pipeline system in New York, Pennsylvania, Massachusetts, New Hampshire, and Connecticut to provide 2.2 billion cubic feet of natural gas per day to the New England area. Preliminary project designs for the proposed NED Project include 32 miles of pipeline looped adjacent to the existing TGP 300 Line in Pennsylvania; 135 miles of greenfield pipeline from Troy, Pennsylvania to Wright, New York; 177 miles of greenfield pipeline from Wright, New York to Dracut, Massachusetts; and approximately 73 miles of lateral or pipeline looping throughout Pennsylvania, New York, Massachusetts, Connecticut, and New Hampshire. The NED Project would also involve modifications to an existing compressor station, the construction of 15 new M&R stations, modifications to 7 existing M&R stations, and construction of 8 new compressor stations. TGP's anticipated construction start date is January 2017 with an in-service date of November 2018. Therefore, construction of the NED Project would not coincide or occur within the same general timeframe of the proposed Constitution and Iroquois projects. However, ongoing restoration activities associated with the Constitution and Iroquois projects could still be occurring during the anticipated construction schedule of the NED Project.

Since the NED Project has just begun the pre-filing process with the FERC, the project may come to fruition, may be denied by the Commission, could be delayed, or could be withdrawn by the project sponsor. If the NED Project were approved by the Commission, there would be some cumulative impacts with the Constitution project on resources such as wetlands, streams, vegetation, and land use. However, the separation in time between the Constitution and Iroquois projects and the NED Project would minimize the temporary impacts on certain resources. The permanent impacts of these projects, for example loss of forested lands, could result in significant cumulative impacts. Construction would occur consecutively rather than simultaneously, and areas disturbed by the Constitution pipeline would be restored and stable prior to construction of the NED Project, as the same regulatory oversight by the FERC would occur. In addition, the NED Project would be constructed and maintained in accordance with our approved procedures and other construction, operation, and mitigation measures that may be required by federal, state, or local permitting authorities, further reducing the potential for cumulative impacts.

We estimate that the entire NED Project could impact over 5,500 acres during construction and about 2,500 acres during operation[16]. As currently planned by TGP, portions of the NED Project would be collocated with Constitution's pipeline for portions of its route. We analyzed two scenarios: one with a 25-foot overlap between the permanent rights-of-way, and one with no overlap between the two rights-of-way. Assuming no overlap, the NED Project along the Constitution pipeline (125 miles) would impact

[15] This can be found at http://elibrary.ferc.gov:0/idmws/file_list.asp?document_id=14257013.

[16] Calculation is an estimate assuming a total project length of 417 miles, a construction right-of-way of 110 feet, and a permanent right-of-way of 50 feet.

approximately 1,667 acres during construction and approximately 758 acres during operation[17]. Assuming a 25-foot overlap, the NED Project along the Constitution pipeline (125 miles) would impact approximately 1,288 acres during construction and approximately 379 acres during operation[18]. For the purposes of this cumulative impacts analysis, only the portion of the NED Project which could be generally collocated with the Constitution project was considered.

Iroquois's South-to-North (SoNo) Project would use existing interconnects with DTI in Canajoharie, New York and Algonquin Gas Transmission in Brookfield, Connecticut as well as with Iroquois in Wright, New York to reverse flow up to 300,000 Dth/day of natural gas to the U.S./Canada border. The SoNo Project is under initial development, and Iroquois has not submitted any project-related filings or applications at this time with the FERC. The anticipated in-service date for the planned SoNo Project is November 2016 (P&G Journal 2014). Iroquois has not suggested a construction date at this time, but based on the scope of the project, the sponsor may plan on beginning construction in early 2016. If the SoNo Project involves a simple flow reversal, the need for new infrastructure and resulting environmental impacts would be minimal.

Based on various combinations of their distance from the proposed and planned projects, scope, and schedule, construction of the aforementioned FERC-jurisdictional projects are not expected to significantly contribute to cumulative impacts in the area of the proposed projects. In addition, all of the FERC-jurisdictional projects would be constructed and maintained in accordance with our approved procedures and other construction, operation, and mitigation measures that may be required by federal, state, or local permitting authorities, further reducing the potential for cumulative impacts.

4.13.5 Other Projects

Electric Generation and Transmission Projects

There are two proposed electric and transmission projects located within ten miles of the proposed projects, both of which are located in New York. New York Transco's Oakdale-Frasier 345 kilovolt (kV) Line Upgrade project would include approximately 57 miles of new electrical transmission line from Union Township in Broome County to Delhi Township in Delaware County and is expected to cross the proposed Constitution pipeline at MP 53.0. If the Oakdale-Frasier 345-kV Line Upgrade project is built, construction is expected to commence in 2014 and be inservice in December 2018. However, the permitting process is ongoing and incomplete and could result in changes to the New York Transco's schedule. Therefore, while the project status is uncertain, it is reasonable to assume that a crossing of the pipeline in Broome or Chenango Counties would be required for the project whether or not construction occurs concurrently or at a later date.

New York Transco is also proposing to construct the Delhi-Colliers 115-kV Line Reconductoring project, which would include the reconductoring of 17.5 miles of existing transmission line that intersects Constitution's project route at MP 57.0. The existing 115-kV line extends begins in Colliersville Township in Otsego County and ends in the Village of Delhi in Delaware County. Information on the proposed timeline for this project is not available; therefore, it was not possible to determine if it is reasonably foreseeable. We anticipate that the reconductoring work would take place within the existing transmission line corridor on existing transmission line structures and also using existing access roads.

[17] Calculation is an estimate assuming a total project length of 125 miles, a construction right-of-way of 110 feet, and a permanent right-of-way of 50 feet.

[18] Calculation is an estimate assuming a total project length of 125 miles, a construction right-of-way of 85 feet, and a permanent right-of-way of 25 feet.

Therefore, cumulative impacts associated with the operation of the Delhi-Colliers 115-kV Line Reconductoring project are not expected to occur.

There are five potential wind energy projects within 10 miles of the proposed projects, all of which would be in the state of New York. Very little public information is available about these projects; therefore, their exact locations and current status are unknown. For the purposes of this analysis, it was assumed that all five projects are in the permitting phase and could move forward to construction at an undetermined date.

Gulf Oil is planning to construct an inland LNG facility in Great Bend, Susquehanna County, Pennsylvania. The facility would liquefy and store natural gas received from a Williams gathering line. The LNG facility would have the capacity to produce up to 300,000 gallons per day of liquefied natural gas. This project is in the preliminary phases of development. This would not be a FERC-regulated project as it would not involve shipping natural gas through an interstate pipeline. Instead, Gulf Oil would deliver its product via truck to heavy equipment operators that want to fuel their equipment with natural gas instead of diesel fuel. The LNG would also be sold and trucked to utility companies for use during periods of high energy demand. The proposed facility is subject to review and permitting by the PADEP, the Pennsylvania Public Utility Commission, and other Pennsylvania and federal agencies. If approved by the applicable agencies, the project's anticipated in-service date is the end of 2015 (FERC 2014, NGI 2014, Times Tribune 2014).

Transportation and Commercial/Residential Development Projects

Transportation Projects

The Pennsylvania Department of Transportation (PennDOT) and the NYSDOT are overseeing multiple ongoing and proposed infrastructure projects in the region of influence for the proposed projects. The scopes of all of the projects are limited to work on existing infrastructure. The exact locations for many transportation projects are not available, because they involve work at multiple locations. Therefore, the proximity of these projects to the Constitution and Iroquois' projects could not be determined. Of the transportation projects with multiple locations, those that are located in counties crossed by the Constitution and Iroquois projects were evaluated according to the guidelines and criteria established for this cumulative analysis. Of the projects that do have specific locational information, four intersect Constitution's project:

- The PennDOT's District Bridge Group #12 project crosses the proposed Constitution pipeline in multiple locations in Harmony Township, Susquehanna County. This project would consist of bridge work along State Route 1009. The project's status is unknown.
- The PennDOT completed its Susquehanna County Flood Repairs project, which involved emergency flood repairs along State Route 492 in Jackson Township and crossed the current proposed Constitution pipeline at MP 10.0;
- The NYSDOT's proposed Route 357 Resurfacing project would cross the proposed Constitution project at MP 60.6. This project would resurface Route 357 from Route 7 to Merrickville Road in the towns of Sidney and Franklin; and
- The NYSDOT's Bridge Painting – Route 17 project was completed in September 2013. This project crosses Constitution's proposed route at MP 28.7.

All of the aforementioned transportation projects are minor with the exception of PennDOT's I-81 Reconstruction project, which would rebuild the north and south lanes of Interstate 81 from Exit 223

(New Milford Township, Pennsylvania) to the New York-Pennsylvania border. This project would be 1.0 mile northwest of MP 9.7 of Constitution's project and would be within two of the same watersheds. The status of the I-81 project is unknown but based on available information could likely occur concurrently or after construction of the proposed projects.

Commercial/Residential Development Projects

Constitution identified one utility infrastructure project in the vicinity of the proposed projects. The Town of Cobleskill, New York is currently constructing a potable water system and a sanitary sewer system to serve the Village of Cobleskill. The New York State Route 7/ Howe Caverns Water and Sewer Line Infrastructure Project, is located 1.4 mile northwest of the proposed Constitution pipeline in Schoharie County. The Route 7/ Howe Caverns Water and Sewer Line Infrastructure project, along with the proposed projects, are within the Mohawk River watershed and the Hudson Valley Interstate ACQR. It is anticipated that the system will be placed into service by the end of August 2014 (Cobleskill 2014).

Constitution identified seven minor residential developments within 0.25 mile of the proposed projects. Details of the locations of the developments relative to the projects are provided in table 4.13-1. The Constitution project would cross one outer edge of a subdivided parcel that is part of a subdivision in the Town of Summit in Schoharie County, New York. Constitution's project would also cross a parcel in the Town of Schoharie near State Routes 7 and 30 that is labeled 'subdivision' by the Schoharie County Planning and Development Agency. This land is not currently officially planned for development, and Constitution is in easement negotiations with the landowner.

The majority of these projects would consist of short-term, localized activities. We anticipate that these transportation and commercial/residential development projects would require state or local approval and that BMPs would be implemented to minimize environmental impacts such as erosion and sedimentation.

4.13.6 Potential Cumulative Impacts of the Proposed Action

The potential impacts that we consider as part of our cumulative review pertain to geology and soils; groundwater, surface water, and wetlands; vegetation; wildlife; fisheries and aquatic resources; land use, recreation, special interest areas, and visual resources; socioeconomics; cultural resources; and air quality and noise.

In the following analysis we discuss the potential cumulative impacts associated with the general development of the Marcellus Shale, nearby non-jurisdictional project-related projects, residential development projects, and wind energy projects. For reasons discussed above, we did not further consider more distant FERC-jurisdictional projects, New York Transco's electric transmission line projects, or transportation projects in our analysis.

4.13.6.1 Geology and Soils

Cumulative effects on geology crossed by the proposed projects would be limited primarily to the combined impacts of construction projects located within the same region of influence as the proposed projects and recently completed or concurrent construction activities along the same route as the proposed projects. These include natural gas wells, natural gas gathering systems, wind energy projects, and non-jurisdictional project-related natural gas projects. The facilities associated with the proposed projects are expected to have a temporary, but direct impact on near-surface geology and soils. The soil stabilization and revegetation requirements included in Constitution's ECP and Iroquois' Plan and Procedures would prevent or minimize any indirect impacts. Because the direct effects would be highly localized and

limited primarily to the period of construction, cumulative impacts on geology and soils would primarily occur if other projects are constructed at the same time and place as the proposed projects. The construction of some of the projects listed in table 4.13-1, such as the Marcellus Shale gathering systems projects, several residential development projects, and the non-jurisdictional project-related facilities, could coincide with the schedule proposed for the Constitution pipeline and the Iroquois compressor station. Projects that require significant excavation or grading would also have temporary, direct impacts on near-surface geology and soils, although like the proposed projects, the duration and effect of these projects would be minimized by the implementation of erosion control and restoration measures.

In Pennsylvania, the permitting of upstream facilities associated with the development of the Marcellus Shale is under the jurisdiction of the PADEP Bureau of Oil and Gas Management. The PADEP has developed BMPs for the construction and operation of upstream oil and gas production facilities. These BMPs include erosion and sediment control practices; setback requirements from springs, wetlands, and waterbodies; wetland and waterbody crossing procedures; access road construction practices; soil amendment procedures; and right-of-way restoration measures. Implementation of these measures, in combination with the measures outlined in Constitution's ECPs would avoid or minimize cumulative impacts of Marcellus Shale development activities on geology and soil resources in the project area, particularly where workspaces are adjacent to each other.

Many of the non-jurisdictional project-related facilities, the Leatherstocking Project, and residential development projects are adjacent to Constitution's project. In addition, there are several proposed wind energy projects in the region of influence. Since the schedule for construction of the non-jurisdictional project-related facilities, the wind energy projects, the Leatherstocking Project, and the two residential subdivisions is not known, we are unable to determine if any or all would be constructed at the same time as the proposed project. However, we expect these projects to be required by the state permitting agencies to adhere to BMPs similar to those proposed by Constitution and Iroquois. The potential for cumulative soil impacts resulting from one or more of these projects is low and primarily temporary because construction of other pipeline facilities would generally not result in loss of soils. The five wind energy projects proposed in the region of influence could result in the loss of soils due to installation of wind turbines and support structures. However, these five projects would be relatively small (6 to 16 turbines, with one project proposing 33 turbines). Residential subdivisions could result in some loss of productive soils from the additions of impervious surfaces (e.g., building footprint, driveways, sidewalk), however these are limited in scope, and would be distributed along the length of the pipeline and not concentrated in any one area. Furthermore, due to aesthetic reasons, it is unlikely that any residential area would be left unrestored following its construction, thereby minimizing exposure of soils to erosive forces. As Constitution and Iroquois would follow the recommended procedures and take the necessary precautions to avoid and mitigate soil impacts, the proposed projects are not expected to significantly contribute to the potential cumulative impact on soils.

Direct effects on geological resources would be highly localized and limited primarily to the period of construction. Since construction of the NED Project could occur following construction and restoration of the proposed projects (rather than concurrently), cumulative impacts would be limited. In addition, the NED Project would also be required to adhere to our Plan and Procedures to further minimize impacts. The potential for cumulative soil impacts resulting from the projects combined with the NED Project is low and primarily temporary because construction of all three projects would generally not result in loss of soils. Consequently, the cumulative effect of the projects on geological resources and soils would be temporary and minor.

4.13.6.2 Water Resources

Construction and operation of the proposed projects would likely result in only short-term impacts on water resources (section 4.3). These impacts, such as increased turbidity, would return to baseline levels over a period of days or weeks following construction.

Groundwater

Any of the projects listed in table 4.13-1 involving ground disturbance or excavation, including the proposed Constitution Pipeline Project, Marcellus Shale development, the NED Project, the Leatherstocking Project, and non-jurisdictional project-related facilities, could impact groundwater resources. The major pipeline construction activities for the Constitution project and the NED Project that could affect groundwater include the clearing of vegetation, excavation and dewatering of the trench and bore pits, soil mixing and compaction, and hazardous material handling. Major construction activities for the Iroquois facilities that could affect groundwater include excavation of the foundation for the transfer station and hazardous material handling. However, depth to groundwater at Iroquois' project site is approximately 6 feet. According to Iroquois, foundation excavations are not anticipated to be deeper than 6 feet and therefore construction would not likely impact groundwater to a significant extent.

The impacts of both projects on groundwater resources are expected to be short-term and minor. All of the major projects (such as the NED Project, the Leatherstocking Project, wells and gathering lines for Marcellus Shale development, and non-jurisdictional project-related facilities) in the region of influence identified in table 4.13-1, would be required to obtain water use and discharge permits and would implement their various SPCC Plans as mandated by federal and state agencies.

Concerns have been raised regarding the potential impact that completion of natural gas wells in the Marcellus Shale may have on groundwater quality due to gas migration and the use of chemical additives in the fracking water to stimulate gas flow. In response to these concerns in Pennsylvania, the PADEP has updated its regulations governing the drilling, casing, cementing, testing, monitoring and plugging of oil and gas wells; and for the protection of water supplies (law signed February 2012 and effective April 2012). This recent rulemaking includes updated material specifications and performance testing and amended design, construction, operational, monitoring, plugging, water supply replacement, and gas migration reporting requirements. Oil and gas wells must also be sited at least 500 feet from a drinking water well and at least 100 feet from a spring. According to the PADEP, the additional requirements would provide an increased degree of protection for both public and private water supplies. Drilling companies must now also disclose the chemical additives used in fracking gas wells and appropriately manage drilling return water to prevent impacts on water resources.

For these reasons, we anticipate that the proposed projects would only contribute to minor and temporary cumulative impacts on groundwater.

Wetlands and Waterbodies

Constitution conducted wetland surveys for all parcels crossed by the proposed route, with the exception of those parcels for which the landowners would not grant access. Surveys will continue as additional access is granted. Constitution performed desktop surveys using data from state and federal sources to approximate wetland locations on parcels it could not access. Based on the outcome of these surveys, construction of Constitution's project would impact 95.3 acres of wetlands, with 33.8 acres affecting forested wetlands, 26.1 acres affecting scrub-shrub wetlands, and 35.4 acres affecting emergent wetlands. The Constitution project would affect 19.2 acres of wetlands as a result of operation and maintenance of the project. Section 4.4 of this EIS discusses the wetlands that would be crossed by the

proposed pipeline along with wetland types and crossing acreages. Iroquois' proposed facilities would not impact any wetlands.

Generally, impacts resulting from pipeline construction across waterbodies are localized and short-term. Cumulative impacts would only occur in the event more than one project impacting the same waterbody are constructed within a similar period of time. The Constitution pipeline Project would require 289 waterbody crossings, including 116 perennial waterbody crossings, 109 intermittent waterbody crossings and 64 ephemeral waterbody crossings. The majority of these would be crossed using a dry crossing method, including flume, dam and pump, or cofferdam. The specific dry crossing method to be used at waterbodies would be decided at the time of construction, based on site conditions. Constitution has proposed 21 trenchless crossings via conventional bore or Direct Pipe methods. Construction and operation of the Iroquois compressor station would not impact any waterbodies.

As currently planned, the NED Project would parallel much of Constitution's pipeline route. In the absence of field surveys for the NED Project, we have estimated that the NED Project would also cross 289 waterbodies and impact 95.3 acres of wetlands during construction and 19.2 acres of wetland during operation. These are rough estimates that would likely change due to field surveys and route changes as part of the permitting process.

Concerns have been raised regarding the potential impact of Marcellus Shale development on surface water resources. Approximately 1.9 million gallons of water per day is used for Marcellus Shale development in Pennsylvania, or about 0.02 percent of the 9.5 billion gallons of water withdrawn in Pennsylvania (from surface or groundwater sources) per day for all general uses and consumption (Governor's Marcellus Shale Advisory Commission 2011). The SRBC is responsible for reviewing all consumptive water uses in the Susquehanna River basin, including water used for shale gas production. For each project, the SRBC reviews whether a proposed withdrawal would cause adverse impacts on other water uses, fish, wildlife, threatened and endangered species, recreation, flow regime, and other resources, and can place conditions in any approval, if it chooses to do so, to protect these resources. The DRBC has enacted a drilling ban in the Delaware River watershed while it considers what regulations related to fracking are necessary for protection of water resources in the watershed. Constitution's and Iroquois' projects would require almost 23 million gallons of water during construction, primarily for hydrostatic testing. The SRBC does not consider hydrostatic test water as a consumptive use; whereas the DRBC considers a small amount (usually between 2 and 10 percent) of hydrostatic test water as consumptive use. The proposed projects would account for 0.0006 percent of the total water withdrawn in Pennsylvania (but likely less as some portion would be withdrawn in New York). Therefore, because the water use would be primarily non-consumptive and be less than one-thousandth of one percent of the total water use in Pennsylvania, significant impacts are not expected. Constitution and Iroquois would comply with any stipulations within the authority of the DRBC, SRBC, PADEP, and NYSDEC in the water withdrawal application approval process.

Flowback water from fracking operations could also threaten water quality. Operators report that approximately 15 percent of the 5 million gallons of water used on average to fracture a Marcellus Shale well is returned to the surface. The flowback water contains pollutants of concern, particularly high levels of Total Dissolved Solids (TDS); however, some of the municipal waste treatment plants that well drillers previously used to treat and dispose of the flowback water were unable to adequately remove TDS to meet state drinking water standards. At the request of Governor Corbett, the Pennsylvania well drilling industry agreed to cease taking flowback water to waste treatment plants lacking the appropriate technology to remove TDS. PADEP's recently promulgated Chapter 95 regulations to address the remaining treatment facilities and completely eliminate any potential cumulative impact from natural gas development wastewater discharges (Governor's Marcellus Shale Advisory Commission 2011). Well drillers are implementing other measures, such as recycling, to reduce the volume of flowback water for

treatment and disposal. Furthermore, as previously noted, the PADEP requires operators to implement BMPs during construction and operation of upstream facilities, including wells and gathering systems, to avoid or reduce potential impacts on sensitive resources including water resources.

In conclusion, the PADEP and SRBC have recently enacted regulations to specifically protect surface and groundwater resources from potential impacts associated with the development of the Marcellus Shale, and the DRBC is considering further regulation of Marcellus Shale drilling activities. Development of the Marcellus Shale is expected to continue in proximity to and during construction and operation of portions of Constitution's project in Pennsylvania. Marcellus Shale development is currently banned in New York. However, because the proposed projects and other non-jurisdictional project-related facilities in the area would not have a significant adverse impact on water resources, and considering the significantly greater geographic and time scale for development of the Marcellus Shale, the proposed projects and other non-jurisdictional project-related facilities in the area would not contribute in any significance to cumulative impacts on water resources that may be associated with development of the Marcellus Shale.

Sediment loading could also occur as the result of runoff from construction activities near wetlands and waterbodies. Wetlands and waterbodies could also be adversely affected by a spill of hazardous liquids or the excavation and dispersal of contaminated sediments during trenching. Constitution would minimize these effects by implementing wetland and waterbody construction and mitigation measures, including erosion control measures contained in the ECP, and by complying with applicable federal and state permits requirements. According to federal and state resources, there are no contaminated sediments in the proposed project area. Although unlikely, Constitution would evaluate and treat any unanticipated hazardous materials uncovered during construction in accordance with its Contamination Plan and applicable regulatory requirements.

Most of the projects listed in table 4.13-1 are within watersheds crossed by the proposed projects, and some of these projects could potentially result in impacts on wetlands and surface waters, such as the NED Project, the Leatherstocking Project, wind energy projects, and the non-jurisdictional project-related facilities. Thus, there is the potential that cumulative impacts could result if the proposed projects were constructed in addition to other projects listed in table 4.13-1. However, Constitution's and Iroquois' projects would contribute little to the long-term cumulative impacts on wetlands and waterbodies because the majority of the potential impacts would be temporary and short-term. Impacts on surface waters resulting from construction of Constitution's project would end shortly after the pipeline was installed. Also, wind energy projects and non-jurisdictional project-related facilities would likely follow BMPs similar to those proposed by Constitution and Iroquois so as to minimize impacts on waterbodies. The NED Project would be required to adhere to our Procedures which minimize impacts on waterbodies and wetlands. Therefore, most of the impacts on wetlands would also be of short duration. Consequently, the cumulative effect on wetland and waterbody resources would be temporary and minor.

4.13.6.3 Vegetation

Cumulative effects on vegetation disturbed by Constitution's and Iroquois' projects would be limited primarily to the combined impacts of construction projects located within the same region of influence as the proposed projects and recently completed or concurrent construction activities along the same route and the proposed projects. These include energy development projects listed in table 4.13-1, such as the wind energy projects, residential development projects, Marcellus Shale development, and non-jurisdictional project-related facilities. TGP's 300 Line impacted 834.4 acres of forest lands during construction and 145.8 acres of forest lands during operation in Pennsylvania, with approximately 123 acres impacted during construction and 21 acres during operation in Susquehanna County; while TGP's Northeast Upgrade impacted 141.5 acres of forest lands during construction and 46.0 acres of forest lands

during operation in Pennsylvania (all of which would be outside of Susquehanna County). TGP's NSD Project impacted 36.2 acres of forested lands during construction and 15.2 acres of forested lands during operation in Pennsylvania (all of which would be outside of Susquehanna County). The Leidy Southeast Expansion Project (if approved by the Commission) would impact about 70 acres of forest lands during construction and 18.0 acres of forest lands during operation in Pennsylvania (all of which would be outside of Susquehanna County). The TEAM 2014 Project impacted 114.7 acres of forest lands during construction and 27.0 acres of forest lands during operation in Pennsylvania (all of which would be outside of Susquehanna County). The NSL Project impacted 16.4 acres of forest land during construction and 5.5 acres of forest land during operation in Pennsylvania (all of which would be outside of Susquehanna County). We estimate the Amphenol portion of the Leatherstocking Project would impact approximately 16 acres of forest lands during construction and 15 acres of forest lands during operation[19] in Delaware County, New York. We estimate the NED Project would impact 993 acres of forest land during construction and 452 acres of forest land during operation if the right-of-way parallels Constitution's right-of-way with no overlap[20]. The NED Project would impact an estimated 767 acres of forest lands during construction and 226 acres of forest lands during operation if the rights-of-way overlap by 25 feet.

While the vegetation impacts of the projects discussed above and the proposed projects would not be inconsequential, the overall impact of these projects would be considered minor in comparison to the abundance of comparable habitat in the area. The Applicants would be required to restore vegetation in temporarily disturbed areas, and non-jurisdictional project-related facilities would likely be held to similar standards by state permitting agencies. The FERC jurisdictional projects, including the NED Project, would be held to the same restoration standards and Constitution and Iroquois. As discussed previously, due to aesthetic reasons it is unlikely that any residential area would be left unrestored following its construction.

Construction of the proposed projects would result in both temporary and permanent impacts on vegetation. Among the temporary vegetation impacts, the most prominent would be those impacting forested vegetation that is slow to regenerate within temporary work areas, and permanent conversion of forest to grassy, open lands within the permanent right-of-way (which would be regularly mowed). Constitution has reduced its construction right-of-way width from 110 feet to 100 feet (except in areas of steep slopes) in order to reduce impacts on upland interior forests. In addition, to offset impacts on the total of 1,549.5 acres of high and moderate value upland forest habitat, Constitution would deposit funds in an account(s) for use in the conservation of migratory bird habitat by one or more potential measures including, but not limited to:

- acquisition of lands for forest management and migratory bird conservation;
- restoration of upland forest, riparian corridors, and migratory bird habitat on acquired land;
- grants for projects designed to conserve these habitats; and
- long-term management of lands for migratory bird conservation.

[19] Calculation is an estimate assuming a length of 4 miles to the Amphenol plant, a construction right-of-way width of 50 feet, and a permanent right-of-way width of 30 feet. We used the forest land acres for Delaware County from table 4.8.1-1 to develop a ratio to estimate impacts on forest land from Leatherstocking's pipeline.

[20] Calculation is an estimate using forest land acres for the Constitution pipeline (table 4.8.1-1) to develop a ratio to estimate impacts on forest land from the NED Project.

Constitution would also minimize potential impacts on stream shading by limiting vegetation maintenance in riparian zones in accordance with section V.D.1 of its Procedures. For those areas that would be allowed to revegetate naturally, Constitution would ensure that the disturbed area is stabilized with herbaceous species and managed for the exclusion of invasive species by adhering to state-specific Invasive Species Management Plans in their ECPs. In addition, while the Iroquois compressor station would result in tree removal, the project would be constructed within a currently industrialized parcel.

Implementation of Constitution's ECPs and Iroquois' Plan and Procedures would promote revegetation of the right-of-way and compressor station parcel following construction. Wind energy projects, residential development projects, Marcellus Shale development, and non-jurisdictional project-related facilities would also likely be required to implement mitigation measures designed to minimize the potential for long-term erosion and resource loss, increase the stability of site conditions, and revegetate disturbed soils, thereby minimizing the degree and duration of the impacts of these projects. Thus, cumulative impacts on vegetation resulting from the proposed projects, wind energy projects, residential development projects, Marcellus Shale development, the NED Project, the Leatherstocking Project, and non-jurisdictional project-related facilities are expected to be minor or negligible, considering the limited area impacted within the region of influence and because these projects are expected to take the required precautions and mitigation measures in accordance with state and federal regulations. The incremental and cumulative effect to vegetation would be minor.

4.13.6.4 Wildlife

Cumulative effects on wildlife would occur where projects are constructed in the same general time frame and in proximity or which represent permanent or long term loss of habitat types important to wildlife. These include the wind energy projects, residential development projects, Marcellus Shale development, the NED Project, the Leatherstocking Project, and non-jurisdictional project-related facilities listed in table 4.13-1. Construction activities such as right-of-way and other workspace clearing and grading would result in loss of vegetation cover and soil disturbance, alteration of wildlife habitat, displacement of wildlife species from the construction zone and adjacent areas, mortality of less mobile species, and other potential indirect effects as a result of noise created by construction and human activity in the area. Overall impacts would be greatest where projects are constructed in the same time frame and area as the proposed projects or that have long-term or permanent impacts on the same or similar habitat types.

In general, wildlife is expected to return to affected areas following construction of the proposed projects and other projects in the area. Clearing and grading of the construction rights-of-way for the proposed projects and other nearby projects would result in a loss of wildlife habitat. The effect of workspace clearing on forest-dwelling wildlife species would be greater than on open habitat wildlife species since forested lands could take decades to return to pre-construction condition in areas used for temporary workspace, and would be permanently prevented from re-establishing on the permanent right-of-way. This may result in the cumulative loss of individuals of small mammal species, amphibians, reptiles, nesting birds, and non-mobile species. However, we expect that any projects constructed in the area would be required to restore some vegetation cover to the disturbed areas unless they are covered by buildings or impervious surfaces. Once the area is restored, some wildlife displaced during construction of any of the projects would return to the newly disturbed area and adjacent, undisturbed habitats after completion of construction.

Constitution has reduced its construction right-of-way width from 110 feet to 100 feet (except in areas of steep slopes) in order to reduce impacts on interior forests and interior forest birds. To further mitigate impacts from fragmentation, we are recommending that Constitution develop an Upland Forest Mitigation Plan prepared in consultation with the applicable federal and state agencies.

Construction of Iroquois' compressor station would result in some permanent impacts on wildlife habitat; however, due to the limited size of the proposed compressor station and the prevalence of similar habitats in adjacent areas, as well as Iroquois' collocation with an existing facility and use of an existing industrial site, the permanent conversion of forested lands would not be a significant impact on wildlife resources within the proposed project area.

Construction of any Marcellus Shale development projects would also result in some long-term loss of wildlife habitat due to aboveground structures and well pads. In addition, wind energy projects could result in mortality to bird and bat species. Impacts on wildlife species from construction of any of the projects listed in table 4.13-1 would be local, temporary, and minor. Therefore, cumulative impacts are expected to be negligible for any individual wildlife species relative to the population in the region of influence.

4.13.6.5 Fisheries and Aquatic Resources

Cumulative impacts on fisheries and aquatic resources could occur if other projects occur within the same segment of a waterbody and have similar construction timeframes as the proposed Constitution Pipeline Project or that could result in permanent or long-term impact on the same or similar habitat types. Construction and operation of Iroquois' project would not have any impact on fisheries and aquatic resources. Construction of the projects identified in table 4.13-1, such as wind energy projects, residential development projects, Marcellus Shale development, and non-jurisdictional project-related facilities, and Constitution's project could result in cumulative impacts on waterbodies and fisheries from sedimentation and turbidity, habitat alteration, stream bank erosion, fuel and chemical spills, water depletions, entrainment or entrapment due to water withdrawals or construction crossing operations, blasting, and operational pipeline failure if constructed on the same waterbody in a similar timeframe. We expect that most of the projects in the region of influence, including the NED Project and the Leatherstocking Project, would be designed so as to minimize impacts on waterbodies, and therefore fisheries and aquatic resources, as much as possible. Any waterbodies that could not be avoided would be mitigated through implementation of best management and restoration practices in accordance with the respective federal, state, and local permitting agencies. Further, we expect that the NYSDEC and the PFBC would require any other applicable projects constructed in the region of influence to adhere to timing windows for construction within waterbodies.

In addition, any impacts on waterbodies and therefore fisheries and aquatic resources would be temporary and limited to construction of the projects. As such, none of these impacts are expected to be cumulatively significant because of their temporary nature and the impacts avoidance and mitigation measures that would be implemented. The ensuing operation of the proposed pipeline would not result in any additional impacts unless maintenance activities occur in or near streams.

4.13.6.6 Special Status Species

The species discussed in section 4.7 of this EIS could potentially be affected by construction and operation of other projects occurring within the same area as the proposed projects. Constitution, Iroquois, and all other companies' projects are required to consult with the appropriate federal, state, and local agencies to evaluate the types of species that may be found in the area of the projects; identify potential impacts from construction and operation of the projects to any species identified; and implement measures to avoid, minimize, or mitigate impacts on special status species and their habitat. Based on projected impacts and proposed mitigation measures, all federally- and state-listed endangered and threatened species were determined to be either unaffected or not adversely affected by the proposed projects. Because protection of threatened, endangered, and other special status species is part of the federal and state permitting processes, cumulative impacts on such species would be reduced or

eliminated through conservation and mitigation measures identified during those relevant permitting processes. Consequently, we conclude that past and present projects in combination with the proposed projects would have minor cumulative effects to special status species.

4.13.6.7 Land Use, Recreation, Special Interest Areas, and Visual Resources

Projects with permanent aboveground components, such as buildings, wind energy projects, residential projects, roads, and aboveground electrical transmission lines would generally have greater impacts on land use than the operational impacts of a pipeline (including gathering lines for Marcellus Shale development, the NED Project, and the Leatherstocking Project and non-jurisdictional project-related facilities) which would be buried and thus allow for most uses of the land following construction. Therefore, with the exception of aboveground facilities and the permanent right-of-way, pipeline projects typically only have temporary impacts on land use. The majority of long-term or permanent impacts on land use are associated with vegetation clearing and maintenance of the pipeline right-of-way. Vegetation within the right-of-way would be cleared during construction.

The projects listed in table 4.13-1 would disturb hundreds of additional acres of land affecting a variety of land uses. We focused our analysis of potential cumulative land use impacts on projects located close by or immediately adjacent to the proposed construction workspaces. Of the projects listed in table 4.13-1, those with the greatest potential for impacts include the non-jurisdictional project-related facilities, Marcellus Shale development projects, residential developments, linear infrastructure facilities crossing Constitution's route, the Leatherstocking Project, and the NED Project.

In particular, around MP 3.2, several past, ongoing, and future projects would be active in a reasonably short time. At this location, Williams Field Services would construct its Reynolds discharge line from its Miller Compressor Station, Constitution would construct its White Road Tie-in and the pipeline, and there is a previously constructed well pad and associated pipeline that is in-service. Cumulative impacts on forested lands at this location could occur if these projects are constructed around the same time as the proposed projects.

We estimate the Amphenol portion of the Leatherstocking Project would impact approximately 5 acres of agricultural lands, 2 acres of open lands, 1 acre of wetlands, and 16 acres of forested lands during construction; and 3 acres of agricultural lands, 1 acre of open lands, 1 acre of wetlands, and 9 acres of forested lands during operation[21]. We estimate that the pipelines associated with the other Leatherstocking connections would impact 194 acres during construction and 116 acres during operation in Delaware County, 36 acres during construction and 22 acres during operation in Chenango County, 103 acres during construction and 62 acres during operation in Broome County, and 12 acres during construction and 7 acres during operation in Otsego County. We estimate the NED Project could impact 993 acres of forest land, 381 acres of agricultural lands, 173 acres of open lands, and 97 acres of wetlands during construction; and 452 acres of forest land, 173 acres of agricultural lands, 79 acres of open lands, and 44 acres of wetlands during operation if the right-of-way parallels Constitution's right-of-way with no overlap[22]. If the rights-of-way overlap by 25 feet, the NED Project could impact an estimated 767 acres of forest lands, 294 acres of agricultural lands, 133 acres of open lands, and 75 acres of wetlands during

[21] Calculation is an estimate assuming a length of 4 miles to the Amphenol plant, a construction right-of-way of 50 feet, and a permanent right-of-way of 30 feet. We used the land use acres for Delaware County from table 4.8.1-1 to develop a ratio to estimate impacts on land uses from Leatherstocking's pipeline.

[22] Calculation is an estimate using land use acres for the Constitution pipeline (table 4.8.1-1) to develop a ratio to estimate impacts on land uses from the NED Project.

construction; and 226 acres of forest lands, 87 acres of agricultural lands, 39 acres of open lands, and 22 acres of wetlands during operation.

The majority of the Constitution project's potential impacts on agricultural land and other non-forested land use types would be temporary, as most land uses would be allowed to revert to prior uses following construction. Any impacts would be minimized or mitigated to the greatest extent practicable through the use of resource-specific construction plans (for example, Constitution's ECPs, Plan, and Procedures) and consultation with state agencies, federal agencies, and landowners. It is anticipated that other projects in the region of influence would be required to implement similar construction and restoration practices to minimize impacts on land use. The NED Project, as a FERC-jurisdictional project, would be required to adhere to our Plan so as to minimize impacts on land use.

Constitution's project, if built at the same time as other foreseeable future projects, could result in cumulative impacts on recreation and special-interest areas if other projects affect the same areas or feature at the same time. The Constitution project would cross or be located near several recreation and special interest areas, including four state forests in New York: Melondy Hill State Forest (MPs 42.5 and 44.6) in Chenango County; Pine Hill State Forest (MP 52.4) in Delaware County; and Clapper Hollow (MP 97.0 to 97.1) and Petersburg State Forest (MP 110.4 to 110.8) in Schoharie County. Constitution has and will continue to consult with the NYSDEC on routing through the New York State Forests to minimize impacts on these lands, where feasible. Additional details are provided in section 4.8.4 of this EIS. At this time, we have not determined that any of the projects listed in table 4.13-1 would impact any of the recreation and special-use areas that would be crossed by Constitution's project at the same time as Constitution's project. However, if one or more of the projects listed in table 4.13-1 was constructed at the same time and nearby location as the proposed projects, then temporary cumulative impacts could occur in those areas. While the NED Project could cross some or all of the same recreation and special-use areas as Constitution, any impacts would be separated by time, and would not occur concurrently. However, if construction were to occur consecutively, the temporary nuisance disturbances could be prolonged, resulting in a diminished quality recreational experience.

The visual character of the existing landscape is defined by historic and current land uses such as recreation, conservation, and development. The visual qualities of the landscape are further influenced by existing linear installations such as highways, railroads, pipelines, and electrical transmission and distribution lines. Within this context, the pipelines, wind farms, electrical transmission lines, and residential developments listed in table 4.13-1 would have the greatest cumulative impact on visual resources in the proposed project area. Constitution's and Iroquois' projects would add incrementally to this impact, but the overall contribution would be relatively minor given that the majority of Constitution's project would be buried pipeline and Iroquois' compressor station would be added to an existing compressor station site. Existing vegetation around both projects' aboveground facilities would shield surrounding areas from visual impacts. Additionally, disturbed areas would be revegetated as appropriate. Constitution's project would also consist of installation of ten 100-foot-high communication towers to allow for a dedicated method of communication during operation and in the event of emergency situations. Given the rural location of the M&R station and MLVs, the number of visual receptors is limited. However, we are recommending in section 4.8 that Constitution further assess these areas after construction and describe mitigation measures if necessary. Therefore, overall visual impacts from the stations and associated towers would be minor, but permanent. The impact of Marcellus Shale development activities on land use, recreation, special interest areas, and visual resources would vary widely depending on the location of specific facilities and access roads, but would be minimized to the extent possible through the PADEP review and permitting process. One advantage of the horizontal drilling technique used in the Marcellus Shale is that numerous wells can be drilled from a single well pad, thereby reducing the land use requirements for access roads, gathering pipelines, and individual well pads.

The assessment of visual importance of an object or area varies greatly between individuals. In particular, some may find alternate forms of energy infrastructure (i.e., windmill) appealing for its intrinsic value while others may take a tangible approach in their evaluations, making meaningful conclusions on visual resources subjective. Visual impacts associated with operation of Marcellus Shale and other natural gas development result from maintained rights-of-way for gathering lines and other pipelines, well pads, compressor stations, meter stations, and gas processing facilities. The turbines associated with the Horizon Wind Energy's wind farm in Franklin could be 400 feet tall and be visible from residences nearby the project in Delaware County. Construction of the turbines would require the presence of large equipment to transport and install turbines and blades, and large cranes would be brought on site to complete installation of the turbines, blades, and shaft.

Although the visual impact of the wind farm and Marcellus Shale production may be long term, only a minor visual impact would occur due to the operation of the proposed projects, primarily resulting from the conversion of forested land to scrub-shrub or herbaceous vegetation types. Project proponents for gathering lines for Marcellus Shale development and non-jurisdictional project-related facilities would restore disturbed areas in accordance with state permitting agency requirements, thereby limiting permanent visual impacts on those areas where previously existing forest would not be allowed to reestablish within the new permanent right-of-way. The locations of any aboveground facilities for the Leatherstocking Project are not known and therefore visual impacts from this project cannot be reliably estimated at this time. As currently planned, the NED Project would involve construction of eight new compressor stations and 15 new M&R stations, as well as modifications of one existing compressor station and seven existing M&R stations. The NED Project would be required to assess visual impacts as part of TGP's application with the FERC. Although we have preliminary information about the locations of aboveground facilities for the NED project, we do not have information about the visual setting, sensitive receptors, or the appearance of aboveground structures. The NED Project would be required to assess visual impacts as part of TGP's application with the FERC. Permanent visual impacts would also occur in developed areas where permanent structures (e.g., transmission line posts) would remain. Other recently completed or proposed project aboveground facilities would, for the most part, likely be located adjacent to an existing right-of-way (e.g., transmission line), at existing paved commercial/industrial sites, in remote locations, and/or within a permanent right-of-way. Whereas these permanent visual impacts may be locally noticed, generally they would not be inconsistent with the existing visual character of the area. Therefore, the proposed projects' contribution to cumulative impacts on land use, recreation, special interest areas, and visual resources would mostly be limited to the construction phase and would be temporary and minor.

4.13.6.8 Socioeconomics

Present and reasonably foreseeable future projects and activities could cumulatively impact socioeconomic conditions in the region of influence for both projects. The socioeconomic issues considered in the area of the proposed projects were employment, housing, public services, transportation, property values, economy and tax revenues, and environmental justice.

Employment

The projects considered in this section would have cumulative effects on employment during construction if more than one project is built at the same time. Constitution has estimated that the Constitution project would employ up to 260 workers for each of five spreads to fill up to 1,300 new jobs. Local hires could include surveyors, welders, equipment operators, and general laborers. Iroquois estimates that the proposed compressor station would employ 50 workers on a regular basis during construction with fluctuations as high as 75 workers. Due to the relatively low populations, if multiple similar projects are built at the same time, the demand for workers could exceed the local supply of

appropriately skilled labor. A small number of new permanent employees would be hired to operate the proposed Constitution facilities, which would not have a measurable impact on the economy or employment.

Temporary Housing

Temporary housing would be required for construction workers not drawn from the local area. Given the current vacancy rates, the number of rental housing units in the area, and the number of rental housing units in the area, and the number of hotel/motel rooms available in the vicinity of the projects, construction workers should not encounter difficulty in finding temporary housing. If construction occurs concurrently with other projects, particularly during peak tourist periods, temporary housing would still be available but may be slightly more difficult to find and/or more expensive to secure. Regardless, these effects would be temporary, lasting only for the duration of construction, and there would be no long-term cumulative impact on housing.

Infrastructure and Public Services

The cumulative impact of the proposed projects and the other projects listed in table 4.13-1 on infrastructure and public services would depend on the number of projects under construction at one time. The small incremental demands of several projects occurring at the same time could become difficult for police, fire, and emergency service personnel to address. The problem would be temporary, occurring only for the duration of construction, and could be mitigated by the various project sponsors providing their own personnel to augment the local capacity or by providing additional funds or training for local personnel.

In addition, increased use of local roadways from multiple projects could accelerate degradation of roadways and require early replacement of road surfaces. However, Constitution committed to the repair any roadways damaged during installation of the proposed pipeline and Iroquois stated that it also would coordinate with local authorities regarding any project-related impacts on roads.

No long-term cumulative effect on infrastructure and public services is anticipated.

Transportation and Traffic

Construction of the proposed projects could result in temporary impacts on road traffic in some areas and could contribute to cumulative traffic, parking, and transit impacts if other projects are scheduled to take place at the same time and in the same area. The local road and highway system in the vicinity of the proposed projects is readily accessible by interstate highways, U.S. highways, state highways, secondary state highways, county roads, and private roads. However, the majority of the Constitution project is located in rural areas and most of the roads impacted by the project would be county or private roads. Constitution has stated that it would utilize major highways, as well as using the construction right-of-way to the extent practicable, to reduce impacts on local roadways.

The addition of traffic associated with construction personnel commuting to and from the projects could also contribute to cumulative regional traffic congestion. However, any construction of the proposed project to cumulative traffic impacts would be temporary and short-term. Workers associated with the projects would generally commute to and from the pipeline right-of-way, contractor yards, or aboveground facility sites during off-peak traffic hours (e.g., before 7:00 AM and after 6:00 PM). In addition, Constitution has identified many of its workers would travel to project workspaces via buses. It is unlikely that other projects listed in table 4.13-1 would have similar commuting schedules or reach peak traffic conditions simultaneously.

Constitution stated that it would be further minimize impacts associated with road crossings through the creation of temporary travel lanes during construction, temporary placement of steel plate bridges to accommodate traffic during open trenching for use by fire and emergency vehicles, and implementation of its Residential Access and Traffic Mitigation Plan. We expect other projects to develop similar procedures.

The proposed projects would not contribute to any long-term cumulative impact on the transportation infrastructure, because only a small number of new permanent employees would be required to operate Constitution's project.

4.13.6.9 Cultural Resources

Cumulative impacts on cultural resources would only occur if other projects were to impact the same historic properties impacted by the Constitution and Iroquois projects. The currently proposed projects listed in table 4.13-1 that are defined as federal actions (such as the NED Project) would include mitigation measures designed to avoid or minimize additional direct impacts on cultural resources. Where direct impacts on significant cultural resources are unavoidable, mitigation (e.g., recovery of data and curation of materials) would occur before construction. Non-federal actions would need to comply with any mitigation measures required by the affected states. The Applicants developed project-specific plans to address unanticipated discoveries of cultural resources and human remains in the event they are discovered during construction. Therefore, the proposed projects may incrementally add to the cumulative effects of other projects that may occur at the same time. However, this incremental increase would not be significant.

4.13.6.10 Air Quality and Noise

Air Quality

Construction of Constitution and Iroquois' projects and the projects listed in table 4.13-1 would involve the use of heavy equipment that would generate air emissions (including fugitive dust), and noise. The majority of these impacts, with the exception of Direct Pipe installation and modification of the Iroquois compressor station, would be minimized, because the construction activities would occur over a large geographical area and would be moving regularly. The majority of emissions associated with Constitution's project would be temporary, resulting from construction activities, and would be minimized by mitigation measures such as using properly maintained vehicles and commercial gasoline and diesel fuel products with specifications to control pollutants.

Air emissions resulting from diesel- and gasoline-fueled construction equipment and vehicle engines for the Constitution project would be minimized by federal design standards required at the time of manufacture of the equipment and vehicles, and would comply with the EPA's mobile and non-road emission regulations found in 40 CFR Parts 85, 86, and 89. Contractors and employees would be encouraged by the Applicants to minimize vehicle and equipment idling time to the extent practical during construction activities to further minimize emissions. In addition, the Applicants would further mitigate GHG emissions during construction by regularly maintaining construction equipment and complying with applicable Pennsylvania and New York regulations. While fugitive dust impacts would also be temporary and not be expected to affect local or regional air quality, dust suppression techniques would be implemented in all construction work areas near residential and commercial areas to reduce potential impacts of fugitive dust emissions.

With the exception of GHG emissions, air impacts from construction of the Constitution project would be localized and confined primarily to the airsheds in which the activities occur. In Schoharie

County, the proposed project's estimated emissions would be well below the *de minimus* threshold for a general conformity determination. In all counties, impacts would not be expected to result in a significant impact on local or regional air quality. The combined effect of multiple construction projects occurring in the same airshed, ACQR, and timeframe as the proposed project could temporarily add to the ongoing air quality effects of existing activities. However, the contribution of the proposed project to the cumulative effect of all foreseeable projects would be temporary. The projects listed in table 4.13-1 have varying construction schedules and would take place over a relatively large geographic area.

It is likely that mitigation measures similar to those employed for the proposed projects would be required for other projects to protect ambient air quality, thereby reducing the extent of cumulative impacts on air quality that could occur if projects are being constructed within the same timeframe and within the same region of influence. The construction of the Constitution's project would not have a significant long-term adverse impact on air quality and would not add significantly to the long-term cumulative impact of other projects. It is also possible that Constitution's project could contribute to cumulative improvements in regional air quality if a portion of the natural gas associated with the project displaces the use of other fossil fuels that may contribute greater amounts of air pollutants of concern. Iroquois' construction activity would result in PM, NOX, CO, VOC, SO2, GHG, and HAP emissions from equipment as well as construction and worker vehicles. Potential impacts from diesel- and gasoline-fueled construction equipment and vehicle would be minimized by federal design standards imposed when the equipment engines were manufactured, and would comply with EPA mobile emission regulations at 40 CFR 85. Fugitive dust emissions would be generated during excavation, by vehicles traveling on unpaved roadways, and from disturbed land surfaces. Fugitive dust emissions would be controlled by monitoring and the use of dust suppression techniques when necessary, which typically include application of water or lime. These suppressants would be applied only in accordance with applicable regulations and the presence of nearby waterways or wetlands would be considered prior to application. Like Constitution's pipeline project, the Iroquois compressor station emissions during construction would be temporary and would be minimized by mitigation measures described above. Impacts from construction of the proposed compressor station are not expected to result in a significant impact on local or regional air quality.

Operation of Constitution's pipeline would generate emissions from maintenance vehicles and equipment, as well as vented and fugitive GHG emissions. Iroquois' compressor station would generate primarily NO_X, CO, GHG, and PM emissions, with lesser amounts of SO_2, VOC, and HAP emissions. However, none of the major source thresholds would be exceeded for either project. Therefore, emissions from operation of the Constitution and Iroquois projects are not expected to result in a significant impact on local or regional air quality.

Ongoing drilling activities of Marcellus Shale natural gas reserves and other projects in the area such as non-jurisdictional project-related facilities and Marcellus Shale development projects (table 4.13-1), would involve the use of heavy equipment that would generate emissions of air contaminants and fugitive dust during construction. Because pipeline construction moves through an area quickly, air emissions associated with pipelines would be intermittent and short term. The majority of these impacts would be minimized further because the construction activities would occur over a large geographical area and, in many cases, construction schedules would not directly overlap. Although these projects would result in short-term construction air emissions, they are not likely to significantly affect long-term air quality in the region. Operation of the proposed projects, Marcellus Shale drilling activities, other FERC-jurisdictional projects, and other nearby projects would also contribute cumulatively to existing air emissions. As with the operational impacts of the Constitution and Iroquois projects, operation of other nearby, similar projects would generate emissions from maintenance vehicles and equipment, as well as vented and fugitive GHG emissions, which would contribute to cumulative impacts on air quality within the region of influence. We expect that operation of nearby, similar projects would be held to, and

comply with the same permit requirements and mitigation measures to which the proposed projects would abide. The existing Williams Central Compressor Station has the potential to emit 6.71 tons/year of HAPs and 98,801 CO_2e of GHGs, both of which are below the applicable major source thresholds (EcoLogic 2012). At this time, TGP is proposing modifications to one existing compressor station and construction of eight new compressor stations as part of the NED Project. Four of the eight new compressor stations would be within counties crossed by Constitution's project. Five of the new compressor stations and the existing station requiring modifications would be within AQCRs crossed by the proposed projects. The five new compressor stations would range in horsepower from 20,000 to 120,000. We expect impacts on air quality to be similar to those described for the proposed projects (section 4.11.1), scaled to account for differences in horsepower.

Operation of wind energy projects and residential development projects are not expected to contribute to air emissions in the region of influence. Each of the projects would need to comply with federal, state, and local air regulations, which may require controls to limit the emission of certain criteria pollutants or HAPs. Although outside the extent of the Commission's jurisdiction, it is anticipated that Marcellus Shale development activities would result in increased long-term emissions of criteria pollutants, HAPs, and GHGs within the region.

Climate Change

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

The leading U.S. scientific body on climate change is the U.S. Global Change Research Program. Thirteen federal departments and agencies participate in the U.S. Global Change Research Program, which began as a presidential initiative in 1989 and was mandated by Congress in the Global Change Research Act of 1990.

In June 2009, the U.S. Global Change Research Program issued a report, *Global Climate Change Impacts in the United States*, summarizing the impacts that climate change has already had on the United States and what projected impacts climate change may have in the future. The report includes a breakdown of overall impacts by resource and impacts described for various regions of the United States. Although climate change is a global concern, for this cumulative analysis, we will focus on the potential cumulative impacts of climate change in the area of both projects.

The U.S. Global Change Research Program's report notes the following observations of environmental impacts that may be attributed to climate change in the Northeast region:

- more frequent days with temperatures above 90º F;
- a longer growing season;
- increased heavy precipitation;
- less winter precipitation falling as snow and more as rain; and
- rising sea surface temperatures and sea level.

GHG emissions are a primary cause of climate change (EPA 2014c). Of the GHGs emitted, CO_2 is the most prevalent, accounting for 82 percent of all U.S. emissions in 2012 (EPA 2014d). Methane

(CH_4) is the second most prevalent, accounting for 9 percent of the total U.S. emissions (EPA 2014e). Between 1990 and 2012, natural gas and petroleum systems accounted for 29 percent of CH_4 emissions in the United States. Although the amount of CH_4 being emitted into the atmosphere is significantly less than that of CO_2, the comparative impact of CH_4 on climate change over a 100-year period (that is, its GWP) is more than 20 times greater (EPA 2014f). Fugitive CH_4 emissions are common in natural gas systems and can occur during natural gas production, transmission, storage, and distribution (EPA 2014g).

Emissions of GHGs from Constitution's project would not have any direct impacts on the environment in the area of the projects. Currently, there is no standard methodology to determine how the proposed Constitution Pipeline Project's relatively small incremental contribution to GHGs would translate into physical effects of the global environment. The GHG emissions from the construction and operation of Constitution's project would be negligible compared to the global GHG emission inventory. Additionally, burning natural gas results in less CO_2e compared to other fuel sources (e.g., fuel oil or coal). Because fuel oil is widely used as an alternative to natural gas in the region in which Constitution's pipeline project would be located, it is anticipated that the project would result in the displacement of some fuel oil use, thereby potentially offsetting some regional GHG emissions, in terms of CO_2e.

Operation of the new turbines associated with Iroquois' project would result in the existing Wright Compressor Station becoming a major source of GHGs requiring a Title V application and permit at start-up of the new compressors. However, the GHG emissions during construction and operation phases of the compressor station would be a maximum of 177,080 tpy of CO_2e, which would be very small when compared with the U.S. Greenhouse Gas Inventory of 6.63 billion metric tons of CO_2e (EPA 2009). The GHG emissions for both construction and operation of the pipeline are very small (about 0.001 percent) when compared with the U.S. Greenhouse Gas Inventory of 6.63 billion metric tons of CO_2e (EPA 2009). The GHG emissions for both construction and operation of the compressor facility are also very small (about 0.003 percent) when compared with the U.S. Greenhouse Gas Inventory.

We received a comment on the social cost of carbon. EPA uses a protocol titled "The Social Cost of Carbon" to estimate climate change damages from CO_2 emissions in order to analyze the impacts of federal rulemakings. In brief, the protocol assigns a dollar cost to one metric ton of CO_2[23] based on its estimated future effects on various metrics such as agricultural productivity, human health, and property damages from flood risks. Although EPA caveats its use ("…any effort to quantify and monetize the harms associated with climate change will raise serious questions of science, economics, and ethics and should be viewed as provisional"), they also indicate that it can be useful in providing tangible comparisons to decision makers (United States Government 2010).

The protocol is based on a present value calculation, so the selection of the discount rate has a significant effect on the results. The discount rate is the rate of interest used to determine the present value of a future cash flow. For 2015, the first year of project operation, the protocol provides CO_2 costs per metric ton for discount rates of 5 percent ($12), 3 percent ($39), and 2.5 percent ($61) (EPA 2014b). The project would emit about 150,529 tpy of CO_2 during operation, which converts to 136,559 tonnes per year. We agree with EPA that use of this tool should be viewed as provisional and not the sole basis for any decision; however, in accordance with EPA's protocol we calculate that the project's social cost of carbon for 2015 would be $1,638,708 at a discount rate of 5 percent, $5,325,802 at 3 percent, and $8,330,100 at 2.5 percent.

[23] The protocol will not provide accurate estimates for other GHGs or for CO_2e. This is because of the varying lifetimes and effects of the different compounds (EPA 2010).

Currently proposed and potential future projects, such as the NED Project, that would connect to the Constitution project could also require the construction and operation of compressor stations. These compressor stations would undergo the relevant state and federal permitting and mitigation process and would be subject to pertinent mitigation requirements. We assume that all existing compressor stations are operating within permit guidelines, and any proposed compressor stations would operate within the same guidelines for their facility. Therefore, anticipated emissions from proposed compressor stations in the region are expected to be similar to that of the Wright Interconnect Project and would be subject to mitigation measures set forth in the PADEP or the NYSDEC permitting requirements. Therefore, we conclude the proposed projects would not significantly contribute to GHG cumulative impacts.

Noise

The proposed projects could contribute to cumulative noise impacts. However, the impact of noise is highly localized and attenuates quickly as the distance from the noise source increases; therefore, cumulative impacts are unlikely unless one or more of the projects listed in table 4.13-1 are constructed at the same time and location. Based on the schedule and proximity of these activities to the pipeline route, there may be some cumulative noise impacts. However, since the majority of noise impacts associated with the projects would be limited to the period of construction and most construction activities would occur during daytime hours and be intermittent rather than continuous, the proposed contribution from both projects to cumulative noise impacts would primarily be for only short periods of time when the construction activities are occurring at a given location.

Operation of the Constitution project's M&R stations would not result in a perceptible noise increase or exceed our thresholds. Noise from blowdown events, which are typically infrequent, of short duration, and occur during daytime hours, may be perceptible at the NSAs, but not at an excessive level such as to interrupt normal human conversation. The maximum estimated noise at a NSA from the blowdown events would be 68.8 dBA, comparable to a washing machine at approximately 65 to 70 dBA (EPA 1974). Based on the analyses conducted and mitigation measures proposed, we conclude that Constitution's project would not result in significant noise impacts on residents, and the surrounding communities.

Operation of the Iroquois project would result in noise from the gas turbines with gas compressors; emergency generator; and turbine, compressor, and control building service equipment. Based on the analyses conducted and mitigation measures proposed, we conclude that Constitution's project would not result in significant noise impacts on residents, and the surrounding communities during operation as noise levels are expected to be below our 55 dBA L_{dn} requirement, and are not expected to result in a perceptible noise increase at the nearest NSAs. In addition, the operation of Iroquois' project is not expected to result in a perceptible increase in vibration at any NSA, as gas turbines do not produce as high of levels of vibration as compared to reciprocating engines. In addition, noise levels from combined operation of the Westfall Road M&R Station, the proposed Iroquois project facilities, and the existing Wright Compressor Station were modeled and would be expected to be below our 55 dBA L_{dn} requirement, and are not expected to result in a perceptible noise increase at the nearest NSAs. In addition, the area surrounding Iroquois' project is primarily agricultural and additional development would be unlikely.

Construction and operation of the NED Project would be required to adhere to similar noise requirements and mitigations measures as the Constitution project.

4.13.6.11 Reliability and Safety

Impacts on reliability and public safety would be mitigated through the use of the DOT Minimum Federal Safety Standards in 49 CFR 192, which are intended to protect the public and to prevent natural gas facility accidents and failures. In addition, Constitution and Iroquois' construction contractors would be required to comply with the Occupational Safety and Health Administration Safety and Health Regulations for Construction in 29 CFR 1926. No cumulative impacts on safety and reliability are anticipated to occur as a result of the proposed projects.

4.13.7 Conclusion

The majority of cumulative impacts would be temporary and minor when considered in combination with past, present, and reasonably foreseeable activities. However, some long-term cumulative impacts would occur on wetland and upland forested vegetation and associated wildlife habitats. Short-term cumulative benefits would also be realized through jobs and wages and purchases of goods and materials. There is also the potential that the proposed projects would contribute to a cumulative improvement in regional air quality if a portion of the natural gas associated with the proposed projects displaces the use of other more polluting fossil fuels.

5.0 CONCLUSIONS AND RECOMMENDATIONS

5.1 CONCLUSIONS OF THE ENVIRONMENTAL ANALYSIS

The conclusions and recommendations presented in this section are those of the FERC environmental staff. Our conclusions and recommendations were developed with input from the EPA, COE, FHWA, and NYSDAM as cooperating agencies. The federal cooperating agencies may adopt the EIS per 40 CFR 1506.3 if, after an independent review of the document, they conclude that their permitting requirements and/or regulatory responsibilities have been satisfied. However, these agencies would present their own conclusions and recommendations in their respective and applicable records of decision. Otherwise, they may elect to conduct their own supplemental environmental analysis, if necessary.

We determined that construction and operation of Constitution's and Iroquois' projects would result in adverse environmental impacts. These impacts would occur during both construction and operation of the projects and occur on vegetation and individual wildlife species. However, if the proposed projects are constructed and operated in accordance with applicable laws and regulations, the mitigating measures discussed in this EIS, and our recommendations, these impacts would be reduced to less than significant levels. This determination is based on a review of the information provided by the Applicants and further developed from data requests; field investigations; scoping; literature research; alternatives analysis; and contacts with federal, state, and local agencies as well as individual members of the public. As part of our review, we developed specific mitigation measures that we determined would appropriately and reasonably reduce the environmental impacts resulting from construction and operation of the projects. We are therefore recommending that our mitigation measures be attached as conditions to any authorization issued by the Commission. A summary of the anticipated impacts and our conclusions is provided below, by resource area.

5.1.1 Geology and Paleontological Resources

The primary effect of construction of the projects on geologic resources would be disturbances to steep topographic features found along the construction right-of-way. All areas disturbed during pipeline construction would be graded and restored as closely as possible to pre-construction contours during cleanup and restoration. The projects would not cross any active or proposed mines.

Constitution performed geotechnical feasibility studies at three locations to evaluate subsurface conditions at the proposed trenchless crossing sites. Studies for the remaining nine sites are either on-going or not started due to lack of site access. Since Constitution has not provided the results of the geotechnical studies for all proposed trenchless crossings, we are recommending that Constitution provide geotechnical feasibility studies for all locations where the trenchless crossing method is proposed.

Flash flooding is a potential hazard in the project area. Constitution has designed all waterbody crossings to minimize potential impacts from flash flooding, scouring, and high flow velocities on the pipeline. There are several areas along the pipeline route where a karst hazard may be present. Constitution identified several site-specific construction recommendations and mitigation measures that could be employed for steep slope and karst areas, but did not indicate if it would adhere to these measures. Therefore, we are recommending that Constitution implement the karst mitigation measures.

The pipeline would traverse 45.5 miles of shallow bedrock that may require blasting. In order to minimize potential impacts from blasting, Constitution would comply with all federal, state, and local regulations for blasting and has developed a Blasting Plan to be implemented during construction. Iroquois does not anticipate that blasting would be required to construct its compressor station.

A well-defined landslide feature was identified in the area of MP 30.3, for which Constitution intended to perform a formal slope stability analysis. In the draft EIS, we recommended that Constitution file the results of a formal slope stability study for the area at MP 30.3. However, following issuance of the draft EIS, Constitution proposed a minor route change that would avoid the landslide feature at MP 30.3. Therefore, the recommendation was no longer applicable and we removed it from the final EIS.

Constitution stated that its EI and construction crews would be responsible for identifying potential landslide conditions and Constitution would provide a geotechnical specialist if necessary. Due to the specialized nature of identifying landslide areas and Constitution's lack of a firm commitment, we are recommending that Constitution employ a geotechnical expert to identify and develop mitigation measures regarding potential landslide hazards during construction.

With the implementation of Constitution's state-specific ECPs (which include its Plan and Procedures), as well as our additional recommendations, we conclude that impacts on geological resources would be adequately minimized.

We do not anticipate that construction of the projects would uncover significant paleontological resources, and no known paleontological sites have been identified. However, there is the potential for an unanticipated discovery of fossils along the proposed pipeline route, especially in areas of shallow bedrock or where bedrock removal is necessary. To minimize impacts on paleontological resources that may be uncovered during construction, Constitution would follow the procedures provided in its Discovery Plan and notify the PADCNR Bureau of Topographic and Geologic Survey or the New York State Paleontologist and other relevant agencies as necessary. Given these measures, we conclude that potential impacts on paleontological resources would be adequately minimized.

5.1.2 Soils

The projects would traverse a variety of soil types and conditions. Construction activities associated with the projects, such as clearing, grading, trenching, and backfilling, could adversely affect soil resources by causing erosion, compaction, and introduction of excess rock or fill material to the surface, which could hinder restoration. However, the Applicants would implement the mitigation measures contained in their ECPs (Constitution) and Plan (Iroquois) to control erosion, enhance successful revegetation, and minimize any potential adverse impacts on soil resources. Specifically, soil impacts would be mitigated through measures such as topsoil segregation, temporary and permanent erosion controls, and post-construction restoration and revegetation of construction work areas. Additionally, Constitution and Iroquois would implement their Spill Plan and SPCC Plan, respectively, during construction and operation to prevent and contain, and if necessary clean up, accidental spills of any material that may contaminate soils. We are further recommending that Constitution adhere to a maximum allowable rutting depth of 4 inches in agricultural areas and that Constitution consult with the FERC, the NYSDAM, and the AI (for New York parcels) prior to conducting any agricultural restoration between October 1 and May 15 to determine soil workability.

Permanent impacts on soils would mainly occur at the aboveground facilities where the sites would be graveled and converted to natural gas use. Implementation of Constitution's ECPs and Iroquois' Plan and other project-specific plans would adequately avoid, minimize, or mitigate construction impacts on soil resources in the remainder of the area of both projects. Based on our analysis of the Applicants' proposed measures, we conclude that potential impacts on soils would be avoided or effectively minimized or mitigated.

5.1.3 Water Resources

Groundwater

Groundwater resources in the area of both projects come from Devonian-aged sedimentary rock consisting of sandstones, shales, and limestones. The pipeline would cross approximately 4 miles of the Clinton Street Ballpark SSA in Broome County, New York. Project facilities in New York would not be within designated primary aquifers; however, they would cross 19 designated principal aquifers. Facilities in Pennsylvania would not cross or affect any WHPAs; however, the New York portion of the pipeline would cross three WHPAs. Access roads and contractor yards would cross an additional five WHPA areas.

No public water supply wells or springs are within 150 feet of the proposed projects. The projects are within 150 feet of 2 water supply monitoring wells, 4 private water wells used for drinking water, and 18 private water supply wells or springs that are not used for drinking water. However, Constitution has not yet completed identifying water wells and springs within 150 feet of the project in Pennsylvania. Therefore, we are recommending that Constitution report the location of all water wells and springs within 150 feet of the proposed pipeline and aboveground facilities. Constitution has agreed to test all water wells within 150 feet of the construction workspace for water quality and quantity prior to and after construction, and provide an alternative water source or a mutually agreeable solution in the event of construction-related impacts.

Constitution provided field survey results and agency consultations for wetlands and waterbodies for three of the six proposed contractor yards. Field surveys identified waterbodies within the boundaries of contractor yards Spread 1 and Spread 5. Therefore, we are recommending that Constitution complete all required surveys and provide us with the updated status of agency permitting for all of the proposed contractor yards.

Construction activities are not likely to significantly impact groundwater resources because the majority of construction would involve shallow, temporary, and localized excavation. These potential impacts would be avoided or further minimized by the use of construction techniques and mitigation described in Constitution's ECPs and Iroquois' Procedures. Constitution and Iroquois would prevent or adequately minimize accidental spills and leaks of hazardous materials into groundwater resources during construction and operation by adhering to their Spill Plan (Constitution) and SPCC Plan (Iroquois). Given the Applicants' proposed measures, as well as our recommendations, we conclude that potential impacts on groundwater resources would be avoided, minimized, or mitigated.

Surface Waters

The pipeline project would cross 289 waterbodies (116 perennial, 109 intermittent, and 64 ephemeral). The pipeline would cross one major waterbody (greater than 100 feet wide): Schoharie Creek in New York.

Constitution is proposing to use trenchless crossing methods (conventional bore or Direct Pipe) for 21 of the crossings, including the major waterbody crossing. Constitution would cross the remaining 268 waterbodies via dry crossing methods (dry open cut, dam and pump, flume, or cofferdam). None of the proposed aboveground facilities, including Iroquois' project, would impact waterbodies. Use of trenchless and dry crossing methods to cross the waterbodies, and implementation of the mitigation measures outlined in Constitution's ECPs and other project-specific plans would aid in the effective avoidance or minimization of impacts on surface water resources.

Access roads associated with Constitution's project would require installation of temporary and permanent culverts or equipment bridges over waterbodies. According to Constitution, the size and installation methods for the culverts that would be permanently installed would vary based upon individual waterbody size and characteristics. In addition, Constitution proposed to stabilize and permanently fill (with culverts) five waterbodies, use minor fill at one waterbody, and permanently fill six wetlands for the purposes of constructing access roads. As part of the draft EIS, we recommended Constitution file site-specific plans for the proposed permanent access road crossings of waterbodies and wetlands, including site-specific justifications for the use of permanent fill. This information was provided by Constitution in April 2014. However, based on our experience with similar projects in similar terrain, we conclude that the use of permanent fill is not justified for access of the permanent roads. Therefore, we are recommending that Constitution should not permanently fill any waterbodies or wetlands for the use of access roads.

As discussed previously, several waterbodies along the pipeline route and access roads would be within Constitution's construction workspaces, but would not be crossed by the pipeline directly. Constitution stated that it would avoid impacts on such waterbodies to the extent possible. We have reviewed Constitution's proposed generalized measures and determined in the draft EIS that impacts on these waterbodies should be quantified on a waterbody-specific basis. Therefore, in the draft EIS we recommended that Constitution file a description of impacts and any proposed impact avoidance, minimization, and mitigation measures for each waterbody that would not be directly crossed, but would be impacted by workspaces. This information was provided by Constitution in April 2014. Constitution has adjusted its proposed route, and extra workspaces in numerous locations to better avoid waterbodies. We have reviewed Constitution's proposed mitigation measures and find them acceptable.

Surface Water Uses during Construction

The Applicants are proposing to use both surface water and municipal water sources for hydrostatic testing. Constitution and Iroquois would require a total of 22,708,949 gallons of water for hydrostatic testing. Iroquois anticipates using a combination of nitrogen and water from municipal sources.

Constitution would use water from municipal sources or surface water during the Direct Pipe operations to create the drilling mud used to lubricate the drill bit, remove drill cuttings, and hold the hole open. After completion of the Direct Pipe operations, the recovered drilling mud would be recycled or disposed of at a suitable upland location or disposal facility.

Both projects would also require municipal and/or surface water for dust suppression. Iroquois estimates the water needed for dust suppression would be imported via a 2,000 gallon capacity truck twice a week as needed. Given the length of the pipeline and that weather conditions would play a large role in determining need, the amount of water that Constitution would need for dust suppression would be determined at the time of construction.

Impacts associated with the withdrawal and discharge of water would be effectively minimized by the implementation of the mitigation measures outlined in Constitution's ECPs and Iroquois' Procedures. In addition, Constitution and Iroquois would obtain appropriate National Pollutant Discharge Elimination System discharge permits prior to conducting hydrostatic testing. Accidental spills during construction and operations would be prevented or adequately minimized through implementation of Constitution's Spill Plan and Iroquois' SPCC Plan.

Based on the avoidance and minimization measures developed by Constitution including the ECPs, as well as our recommendations, we conclude that the projects would not have adverse impacts on surface water resources.

5.1.4 Wetlands

Construction of the pipeline would impact a total of 95.3 acres of wetlands, including 33.8 acres of forested wetlands, 35.4 acres of herbaceous wetlands, and 26.1 acres of shrub-scrub wetlands. The majority of wetland impacts would be from temporary workspaces (76.1 acres); these areas would return to pre-construction conditions following construction. Constitution would maintain a 30-foot-wide corridor with selective removal of trees within forested wetlands, impacting a total of 14.5 acres through the operational life of the project. Additionally, Constitution would mow and maintain a 10-foot-wide corridor within shrub-scrub wetlands, impacting a total of 4.6 acres during operation. Constitution has completed surveys for three of the six contractor yards. Because the surveys for three yards are not complete we are recommending that Constitution provide survey results for all proposed contractor yards. No wetlands would be impacted by construction of Iroquois' project.

Construction and operation-related impacts on wetlands would be mitigated by Constitution's compliance with the conditions of the COE Section 404 and the NYSDEC permits; and by implementing the wetland protection and restoration measures contained in Constitution's ECPs, including its Procedures. Constitution would conduct annual post-construction monitoring of all wetlands affected by construction to assess the condition of revegetation and the success of restoration until revegetation is successful.

Constitution requested alternative measures from its Procedures in several areas where it concluded that site-specific conditions do not allow for a 50-foot setback of extra workspace from wetlands, or where a 75-foot-wide right-of-way is insufficient to accommodate wetland construction. Based on our review, we determined that these requests are justified.

Constitution would also avoid wetland impacts at 13 locations by using trenchless (conventional bore or Direct Pipe) construction methods. At three locations, Constitution proposed to clear vegetation within a 10-foot-wide corridor between the Direct Pipe entry and/or exit location along the centerline to facilitate access to water for drilling operations during construction. However, to further reduce impacts and to limit disturbance to the minimum area needed to construct the Direct Pipe crossings, we are recommending that Constitution limit vegetation clearing between Direct Pipe entry and exit points.

Based on the avoidance and minimization measures developed by Constitution, as well as our recommendations, we conclude that impacts on wetland resources would be effectively minimized or mitigated.

5.1.5 Vegetation

Construction of the projects, including the construction right-of-way, extra workspace, aboveground facilities, contractor yards, and access roads would result in impacts on 1,800.9 acres of vegetated lands. This total includes 1,033.9 acres of upland forest. During operations, Constitution would mow and maintain a 50-foot-wide permanent right-of-way no more than once every three years; however, a 10-foot-wide swath may be mowed more frequently to facilitate routine patrols and emergency access to the pipeline centerline. Operation of the projects would result in impacts on 730.9 acres of vegetated lands, including 477.4 acres of upland forest.

Constitution would use 10 temporary access roads during construction activities and an additional 68 permanent access roads during construction and operation. The access roads would impact 42.7 acres of upland forest during construction and 19.8 acres of upland forest during operation.

The greatest impact on vegetation would be on forested areas because of the time required for tree regrowth back to pre-construction condition. Construction in forest lands would remove the tree canopy over the width of the construction right-of-way, which would change the structure and local setting of the forest area. The regrowth of trees would take years and possibly decades. Moreover, the forest land on the permanent right-of-way would be permanently impacted by ongoing vegetation maintenance during operations, which would preclude the re-establishment of trees on the right-of-way.

Constitution would cross 36 miles of interior forest habitat, which includes upland and wetland communities. The construction workspace and right-of-way width would be reduced from 110 feet to 100 feet within interior forests except where extra workspace is necessary for safety or engineering reasons. This neck-down would prevent 51.8 acres of interior forest from being cleared during construction. Although Constitution has attempted to route its pipeline adjacent to existing disturbances and outside of forested areas where possible, and has decreased workspaces within interior forest areas relative to its original proposal, impacts on the interior forest habitat, and the migratory birds and other wildlife that use it, still account for about 43 percent of the total forest impacts and about 24 percent of the total project impacts. Therefore, we recommended in the draft EIS that Constitution file a draft Upland Forest Mitigation Plan developed in consultation with the FWS, the NYSDEC, the PADCNR, and the PGC. Based on our recommendation, Constitution proposed compensatory mitigation to offset impacts on interior forests, including allocation of funds for acquisition of lands for conservation and/or restoration, grants for habitat conservation, and long-term management of lands for migratory birds. We are now recommending that Constitution submit the final plan prior to construction.

Constitution also conducted invasive plant surveys and identified multiple invasive species along the proposed project's right-of-way where access was granted. Constitution would minimize the spread of invasive plant species through use of wash stations to clean equipment and by rapid restoration and seeding of cleared areas (as discussed in its Invasive Species Management Plans). Since the invasive species surveys are not yet complete, and the location of wash stations has not been determined, we are recommending that these surveys and mitigation measures be completed prior to construction. In addition, we are recommending that Constitution continue field monitoring for invasive species for 3 years after vegetation restoration is complete, as determined by our staff and that mowing and maintenance equipment be adequately cleaned.

The impact of the pipeline project on open lands would be short term as these areas would revegetate quickly, usually within 1 to 3 years. Moreover, open areas would be less affected by vegetation maintenance on the permanent right-of-way.

Constitution has committed to reduce the construction right-of-way footprint through interior forests to 100 feet where possible, collocate with existing utilities where possible, and re-seed and monitor revegetation success to minimize the spread of invasive species. With our further recommendations to finalize mitigation for upland forest impacts, we conclude that the proposed projects would not result in a significant impact on vegetation resources.

5.1.6 Wildlife and Aquatic Resources

The projects could have both direct and indirect impacts on wildlife species and their habitats. Direct impacts of construction on wildlife include the displacement of wildlife from the right-of-way or work sites into adjacent areas and the potential mortality of some individuals. The cutting, clearing,

and/or removal of existing vegetation within the construction work area could also affect wildlife by reducing the amount of available habitat for nesting, cover, and foraging. Indirect effects of construction could include lower reproductive success by disrupting courting, nesting, or breeding of some species, which could also result in a decrease in prey available for predators of these species. Some of these effects would be temporary, lasting only while construction is occurring, or short-term, lasting no more than a few years until the pre-construction habitat and vegetation type would be reestablished. Other impacts would be longer term such as the re-establishment of forested habitats, which could take decades. The Applicants proposed several measures to minimize or avoid impacts on wildlife, including collocating the proposed workspace with other existing rights-of-way (approximately 9 percent of the proposed alignment), utilizing the existing Wright Compressor Station (an industrial location) for construction of the compressor transfer station, and by reducing the construction right-of-way width to 100 feet in interior forest areas.

Constitution has routed the pipeline to minimize impacts on sensitive wildlife habitats, such as the Taylor Hill area, Melondy Hill State Forest, Cannonsville/Steam Mill Area IBAs, and Clapper Hollow State Forest, whenever feasible. Constitution would further minimize impacts on wildlife habitat further by adhering to its state-specific ECPs, Plan, and Procedures.

A variety of migratory bird species, including BCCs, are associated with the habitats that would be affected by the pipeline. The clearing of vegetation during the nesting season could have direct impacts on individual migratory birds. Constitution would conduct the majority of tree-clearing activities within the FWS's recommended clearing window for the protection of migratory birds. As noted above, we are recommending that Constitution finalize an Upland Forest Mitigation Plan that would specifically address impacts on migratory bird habitat for forest land that would be cleared outside of the FWS-recommended clearing window. In addition, we are recommending that Constitution conduct nest surveys for birds of conservation concern whenever clearing would occur outside of the recommended window, and that a buffer be provided for active nests. Iroquois is currently proposing to clear a small tract of trees outside of the FWS-recommended clearing window and is therefore working with the FWS to develop additional mitigation measures for the protection of migratory birds.

Given the impact avoidance, minimization, and mitigation measures proposed by the Applicants, as well as our recommendations, we conclude that the proposed projects would not have a significant adverse effect on wildlife.

All waterbodies that would be crossed by the pipeline are classified as coldwater fisheries with the exception of Schoharie Creek (a warmwater fishery). Consultations with the PFBC and the NYSDEC determined that 118 waterbodies classified as fisheries of special concern would be crossed, with six impacted by permanent access roads. Iroquois' project would not impact any waterbodies. In-stream pipeline construction across waterbodies could have both direct and indirect effects on aquatic species and their habitats, including increased sedimentation and turbidity, alteration or removal of aquatic habitat cover, stream bank erosion, impingement or entrainment of fish and other biota associated with the use of water pumps, downstream scouring, and the potential for fuel and chemical spills. No in-stream blasting is expected to be required for any of the pipeline crossings; therefore, we do not expect any blasting-related fishery impacts. However, if it is later determined that in-stream blasting is required, Constitution would develop a detailed in-stream blasting plan that complies with state-specific regulations and permit conditions. We are recommending that Constitution provide the FERC with any such plans and that they include protocols for in-stream blasting and the protection of aquatic resources and habitats.

Constitution would minimize the effects of its project on aquatic resources through the use of various trenchless or dry crossing methods, construction timing windows, extra workspace restrictions, and restoration procedures. Constitution would also implement measures outlined in its ECPs and

Procedures to minimize impacts on aquatic resources such as restoring stream beds and banks to pre-construction conditions. Adherence to the ECPs would maximize the potential for regrowth of riparian vegetation.

Constitution proposes to use the conventional bore method at 14 waterbody crossings and the Direct Pipe method at 7 waterbody crossing. These methods would avoid impacts on the streambed, stream banks, and aquatic resources. Constitution would use dry crossing methods (flume, dam and pump, or cofferdam) at the remaining crossings in order to minimize potential sedimentation and turbidity impacts. Constitution has indicated that it would adhere to the state-designated allowable construction windows for protected coldwater streams to avoid disruption of spawning and over-wintering of trout eggs.

The Applicants would use surface water and municipal sources of water for hydrostatic testing. Constitution proposes to use five waterbodies as sources of hydrostatic test water, all of which contain sensitive fisheries: Starrucca Creek in Pennsylvania; and Oquaga, Ouleout, Kortright, and Schoharie Creeks in New York. The PFBC approved the withdrawal of water from Starrucca Creek, but requested that water not be withdrawn between March 1 and June 15, which could be outside of Constitution's proposed water withdrawal window of December through March. We note that the water withdrawals could be delayed until the fourth quarter of 2015 given the current status of the likely construction schedule. Constitution has not received approval from the NYSDEC for water withdrawal from Oquaga, Ouleout, Kortright, and Schoharie Creeks, nor has Constitution verified whether water withdrawals would be subject to the in-stream work windows. Therefore, we are recommending that Constitution not withdraw water from Starrucca Creek outside of the PFBC-recommended allowable work window of June 16 to February 28, or provide the results of additional coordination with the PFBC. In addition, we are recommending that Constitution file written approval from the NYSDEC allowing water withdrawal from Oquaga, Ouleout, Kortright, and Schoharie Creeks, as well as listing any timing restrictions that would be placed on water withdrawals at those locations.

Constitution would minimize impacts associated with hydrostatic testing by fitting intake lines with screens to minimize the entrainment of fish and maintaining ambient, downstream flow rates to protect aquatic life. Following the completion of the hydrostatic tests, Constitution would discharge the test water into an upland dewatering structure. The discharge rates would be regulated and energy dissipation devices would be employed to prevent erosion, stream bed scour, suspension of sediments, flooding, or excessive flows. Discharge of hydrostatic test water would comply with all applicable permits, including the sampling of discharge water to document water quality at the time of discharge.

The Applicants would minimize the potential for spills to impact aquatic resources by implementing the measures contained in Constitution's Spill Plan and Iroquois' SPCC Plan. These plans include measures that restrict refueling or other handling of hazardous materials within 100 feet of a waterbody and require the Applicants to conduct routine inspections of tank and storage areas to reduce the potential for spills or leaks of hazardous materials.

Given the impact avoidance, minimization, and mitigation measures proposed by the Applicants, including their adherence to multiple resource protection plans, as well as our additional recommendations, we conclude that the projects would not result in adverse impacts on aquatic resources.

5.1.7 Special Status Species

To comply with Section 7 of the ESA, we consulted either directly or indirectly (through the Applicants' informal consultation) with the FWS, NOAA Fisheries, and state resource agencies regarding the presence of federally listed, proposed for listing, or state-listed species in the project area. Based on

these consultations, we determined that construction and operation of Constitution's project would *not affect* the bog turtle and *may affect, but would not likely adversely* affect the Indiana bat, dwarf wedgemussel, and Northern monkshood. No federally or state-listed special status species were noted in the vicinity of Iroquois' compressor transfer station site. In compliance with Section 7, we requested that the FWS consider the EIS, along with various survey reports prepared by the Applicants, as the BA for the projects. The northern myotis, a bat species proposed to be listed as endangered by the FWS, is found within the project area. We have included a recommendation that Constitution develop a site-specific bat tree clearing plan that includes potential impact avoidance, minimization, or mitigation measures, in anticipation that the species becomes officially listed in 2015.

Constitution has not completed necessary surveys for dwarf wedgemussels, northern monkshood, sensitive bat species, bald eagle, and any other state-listed species of concern. Therefore, we have recommended that Constitution file the results of any remaining surveys for these species as well as any additional mitigation measures developed in consultation with the applicable state and federal agencies.

Although no bald eagle nests were encountered within 0.25 mile of Constitution's proposed pipeline, two nests are within 0.5-mile of areas that may require excavation by blasting. Constitution has indicated that it is still consulting with the FWS and the NYSDEC to determine if blasting within 0.5 mile of these nests would adversely impact bald eagles. The National Bald Eagle Management Guidelines indicate that blasting should be avoided within 0.5-mile of an active nest; therefore, we are recommending that Constitution provide the final bald eagle mitigation plan developed in coordination with the FWS and the NYSDEC.

In addition to the federally listed and proposed species, 22 other candidate, state-listed, or special concern species were identified as potentially present in Constitution's project area. These species could be affected by Constitution's project, but we do not expect any adverse effects given Constitution's proposed measures and our recommendations. Based on implementation of those measures, we conclude that impacts on special-status species would be adequately avoided or minimized.

5.1.8 Land Use, Recreation, Special Interest Areas, and Visual Resources

Construction of the projects would affect approximately 1,871.5 acres of land. Of this, about 1,669.4 acres would be for the pipeline facilities, including about 1,558.7 acres for the pipeline right-of-way and about 110.7 acres for extra workspaces. Of the remaining areas affected, 20.7 acres would be for the aboveground facilities, 101.5 acres would be for contractor yards, and 79.9 acres would be for access roads. During operation, the permanent pipeline right-of-way, aboveground facilities, and permanent access roads would newly encumber 761.5 acres of land. The new pipeline would require a new 50-foot-wide permanent right-of-way. To facilitate pipeline inspection, operation, and maintenance, the entire permanent right-of-way in upland areas would be maintained in an herbaceous/scrub-shrub vegetated state. This maintained right-of-way would be mowed no more than once every 3 years, but a 10-foot-wide strip centered over the pipeline may be mowed annually to facilitate operational surveys.

Constitution's proposed construction work area is within 50 feet of six residential structures and one occupied pool house. Three residences and the pool house are within 25 feet of proposed construction work areas. Constitution prepared site-specific plans to address impacts for residences within 50 feet of construction workspace. We have reviewed these plans and found them acceptable with the exception of one plan that was not sufficient. Therefore, we are recommending that Constitution provide an updated plan for the residence and septic field crossed at MP 96.7 and updated classifications for unsurveyed structures.

No planned developments in Pennsylvania are within 0.5 mile of the pipeline project. In New York, four planned projects were identified within 0.5 mile of the pipeline project including three subdivisions, an apartment complex, and a water/sewer line infrastructure project, all in Schoharie County. The status of the subdivisions suggests that while they are approved, construction has not yet begun. Constitution incorporated several route variations to minimize or avoid impacts on planned developments. We determined that implementation of the identified mitigation measures would minimize or mitigate the impacts of Constitution's project on planned residential developments.

In general, impacts on recreational and special interest areas, including two New York State Forests, two recreational trails, and one gun club, would be temporary and limited to the period of active construction, which typically would last only several days to several weeks in any one area. These impacts would be minimized by implementation of Constitution's ECPs.

The pipeline would cross several tracts of land supporting specialty crops such as tree farms (Christmas trees, pine, and spruce), Certified Green Tag Forest, an Organic Rated Farm, and a sugar bush operation, as well as 33.4 miles of agricultural districts. Constitution has committed to continuing coordination with landowners to avoid and minimize impacts on specialty crops. Where impacts on specialty crops cannot be avoided, Constitution would implement special construction procedures in accordance with the ECPs. Based on our recommendation in the draft EIS, Constitution committed to the use of organic straw/hay for mulch on certified organic agricultural lands.

Crop yields would be monitored based on the measures developed by the NYSDAM. These measures would ensure that yields in areas affected by construction return to levels similar to those of adjacent, undisturbed areas. Finally, the owners of agricultural land would be compensated for any measureable loss of agricultural or livestock production in accordance with the terms of landowner agreements. Impacts on agricultural lands would be short-term and offset by compensation agreed to during easement negotiations. However, since the potential impacts on the sugar bush operation have not yet been fully described, we are recommending that Constitution develop an impact mitigation plan for all specialty crops, including this location.

We received comments regarding the Schoharie Career and Technical Education School which would be impacted by pipeline construction. The original route crossed the school property in an area where excavation and construction activities are being conducted as part of the school's curriculum. Given the potential for a conflict in use between placement of the pipeline and current usage of the lands by the school, we recommended that Constitution coordinate with the school Board of Educators to ensure Constitution's project does not hinder the school's ability to implement existing or future curriculum. Following issuance of the draft EIS, Constitution adjusted its proposed route to the back of the school property, away from the training area, and also removed an access road from the property. We also recommended in section 3.4.3 that Constitution install a safety fence both during construction and operations to prevent students from using heavy equipment near the pipeline.

Visual resources along the pipeline route are a function of geology, climate, and historical processes, and include topographic relief, vegetation, water, wildlife, land use, and human uses and development. A portion of the pipeline (about 9.0 percent) would be installed within or parallel to existing pipeline and/or utility rights-of-way. As a result, the visual resources along collocated portions have been previously affected by other similar activities. Impacts in other areas would be greatest where a conversion from forested land to a grassy, maintained right-of-way would occur, particularly at viewing locations such as roadways. Additionally, the proposed communication towers could impact the viewshed in five locations and we have included a recommendation that Constitution further assess these areas after construction and to implement mitigation measures if necessary.

In general, the impacts on visual resources resulting from the construction and operation of the meter stations and MLVs would be minimal as each site is small and would be operated within the pipeline operational right-of-way or within an aboveground facility. While construction of the Iroquois project would require the clearing of 3.3 acres of forest land, assessment of the surrounding forest land, site topographic conditions, and the existing industrial setting indicate that visual impacts from construction would be minor. Due to the location of the proposed compressor transfer station in an existing industrial setting surrounded in part by forest land, we anticipate that visual impacts on nearby visual receptors during operation would be permanent, but negligible.

With adherence to Constitution's proposed impact avoidance, minimization, and mitigation plans, and our recommendations, we conclude that overall impacts on land use and visual resources would be adequately minimized.

5.1.9 Socioeconomics

Construction of the projects would not have a significant adverse impact on local populations, housing, employment, or the provision of community services. There would be temporary increases in traffic levels due to the commuting of the construction workforce to the area of the projects as well as the movement of construction vehicles and delivery of equipment and materials to the construction right-of-way. To address traffic impacts related to in-street construction, Constitution developed a Residential Access and Traffic Mitigation Plan.

We received comments regarding the potential effect of the pipeline project on property value devaluation, mortgages, and potentially modified landowner insurance policies. We assessed available studies regarding property values and conclude that a loss of property value or inability to obtain a mortgage due to construction of a pipeline is not supported by the literature. There is no literature available regarding the potential effects of pipeline proximity on property insurance, nor were we able to confirm these claims through our independent research and interviews with regional experts. To address this issue, we are recommending that Constitution file weekly reports during construction and quarterly reports for 2 years after construction describing the nature of the insurance complaints and demonstrating how Constitution coordinated with the affected landowners to mitigate impacts.

Based on our research and analysis, there is no evidence that the projects would result in disproportionately high and adverse health or environmental effects on minority or low-income communities.

The long-term socioeconomic effect of the projects is likely to be beneficial, based on the increase in tax revenues that would accrue in the counties affected by the projects. Based on the analysis presented, and our recommendations, we conclude that the projects would not have a significant adverse effect on the socioeconomic conditions of the project area.

5.1.10 Cultural Resources

Constitution conducted archival research and walkover surveys of the area of the proposed project to identify historic aboveground resources and locations for additional subsurface testing in areas with potential for prehistoric and historic archaeological sites. Constitution identified 138 historic aboveground resources within the area of direct impact for the proposed pipeline route. We have determined that 15 of these historic aboveground resources are eligible for listing in the NRHP and that 123 resources are not eligible. Constitution indicated that two NRHP-eligible resources would be adversely affected by the proposed pipeline and that the other 13 NRHP-eligible resources would not be adversely affected. Constitution would implement measures to avoid, minimize, or mitigate any

anticipated adverse effects to eligible historic aboveground resources. Resources that are determined not eligible for listing in the NRHP would not be affected by the proposed project. Two previously recorded historic railroads would be crossed by Constitution's project. These railroads remain unevaluated. Constitution intends to cross underneath all rail beds by means of conventional bores, thereby avoiding direct impacts.

Twenty-six archaeological sites and 17 stone pile sites would be within the proposed pipeline construction right-of-way, one archaeological site would be in the area of potential impact at a proposed contractor yard, and one cemetery would be within a proposed access road corridor. Constitution has recommended 17 archaeological sites that would be impacted by its project as potentially eligible for listing in the NRHP and 10 sites as not eligible. The OPRHP has requested further testing at three sites that Constitution recommends as not eligible. Constitution has not made recommendations on the NRHP eligibility of the 17 stone pile sites or the cemetery, but has designated them "culturally sensitive."

Constitution plans to modify its project to avoid 5 archaeological sites that it recommends as potentially eligible, and it plans to perform additional testing to formally evaluate the NRHP eligibility of the other 12 sites recommended potentially eligible. If the additional testing were to indicate any of these sites are eligible for listing in the NRHP, Constitution would consider modifications to the project to avoid them. If the sites could not be avoided due to terrain or construction constraints, further investigations would be required to mitigate any adverse effect that would occur. Constitution plans to modify the proposed access road to avoid the cemetery. It also plans to modify its project to avoid 15 stone pile sites recommended as culturally sensitive. Two stone pile sites cannot be completely avoided due to terrain and construction constraints. Constitution is considering measures to mitigate impacts on these sites. If after consultation we determine that the other 10 sites within the construction right-of-way are not eligible for listing in the NRHP, those sites would not be affected and no further work would be required.

Iroquois identified a single archaeological site during its Phase I survey. Iroquois recommended that the site is not eligible for listing in the NRHP and the OPRHP agreed. Two previously recorded historic aboveground resources located within 1 mile of Iroquois' project remain unevaluated. Based on the proximity to Iroquois' project, overall impacts on these resources would be minimized.

Both we and the Applicants consulted with federally recognized Native American tribes (15 associated with the Constitution project and 10 associated with the Iroquois project) and 3 tribes that are not federally recognized to provide them an opportunity to comment on the proposed projects. Several tribes and organizations requested additional consultation or information, but none have provided comments on the projects.

To ensure that our responsibilities under Section 106 of the NHPA are met, we are recommending in section 4.10.4 that Constitution not begin construction until any additional required surveys are completed, survey reports and treatment plans (if necessary) have been reviewed by the appropriate parties, and we provide written notification to proceed. The studies and impact avoidance, minimization, and measures proposed by Constitution, and our recommendation, would ensure that any adverse effects on cultural resources would be appropriately mitigated.

5.1.11 Air Quality and Noise

Air Quality

Air quality impacts associated with construction of the proposed projects would include emissions from fossil-fueled construction equipment and fugitive dust. Such air quality impacts would

generally be temporary and localized, and are not expected to cause or contribute to a violation of applicable air quality standards.

Emissions generated during operation of Constitution's project would be minimal, limited to emissions from maintenance equipment and fugitive emissions. Operation of Iroquois' project would generate emissions of nitrogen oxides, carbon monoxide, and particulate matter, sulfur dioxide, volatile organic compounds, GHGs, and hazardous air pollutants. Operation of the new turbines at the proposed compressor transfer station would result in the existing Wright Compressor Station becoming a major source of GHGs requiring a Title V application and permit at start-up of the new compressors. Because Title V is only required for GHGs, the proposed turbines would still be permitted and regulated as minor sources and minor modifications with regard to emission controls and other requirements.

Iroquois conducted air dispersion modeling for the proposed Wright Compressor Station modification in support of its air permit application to the NYSDEC. The results of the modeling analysis demonstrated that emissions for the modified compressor station would not cause or contribute to a violation of the NAAQS.

We did note that modifications to the construction schedule and/or the projects may result in increases in construction emissions that could exceed the General Conformity applicability threshold for NO_x in Schoharie County. However, because the projects' emissions are conservatively estimated (at a worst case scenario) at only 70 percent of the applicability threshold, we conclude that a Construction Emission Plan is not needed.

We received several comments about the health risk of releasing radon when natural gas is burned in the home. While the FERC has no regulatory authority to set, monitor, or respond to indoor radon levels; many local, state, and federal entities establish and enforce radon exposure standards for indoor air. We expect that the combustion of gas carried by the proposed projects would comply with all applicable air emission standards. In the unlikely event that these standards are exceeded, the necessary modifications would be implemented to ensure public safety. In addition, in certain closed burning systems such as water heaters, boilers, and furnaces, radon is not released into the air as these appliances generally have ventilation systems that exhaust the radon and combusted materials outside the home.

Noise

Noise would be generated during construction of the pipeline and aboveground facilities for both projects. Construction activities in any one area would typically last from several days to several weeks on an intermittent basis. Construction equipment would be operated on an as-needed basis during this period. Construction of Iroquois' project would be limited to daytime hours and to the Wright Compressor Station. Generally, nighttime noise is not expected to increase during construction because most construction activities would be limited to daytime hours with the exception of certain Direct Pipe activities, which may continue into nighttime hours. Constitution replaced several of its proposed HDD crossings with Direct Pipe crossings after the issuance of the draft EIS. Direct Pipe crossings are generally quieter than HDDs, however, we are recommending that Constitution provide a revised acoustical analysis for each of its Direct Pipe installations and develop a site-specific noise mitigation plan for each installation that would result in a 10 dB increase at the nearest NSA.

Constitution's project would likely require blasting in some areas of the proposed route to dislodge bedrock resulting in potential noise and vibration impacts. Constitution's state-specific ECPs include mitigation measures related to blasting activity. Blasting would be conducted in accordance with applicable agency regulations, including pre- and post-blast inspections, advance public notification, and mitigation measures as necessary. Blasting is not anticipated for construction of Iroquois' project.

Based on the analyses conducted, the proposed mitigation measures, and our recommendation, we concluded that construction of the projects would not result in significant noise impacts on residents and the surrounding environment. Constitution performed a noise assessment for its proposed M&R Stations and demonstrated the operation of its M&R Stations would be in compliance with our noise criteria of 55 dBA (L_{dn}) at the nearest NSAs. Iroquois also performed an acoustical analysis for its Wright Compressor Station modifications. Iroquois committed to ensuring that the final design of the modified facility would comply with our noise criteria of 55 dBA (L_{dn}) at the nearest NSAs. To ensure that Iroquois' modified Wright Compressor Station continues to meet our noise criteria, we recommended that Iroquois file a noise survey at this facility operating at full load conditions, and install additional noise controls if the levels are exceeded.

Noise would be generated by the operation of Constitution's M&R Stations and Iroquois' facility. The Applicants completed an acoustical analysis to identify the estimated combined noise impacts from the Westfall Road M&R station and the compressor station to the nearest NSAs. The results of the acoustical analysis demonstrate compliance with the FERC's noise standard of 55 dBA (L_{dn}) at the nearest NSAs.

Given adherence to the Applicants' proposed measures as well as our additional recommendations, we conclude that potential air and noise-related impacts associated with the projects would be adequately minimized or mitigated.

5.1.12 Reliability and Safety

The pipeline and aboveground facilities associated with the proposed projects would be designed, constructed, operated, and maintained to meet the DOT Minimum Federal Safety Standards in 49 CFR 192 and other applicable federal and state regulations. These regulations include specifications for material selection and qualification; minimum design requirements; and protection of the pipeline from internal, external, and atmospheric corrosion. We received comments expressing concern about how the pipeline would be maintained over time and the long-term safety of operations. The DOT rules require regular inspection and maintenance, including repairs as necessary, to ensure the pipeline has adequate strength to transport the natural gas safely. Further, although regulations requiring remote control shut-off valves have not yet gone into effect and would apply to pipelines built in the future, Constitution committed to the use of remote control shut-off valves for the proposed pipeline.

We received several comments about the potential effects of a pipeline rupture and natural gas ignition (the area of potential effect is sometimes referred to as the potential impact radius). While a pipeline rupture does not necessarily ignite, the DOT does publish rules that define high consequence areas (HCA) where a gas pipeline accident could do considerable harm to people and their property and requires an integrity management program to minimize the potential for an accident. Iroquois is currently implementing a comprehensive integrity management plan for its existing facilities that meet the DOT's requirements. It would modify the existing integrity management plan, as necessary, to incorporate its proposed facilities. Constitution would implement its own management plan for its pipeline facilities which would be clearly marked at line-of-sight intervals and at other key points to indicate the presence of the pipeline. The pipeline system would be inspected to observe right-of-way conditions and identify soil erosion that may expose the pipe, dead vegetation that may indicate a leak in the pipeline, conditions of the vegetative cover and erosion control measures, unauthorized encroachment on the right-of-way such as buildings and other structures, and other conditions that could present a safety hazard or require preventive maintenance or repairs. Constitution would also perform integrity risk assessments of the proposed facilities, which would be instrumental in early detection of leaks and reduce the likelihood for pipeline failure.

Constitution representatives would meet with the emergency services departments of the municipalities and counties along the proposed pipeline facilities on an ongoing basis as part of their liaison programs. Constitution would provide these departments with emergency contact information and verbal, written, and mapping descriptions of the pipeline systems. This liaison program would identify the appropriate fire, police, and public officials and the responsibilities of each organization that may respond to a gas pipeline emergency, and coordinate mutual assistance in responding to emergencies.

We conclude that the Applicants' implementation of the above measures, along with our recommendation, would help to protect public safety and the integrity of the proposed facilities.

5.1.13 Cumulative Impacts

Three types of projects (past, present, and reasonably foreseeable projects) could potentially contribute to a cumulative impact when considered with the proposed projects. These projects include Marcellus Shale development (wells and gathering systems), natural gas facilities that are not under the Commission's jurisdiction, other FERC jurisdictional natural gas pipelines, and unrelated actions such as residential or industrial developments, transportation projects, wind farms, and utility lines. The region of influence for cumulative impacts varied depending on the resource being discussed. Specifically, we included:

- minor projects, such as residential development, small commercial development, and small transportation projects within 0.25 mile of the proposed area for both Constitution and Iroquois' projects;
- major projects, such as large commercial, industrial, transportation and energy development projects within 10 miles of the proposed area for both projects, including natural gas well permitting and development projects;
- major projects located within watersheds crossed by the proposed projects; and
- projects with potential to result in longer term impacts on air quality (for example, natural gas pipeline compressor stations) located within an AQCR crossed by the proposed projects.

We received numerous comments about the cumulative impacts associated with development of natural gas reserves in the Marcellus Shale. In Pennsylvania, the permitting of upstream facilities associated with the development of the Marcellus Shale is under the jurisdiction of the PADEP Bureau of Oil and Gas Management. The PADEP has developed BMPs for the construction and operation of upstream oil and gas production facilities. Further, the PADEP and the SRBC have recently enacted regulations to specifically protect surface and groundwater resources from potential impacts associated with the development of the Marcellus Shale. Development of the Marcellus Shale is expected to continue in proximity to and during construction and operation of portions of the pipeline project in Pennsylvania (hydraulic fracturing of the Marcellus Shale is currently prohibited in New York). However, because the proposed projects and other FERC jurisdictional projects in the area would not have an adverse impact on water resources, and considering the significantly greater geographic and time scale for development of the Marcellus Shale, the proposed projects and other FERC jurisdictional projects in the area would not contribute in any significance to cumulative impacts on water resources that may be associated with development of the Marcellus Shale. However, our cumulative impacts assessment was updated to provide an estimate of the number of wells needed to provide the capacity of the proposed projects.

Our cumulative impacts assessment was also updated to assess cumulative impacts related to Tennessee Gas Pipeline Company's Northeast Energy Direct (NED) Project. The NED Project would involve upgrading its existing pipeline system in New York, Pennsylvania, Massachusetts, New Hampshire, and Connecticut to provide 2.2 billion cubic feet of natural gas per day to the New England area. As currently proposed by Tennessee Gas Pipeline Company, portions of the NED Project would be collocated with Constitution's pipeline for portions of its route.

Impacts associated with the proposed projects in combination with other projects such as residential developments, wind farms, utility lines, and transportation projects, would be relatively minor overall, and we included recommendations in the EIS to further reduce the environmental impacts associated with Constitution's and Iroquois' projects, as identified in section 5.2. Additionally, Constitution selected a route that collocates with existing rights-of-way, where feasible. Similarly, each of the other projects considered in our cumulative impacts analysis would have been designed to avoid or minimize impacts on sensitive environmental resources. It is anticipated that any adverse impacts on sensitive resources resulting from these projects would be avoided or effectively minimized or mitigated through project design, BMPs, and regulatory agency permitting. Therefore, we conclude that the cumulative impacts associated with the Constitution and Iroquois projects, when combined with other known or reasonably foreseeable projects, would be effectively limited.

5.1.14 Alternatives

As an alternative to the proposed action, we evaluated the no-action alternative, system alternatives, route alternatives, minor route variations, and aboveground facility site alternatives. While the no-action alternative would eliminate the short- and long-term environmental impacts identified in the EIS, the stated objectives of the Applicants' proposals would not be met. We also evaluated the use of alternative energy sources and the potential effects of energy conservation, but determined that these sources and measures would not be practicable alternatives to the proposed projects.

Our analysis of system alternatives included an evaluation of whether existing or proposed natural gas pipeline systems could meet Constitution's and Iroquois' objectives while offering an environmental advantage. There is no available and suitably located capacity for existing pipeline systems to transport the required volumes of natural gas to the delivery point in Wright, New York in their current configuration. Moreover, none of the existing pipeline systems are directly connected to the proposed pipeline project's gas supply area in Susquehanna County, Pennsylvania except for TGP's 300 Line. However, TGP's 300 Line proceeds in an east-west direction, not northeast towards the existing Wright Compressor Station and proposed delivery area. We determined that all of the other existing systems in the area of the proposed projects would require significant new facilities, which would result in environmental impacts similar to or greater than the proposed projects. Consequently, there are no practicable system alternatives that are environmentally preferable to Constitution's and Iroquois' projects.

We evaluated the potential for collocation of the proposed pipeline project almost completely along the route of existing pipeline systems either alone or in tandem with other existing systems, or a combination of existing and proposed pipeline systems. Two existing pipeline systems or combinations of existing systems were evaluated: TGP and a Millennium-Dominion-TGP system combination. We also assessed collocation using a combination of a proposed EmKey pipeline, an existing EmKey pipeline, the Dominion Pipeline, and TGP's 200 Line. Finally, we reviewed the potential for an alternative with partial collocation along the existing Bluestone pipeline. Based on our analyses, we conclude that none of the collocated route alternatives would be preferable to the proposed projects.

After issuance of the draft EIS, we became aware of another possible project being considered by Iroquois, the South-to-North (SoNo) Project which has not yet been filed with the Commission and would involve reversing the flow of natural gas on parts of its system. If Iroquois pursues the SoNo project and it is approved, then portions of gas supplied to Iroquois could be displaced to other parts of its system. While the gas supplied by Constitution could be displaced to the northern parts of Iroquois' system, the capacity created by the Constitution project would still be realized.

We evaluated two major route alternatives to the proposed pipeline route. Because neither of these would offer major environmental advantages over the proposed pipeline route, we eliminated them from further consideration. We also considered 9 minor route alternatives to resolve or reduce construction impacts on a scale somewhat smaller than the major route alternatives. We reviewed these routes, and their assessments, and concluded none of these routes avoided or reduced impacts over the corresponding segments of the proposed route.

Constitution assessed numerous minor route variations over the course of project development and indicated prior to issuance of the draft EIS that over 50 percent of the proposed pipeline route had changed due to incorporation of variations and alternatives to its originally planned route identified in May 2012 during the pre-filing process. Following issuance of the draft EIS, Constitution adopted 76 more minor route variations into its proposed route. The reasons for the minor route variations were numerous and varied, but included justifications such as accommodation of landowner concerns, avoidance of buildings or cultural resources, resolution of construction or engineering issues, and minimization of impacts on springs, waterbodies, and wetlands.

We also reviewed numerous other stakeholder-reported issues and found that 15 minor route variations and/or modifications in construction method could reduce or eliminate impacts on site-specific resources. Therefore, we are recommending that Constitution adopt our listed minor route variations and/or modifications in construction method. Because the locations of the two meter stations would be linked to the general location of the associated natural gas receipt and delivery points near Constitution's project origin and at the pipeline terminus, the search for alternatives was constrained to sites adjacent to the existing Central Compressor Station and the existing Wright Compressor Station, respectively. We did not identify any alternative sites for the proposed meter stations, communication towers, or the MLVs that would offer a major environmental advantage to the proposed sites for these facilities.

We evaluated six alternative locations for the Iroquois compressor transfer station site. All six parcels were in the vicinity of the existing Wright Compressor Station along Westfall Road or Barton Hill Road. While these parcels were potentially viable alternative sites, locating the compressor transfer station within the existing parcel owned by Iroquois has several advantages including use of existing industrially developed lands, reduction in survey needs, elimination of the need to acquire property not already encumbered by natural gas facilities, and the ability to utilize existing infrastructure (e.g. access roads). We determined that for these reasons, siting the compressor transfer station on the existing Iroquois parcel was preferable to construction on a previously non-industrial site.

5.2 FERC STAFF'S RECOMMENDED MITIGATION

If the Commission authorizes the Constitution and Iroquois projects, we recommend that the following measures be included as specific conditions in the Commission's Order. We conclude that these measures would further mitigate the environmental impact associated with construction and operation of the proposed projects.

1. The Applicants shall each follow the construction procedures and mitigation measures described in its application and supplements, including responses to staff data requests and as identified in the EIS, unless modified by the Order. The Applicants must:

   a. request any modification to these procedures, measures, or conditions in a filing with the Secretary of the Commission (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 OEP **before using that modification**.

2. The Director of OEP has delegated authority to take whatever steps are necessary to ensure the protection of all environmental resources during construction and operation of the projects. This authority shall allow:

   a. the modification of conditions of the Order; and

   b. the design and implementation of any additional measures deemed necessary (including stop-work authority) to ensure continued compliance with the intent of the environmental conditions as well as the avoidance or mitigation of adverse environmental impact resulting from construction and operation of the projects.

3. **Prior to any construction**, the Applicants shall each file an affirmative statement with the Secretary, certified by a senior company official, that all company personnel, EIs, and contractor personnel will be informed of the EIs' 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 EIS, as supplemented by filed alignment sheets. **As soon as they are available, and before the start of construction**, the Applicants shall file any revised detailed survey alignment maps/sheets at a scale not smaller than 1:6,000 with station positions for all facilities approved by the Order. All requests for modifications of environmental conditions of the Order or site-specific clearances must be written and must reference locations designated on these alignment maps/sheets.

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

5. The Applicants shall file detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all route realignments or facility relocations, and staging areas, contractor 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, and documentation of landowner approval, whether any cultural resources or federally listed threatened or endangered species would be affected, and whether any other environmentally sensitive areas are within or abutting the area. All areas shall be clearly identified on the maps/sheets/aerial photographs. Each area must be approved in writing by the Director of OEP **before construction in or near that area**.

This requirement does not apply to extra workspace allowed by the Applicants' Plans and/or minor field realignments per landowner needs and requirements which do not affect other landowners or sensitive environmental areas such as wetlands.

Examples of alterations requiring approval include all route realignments and facility location changes resulting from:

a. implementation of cultural resources mitigation measures;

b. implementation of endangered, threatened, or special concern species mitigation measures;

c. recommendations by state regulatory authorities; and

d. agreements with individual landowners that affect other landowners or could affect sensitive environmental areas.

6. **Within 60 days of the acceptance of the Certificate and before construction begins**, the Applicants shall file their respective Implementation Plans for review and written approval by the Director of OEP. The Applicants must file revisions to their plans as schedules change. The plans shall identify:

a. how the Applicants will implement the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests), identified in the EIS, and required by the Order;

b. how the Applicants 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 Applicants will give to all personnel involved with construction and restoration (initial and refresher training as the projects progress and personnel change) with the opportunity for OEP staff to participate in the training sessions;

f. the company personnel (if known) and specific portion of the Applicant's organization having responsibility for compliance;

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

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

(1) the completion of all required surveys and reports;
(2) the environmental compliance training of onsite personnel;
(3) the start of construction; and
(4) the start and completion of restoration.

7. Beginning with the filing of its Implementation Plan, Constitution shall file updated status reports with the Secretary on a **weekly basis until all construction and restoration activities are complete**. Iroquois shall file updated status reports with the Secretary on a **monthly basis until 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 the Applicant's efforts to obtain the necessary federal authorizations;

   b. the construction status of the projects, work planned for the following reporting period, and any schedule changes for stream crossings or work in other environmentally sensitive areas;

   c. a listing of all problems encountered and each instance of noncompliance observed by the EIs 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 corrective actions implemented in response to all instances of noncompliance, and their cost;

   e. the effectiveness of all corrective actions implemented;

   f. a description of any landowner/resident complaints that 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 Applicants from other federal, state, or local permitting agencies concerning instances of noncompliance, and the Applicant's response.

8. **Prior to receiving written authorization from the Director of OEP to commence construction of their respective project facilities**, the Applicants shall file documentation that they have received all applicable authorizations required under federal law (or evidence of waiver thereof).

9. The Applicants must receive written authorization from the Director of OEP **before placing their respective projects into service**. Such authorization will only be granted following a determination that rehabilitation and restoration of areas affected by the projects are proceeding satisfactorily.

10. **Within 30 days of placing the authorized facilities in service**, each Applicant 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 Certificate conditions the Applicant has complied or will comply with. This statement shall also identify any areas affected by the projects where compliance measures were not properly implemented, if not previously identified in filed status reports, and the reason for noncompliance.

11. Constitution shall adopt the minor route variations and/or modifications of construction methods for the tracts specified in table 3.4.3-1 of the EIS and as depicted in appendix H-2A. As part of its Implementation Plan, Constitution shall file with the Secretary updated alignment sheets incorporating these minor route variations and modifications of construction methods **prior to the start of construction**. *(section 3.4.3.2)*

12. Constitution shall adopt the minor route variations and/or modifications of construction methods for the tracts specified in table 3.4.3-2 of the EIS and as depicted in appendix H-2B. As part of its Implementation Plan, Constitution shall file with the Secretary updated alignment sheets incorporating these minor route variations, and modifications of construction methods, **prior to the start of construction**. *(section 3.4.3.2)*

13. Constitution shall adopt the minor route variation for tracts UA-NY-CH-015.001, NY-CH-015.000, and NY-CH-016.000 as specified in table 3.4.3-3 of the EIS and as depicted in appendix H-3A. Constitution shall file updated alignment sheets incorporating this minor route variation with the Secretary **prior to the start of construction**. *(section 3.4.3.3)*

14. **Prior to construction,** Constitution shall file with the Secretary all outstanding geotechnical feasibility studies for trenchless crossing locations. *(section 4.1.1.2)*

15. Constitution shall adopt the recommendations and mitigation measures for steep slope and karst areas provided in the Geological Reconnaissance Memorandum dated October 4, 2013. *(section 4.1.3.4)*

16. Constitution shall employ a geotechnical expert to identify and develop mitigation measures (where applicable) regarding potential landslide hazards during construction of the pipeline. *(section 4.1.3.4)*

17. Constitution shall adhere to a maximum allowable construction equipment rutting depth of 4 inches in saturated agricultural areas, where Constitution has not segregated topsoil across the full right-of-way width. *(section 4.2.4)*

18. **Prior to conducting any agricultural restoration between October 1 and May 15,** Constitution shall determine soil workability in consultation with the FERC, the NYSDAM, and the AI for all New York agricultural parcels. *(section 4.2.4)*

19. **Prior to construction,** Constitution shall file with the Secretary the location of all water wells and springs within 150 feet of the pipeline and aboveground facilities. *(section 4.3.1.5)*

20. **Prior to construction,** Constitution shall file with the Secretary the results of surveys for all proposed contractor yards not previously filed concerning water wells, waterbodies, and wetlands, as well as the status of any required agency consultations. *(section 4.3.2)*

21. Constitution shall not permanently fill any waterbodies or wetlands for the use of access roads. *(section 4.3.3.1)*

22. **During construction of the project,** Constitution shall not clear any trees between the workspaces for Direct Pipe (or HDD, if subsequently proposed) entry and exit sites. Minor brush clearing, less than 3 feet wide, using hand tools only would be allowed to facilitate the use of the Direct Pipe (or HDD) tracking system or acquisition of water for makeup of the Direct Pipe (or HDD) slurry. During operation Constitution shall not conduct any routine vegetation maintenance in these areas. *(section 4.4.3)*

23. **Prior to construction**, Constitution shall file with the Secretary for review and written approval of the Director of the OEP a final Migratory Bird and Upland Forest Plan developed in consultation with the FWS, the NYSDEC, the PADCNR, and the PGC. The final plan shall include a discussion of compliance with the MBTA and BGEPA, measures to avoid, reduce, or minimize unavoidable impacts on forests and migratory birds, and establishment of mitigation plans for conservation of migratory bird habitat. *(section 4.5.3.1)*

24. Constitution shall conduct invasive species monitoring within the maintained right-of-way **for 3 years** following successful completion of revegetation as determined by the FERC staff based on the FERC's post-construction monitoring inspections. Constitution shall not move mowing and

maintenance equipment from an area where invasive species have been encountered during operation of the project unless it is cleaned prior to moving. *(section 4.5.4)*

25. **Prior to construction,** Constitution shall file with the Secretary the final, complete results of invasive plant surveys and the planned locations of weed wash stations for review and written approval of the Director of OEP. *(section 4.5.3)*

26. **Immediately prior to any vegetation clearing to be conducted between April 1 and August 31**, Constitution shall conduct nest surveys for birds of conservation concern performed by qualified personnel within areas proposed for clearing. Constitution shall provide a buffer around any active nests to avoid potential impacts until the young have fledged. *(section 4.6.1.3)*

27. **Prior to in-stream blasting at any waterbody crossing,** Constitution shall file with the Secretary for review and approval of the Director of OEP, a site-specific Blasting Plan that provides protocols for in-stream blasting and the protection of the fisheries and aquatic resources and habitat. These plans shall be developed in consultation with applicable state resource agencies. *(section 4.6.2.3)*

28. Constitution shall not withdraw water from Starrucca Creek outside of the PFBC recommended in-stream work window of June 16 through February 28, or shall provide the PFBC approval to withdraw water outside this window. **Prior to construction**, Constitution shall also file with the Secretary copies of consultation with the NYSDEC regarding the potential to withdraw water from Oquaga, Ouleout, Kortright, and Schoharie Creeks, as well as any timing restrictions placed on water withdrawal at those locations. *(section 4.6.2.3)*

29. Constitution shall develop a project- and site-specific tree clearing plan for the northern myotis if clearing occurs between April 1 and September 30 that includes the location of any potential roost trees in or adjacent to the construction corridor, and as applicable incorporate any of the FERC's identified mitigation measures in section 4.7.2. This plan shall be filed with the Secretary for review and written approval of the Director of OEP **prior to construction**. *(section 4.7.2)*

30. **Prior to construction within aquatic project segments containing potential mussel habitat,** Constitution shall file with the Secretary impact avoidance or effective impact minimization or mitigation measures (e.g., utilization of trenchless crossing methods or mussel relocation) in consultation with the FWS, the PFBC, the PGC, the PADCNR, and the NYSDEC for any dwarf wedgemussels encountered during field surveys and/or construction. *(section 4.7.2)*

31. **Prior to construction within project segments containing potential Northern monkshood habitat,** Constitution shall file with the Secretary the results of completed Northern monkshood surveys and Constitution's consultation with the FWS and the NYSDEC regarding the results. Constitution shall file the avoidance/minimization measures it would use in the event that Northern monkshood are found either prior to or during construction, including:

    a. avoidance of plant locations and associated habitat, as feasible, including "necking-down" or reducing construction footprint;

    b. the feasibility of conventional boring, direct pipe, or HDD; and

    c. the feasibility of transplanting and seed banking (only after all other options are considered). *(section 4.7.2)*

32. Constitution shall not begin construction of the proposed facilities **until:**

    a. all outstanding biological surveys have been completed;

    b. the FERC staff completes any necessary Section 7 consultation with the FWS (including a conference opinion regarding the northern myotis); and

c. Constitution has received written notification from the Director of OEP that construction and/or use of mitigation (including implementation of conservation measures) may begin. *(section 4.7.2)*

33. **Prior to construction within project segments containing potential bald eagle habitat,** Constitution shall file with the Secretary for review and written approval of the Director of OEP the final bald eagle survey results, as well as the final bald eagle mitigation plan, developed in consultation with the FWS, the PGC, and the NYSDEC. The mitigation plan shall include impact avoidance or effective impact minimization or mitigation measures for any nests encountered during the pre-construction surveys. Specific mitigation, or approval from the applicable agencies, shall be included for potential blasting within 0.5 mile of an active nest. *(section 4.7.3)*

34. **Prior to construction,** Constitution shall develop impact avoidance, minimization, or mitigation measures in coordination with the FWS and the PGC for construction between April 1 and October 31 to minimize impacts on the small-footed bat, silver haired bat, and little brown bat. Constitution shall file any such measures with the Secretary. *(section 4.7.3)*

35. **Prior to construction**, Constitution shall file with the Secretary the results of any outstanding surveys for New York and Pennsylvania state-listed species and identify additional mitigation measures developed in consultation with the applicable state agencies. *(section 4.7.4)*

36. **Prior to construction,** Constitution shall file an updated classification of the current use of the twelve unsurveyed structures identified in table 4.8.3-1 of the EIS within 50 feet of the construction work area. If any of the structures are found to be occupied residences, site-specific plans shall be developed and filed with the Secretary for review and written approval of the Director of OEP. Also, Constitution shall provide an updated site-specific plan for tract ALT-F-NY-SC-011.000 at MP 96.7 that includes adequate impact avoidance, minimization, or mitigation measures for the septic field. *(section 4.8.3.1)*

37. **Prior to construction**, Constitution shall confirm the distance and location of the subdivision at MP 99.3 in relation to the pipeline, and provide a site-specific plan if within 50 feet of the construction work area. *(section 4.8.3.1)*

38. **Prior to construction,** Constitution shall file with the Secretary for review and written approval of the Director of OEP an impact avoidance, minimization, or mitigation plan for specialty crops (e.g., the sugar bush operation at MP 79.5), in consultation with the landowner. *(section 4.8.4.2)*

39. **No more than 60 days following the authorization of in-service**, Constitution shall file with the Secretary for review and written approval of the Director of OEP, site-specific reports for each of the five sites identified in table 4.8.4-6 describing follow-up impact assessments, description of mitigation or visual screening measures, or justification for why no such mitigation measures were required. *(section 4.8.6.2)*

40. Constitution shall file with the Secretary reports describing any documented complaints from a homeowner that a homeowner's insurance policy was cancelled or voided due directly to the grant of the pipeline right-of-way or installation of the pipeline and/or that the premium for the homeowner's insurance increased materially and directly as a result of the grant of the pipeline right-of-way or installation of the pipeline. The reports shall also identify how Constitution has mitigated the impact. During construction these reports shall be included in Constitution's status reports (see recommendation 7 in section 5.2) and in quarterly reports **for a 2 year period following in-service of the project**. *(section 4.9.6)*

41. Constitution shall not begin implementation of any treatment plans/measures (including archaeological data recovery); construction of facilities; or use of staging, storage, or temporary work areas and new or to-be-improved access roads **until:**

a. Constitution files with the Secretary outstanding cultural resources survey and evaluation reports, any necessary treatment plans, site specific protection plans, and the PHMC's and OPRHP's comments, as appropriate, on the reports and plans;

b. Constitution provides documentation that it has provided cultural resources reports to the Native American Tribes which have requested them;

c. the ACHP is provided an opportunity to comment on the undertaking if historic properties would be adversely affected; and

d. the FERC staff reviews and the Director of OEP approves all cultural resources survey reports and plans, and notifies Constitution in writing that treatment plans/mitigation measures may be implemented or construction may proceed.

All material filed with the Secretary containing **location, character, and ownership information** about cultural resources must have the cover and any relevant pages therein clearly labeled in bold lettering: **"CONTAINS PRIVILEGED INFORMATION - DO NOT RELEASE."** *(section 4.10.4)*

42. Constitution shall file with its Implementation Plan for review and written approval of the Director of OEP, updated acoustical analysis for the Direct Pipe crossing locations 1 through 5 including site-specific plans detailing any noise mitigation measures Constitution would use to ensure that the noise levels attributable to the Direct Pipe activities do not exceed an L_{dn} of 55 dBA and/or increase noise over ambient conditions greater than 10 dB at any NSA. *(section 4.11.2.3)*

43. Iroquois shall file a noise survey with the Secretary **no later than 60 days** after placing the authorized units at the Wright Compressor Station in service. If a full load condition noise survey is not possible, Iroquois shall provide an interim survey at the maximum possible horsepower load and provide the full load survey **within 6 months.** If the noise attributable to the operation of all of the equipment at the Wright Compressor Station under interim or full horsepower load conditions exceeds an L_{dn} of 55 dBA at any nearby NSAs, Iroquois shall file a report on what changes are needed and shall install the additional noise controls to meet the level **within 1 year** of the in-service date. Iroquois shall confirm compliance with the above requirement by filing a second noise survey with the Secretary **no later than 60 days** after it installs the additional noise controls. *(section 4.11.2.3)*

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