Federal Energy Regulatory Commission

Office of

Energy Projects

October 2016

Dominion Carolina Gas Transmission, LLC **Docket No. CP16-98-000**

Transco to Charleston Project

Environmental Assessment

Washington, DC 20426

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply Refer To:
OEP/DG2E/Gas 1
Dominion Carolina Gas Transmission, LLC.
Transco to Charleston Project
Docket No. CP16-98-000

TO THE PARTY ADDRESSED:

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared an environmental assessment (EA) for the Transco to Charleston Project (Project), proposed by Dominion Carolina Gas Transmission, LLC (Dominion) in the above-referenced docket. Dominion requests authorization to construct and operate new pipeline and compressor station facilities in South Carolina.

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

The proposed Project includes the following facilities:

- approximately 55 miles of 12-inch-diameter pipeline in Spartanburg, Laurens, Newberry, and Greenwood Counties (Moore to Chappells pipeline);
- approximately 5 miles of 4-inch-diameter pipeline in Dillon County (Dillon pipeline);
- installation of two new 1,400-horsepower (hp) compressor units at the existing Moore Compressor Station in Spartanburg County;
- construction of a new 3,150-hp compressor station in Dorchester County (Dorchester Compressor Station);
- conversion of an existing 1,050-hp compressor unit from standby to base load at the existing Southern Compressor Station in Aiken County;
- upgrades to the existing Charleston Town Border Station in Charleston County and to the existing Greenwood Town Border Station in Greenwood County; and
- associated pipeline support facilities (metering and regulating stations, launcher and receiver assemblies, valves, and pipeline interconnects).

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

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

Any person wishing to comment on the EA may do so. Your comments should focus on the potential environmental effects, reasonable alternatives, and measures to avoid or lessen environmental impacts. The more specific your comments, the more useful they will be. To ensure that the Commission has the opportunity to consider your comments prior to making its decision on this project, it is important that we receive your comments in Washington, DC **on or before November 18, 2016**.

For your convenience, there are three methods you can use to file your comments with the Commission. In all instances please reference the Project docket number (CP16-98-000) with your submission. The Commission encourages electronic filing of comments and has expert staff available to assist you at 202-502-8258 or efiling@ferc.gov.

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

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

(3) You can file a paper copy of your comments by mailing them to the following address:

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

Any person seeking to become a party to the proceeding must file a motion to intervene pursuant to Rule 214 of the Commission's Rules of Practice and Procedures (18 CFR 385.214).[1] Only intervenors have the right to seek rehearing of the Commission's decision. The Commission grants affected landowners and others with environmental concerns intervenor status upon showing good cause by stating that they have a clear and direct interest in this proceeding which no other party can adequately represent. **Simply filing environmental comments will not give you intervenor status, but you do not need intervenor status to have your comments considered.**

Additional information about the Project is available from the Commission's Office of External Affairs, at **(866) 208-FERC,** or on the FERC website (www.ferc.gov) using the eLibrary link. Click on the eLibrary link, click on "General Search," and enter the docket number excluding the last three digits in the Docket Number field (i.e., CP16-98). Be sure you have selected an appropriate date range. For assistance, please contact FERC Online Support at FercOnlineSupport@ferc.gov or toll free at (866) 208-3676, or for TTY, contact (202) 502-8659. The eLibrary link also provides access to the texts of formal documents issued by the Commission, such as orders, notices, and rulemakings.

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

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TECHNICAL ACRONYMS AND ABBREVIATIONS

$\mu g/m^3$	micrograms per cubic meter
AC	alternating current
ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effects
AQCR	air quality control regions
ASTM	American Society for Testing and Materials
ATWS	additional temporary workspace
BCC	Birds of Conservation Concern
BGEPA	Bald and Golden Eagle Protection Act
BMP	best management practice
CAA	Clean Air Act
CEQ	Council on Environmental Quality
Certificate	Certificate of Public Convenience and Necessity
CFAs	Conservation Focus Areas
CFR	Code of Federal Regulations
CH_4	methane
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalent
Commission	Federal Energy Regulatory Commission
CZMA	Coastal Zone Management Act
dB	decibel
dBA	decibels on the A-weighted scale
Dominion	Dominion Carolina Gas Transmission, LLC
Dt	Dekatherms
EA	Environmental Assessment
EFH	essential fish habitat
EI	Environmental Inspector
EIS	Environmental Impact Statement
EO	Executive Order
ESA	Endangered Species Act
FEMA	Federal Emergency Management Agency
FERC	Federal Energy Regulatory Commission
FW	freshwater
GHG	greenhouse gas
GWP	global warming potential
HAP	hazardous air pollutant
HCA	high consequence area
HDD	horizontal directional drill
hp	horsepower
HUC	Hydrologic Unit Code

INGAA	Interstate Natural Gas Association of America
L_{dn}	day-night averaged sound level
L_{eq}	equivalent sound level
LIDAR	light detection and ranging
LUST	leaking underground storage tank
M&R	metering and regulating
MAOP	maximum allowable operating pressure
MBTA	Migratory Bird Treaty Act
mgd	million gallons per day
MLV	mainline valve
MP	milepost
N_2O	nitrous oxide
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act
NESHAPs	National Emission Standards for Hazardous Air Pollutants
NGA	Natural Gas Act
NHD	National Hydrography Dataset
NHPA	National Historic Preservation Act
NO_2	nitrogen dioxide
NOAA	National Oceanic and Atmospheric Administration
NOAA Fisheries	National Marine Fisheries Service
NOI	Notice of Intent
NO_X	nitrogen oxide
NPDES	National Pollution Discharge Elimination System
NRCS	Natural Resources Conservation Service
NRHP	National Register of Historic Places
NSA	noise-sensitive area
NSPS	New Source Performance Standard
NSR	New Source Review
NWI	National Wetlands Inventory
O_3	ozone
OEP	Office of Energy Projects
OPP	overpressure protection
Pb	lead
PEM	palustrine emergent
PFO	palustrine forested
PHMSA	Pipeline and Hazardous Materials Safety Administration
Plan	FERC's Upland Erosion Control, Revegetation, and Maintenance Plan (2013)
PM	particulate matter
PM_{10}	particulate matter with a nominal aerodynamic diameter of 10 microns or less
$PM_{2.5}$	particulate matter with a nominal aerodynamic diameter of 2.5 microns or less
Project	Transco to Charleston Project
PSD	Prevention of Significant Deterioration

PSS	scrub-shrub
SCDHEC	South Carolina Department of Health & Environmental Control
SCDNR	South Carolina Department of Natural Resources
SCDOT	South Carolina Department of Transportation
SHPO	South Carolina State Historic Preservation Office
SO_2	sulfur dioxide
SPHMM	Spill Prevention and Hazardous Materials Management
SSA	Sole Source Aquifer
SWAP	South Carolina State Wildlife Action Plan
SWPA	source water protection area
TMDL	total maximum daily load
tpy	tons per year
T2C Plan	Transco to Charleston Project Upland Erosion Control, Revegetation, and Maintenance Plan
T2C Procedures	Transco to Charleston Project Wetland and Waterbody Construction and Mitigation Procedures
Transco	Transcontinental Gas Pipeline Company, LLC
USACE	U.S. Army Corps of Engineers
USC	United States Code
USDA	U.S. Department of Agriculture
USDOT	U.S. Department of Transportation
USEPA	U.S. Environmental Protection Agency
USFWS	U.S. Fish and Wildlife Service
USGS	U.S. Geological Survey
VOC	volatile organic compound
WMA	Wildlife Management Area
WRP	Wetland Reserve Program

A. PROPOSED ACTION

1. Introduction

The staff of the Federal Energy Regulatory Commission (Commission or FERC) has prepared this environmental assessment (EA) to assess the environmental impacts of the natural gas pipeline facilities proposed by Dominion Carolina Gas Transmission, LLC (Dominion). We[1] prepared this EA in compliance with the requirements of the National Environmental Policy Act (NEPA) (Title 40 of the Code of Federal Regulations [CFR], Parts 1500-1508 [40 CFR 1500-1508]), and the Commission's implementing regulations under 18 CFR 380.

On March 9, 2016, Dominion filed an application in Docket No. CP16-98-000 under Section 7(c) of the Natural Gas Act (NGA) and the certificate procedures of Part 157, Subpart F of the Commission's regulations for a Certificate of Public Convenience and Necessity (Certificate) authorizing construction and operation of natural gas pipeline facilities in various counties in South Carolina. These proposed facilities are referred to as the Transco to Charleston Project (Project). Prior to filing its application, Dominion participated in the Commission's pre-filing review process for the Project under Docket No. PF15-29-000.

The EA is an important and integral part of the Commission's decision on whether to issue Dominion a Certificate to construct and operate the proposed facilities. Our principal purposes in preparing this EA are to:

- identify and assess potential impacts on the natural and human environment that could result from implementation of the proposed action;
- assess reasonable alternatives to the proposed action that would avoid or minimize adverse effects to the environment; and
- identify and recommend specific mitigation measures, as necessary, to minimize environmental impacts.

Under Section 7(c) of the NGA, the Commission determines whether interstate natural gas transportation facilities are in the public convenience and necessity and, if so, grants a Certificate to construct and operate them. The Commission bases its decisions on technical competence, financing, rates, market demand, gas supply, environmental impact, long-term feasibility, and other issues concerning a proposed project.

2. Project Purpose and Need

2.1 Purpose

Dominion's stated purpose of the Project is to provide 80,000 dekatherms (Dt) per day of natural gas firm transportation services in South Carolina to improve regional energy security, system resiliency, and to meet increasing demand for natural gas for local commercial, industrial, and power generation customers. The Project's target in-service date is November 1, 2017. The Project has been fully subscribed by three Project customers (South Carolina Electric and Gas [75,000 Dt], Flakeboard Company Limited [2,000 Dt], and Wyman-Gordon [3,000 Dt]) under binding precedent agreements.

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[1] "We," "us," and "our" refer to the environmental staff of the Commission's Office of Energy Projects (OEP).

South Carolina Electric and Gas would use gas provided by the Project as additional fuel gas supply to existing and future gas customers throughout its service area. Flakeboard Company in Bennettsville, South Carolina would use gas from the Project for manufacturing of particle board and other lumber products. Wyman-Gordon would use gas from the Project for a metals manufacturing and finishing facility located approximately 0.5 mile northwest of the Dillon Pipeline. The Project would serve the growing needs of a local distribution company, and serve commercial and industrial uses directly and as fuel to power electric generation.

Two commenters expressed concern about the Project need. Need is not an environmental issue to be addressed at length in this EA. Applicants propose projects and present their objectives, and the FERC reviews those proposals, including producing an environmental document to satisfy NEPA. The Commission will more fully consider the need for the project when making its decision on whether or not to authorize the project.

2.2 Scope of This Environmental Assessment

The topics addressed in this EA include alternatives, geology, soils, groundwater, surface water, wetlands, fisheries, wildlife, vegetation, species of special concern, cultural resources, socioeconomics (including transportation and traffic), air quality, noise, land use, recreation, aesthetics, reliability and safety, and cumulative impacts. This EA describes the affected environment as it currently exists, discusses the environmental consequences of the Project, and compares the Project's potential impact with that of various alternatives. This EA also presents our recommended mitigation measures.

One commenter suggested that an environmental impact statement (EIS) rather than an EA should be prepared. An EA is a concise public document for which a federal agency is responsible that serves to provide sufficient evidence and analysis for determining a finding of no significant impact. The Commission's regulations under 18 CFR 306(b) state: "If the Commission believes that a proposed action…may not be a major federal action significantly affecting the quality of the human environment, an EA, rather than an EIS, will be prepared first. Depending on the outcome of the EA, an EIS may or may not be prepared." In preparing this EA, we are fulfilling our obligation under NEPA to consider and disclose the environmental impacts of the Project. As noted above, this EA addresses the impacts that could occur on a wide range of resources should the Project be approved and constructed. Based on our analysis, and the extent and content of comments received during the scoping period, we conclude in section D that the impacts associated with this Project can be sufficiently mitigated to support a finding of no significant impact and, thus, an EA is warranted.

3. Public Review and Comment

On July 30, 2015, Dominion requested approval to initiate our pre-filing review process for the Project. FERC approved Dominion's request on September 2, 2015, in Docket No. PF15-29-000. On September 29 and October 1, 12, 13, 15, and 20, 2015, we participated in open houses, sponsored by Dominion, to explain our environmental review process to interested stakeholders. We conducted a site visit of the Project route on September 30, 2015.

On October 30, 2015, we issued a *Notice of Intent to prepare an Environmental Assessment for the Planned Transco to Charleston Project, Request for Comments on Environmental Issues, and Notice for Public Scoping Meetings* (NOI). The NOI was published in the Federal Register[2] and issued for a 30-

[2] 80 Federal Register 214 (November 5, 2015)

day comment period. On November 10, 2015, we issued an Errata Notice with an updated map of the planned Moore to Chappells pipeline route in the vicinity of the Moore Compressor Station in Spartanburg County, South Carolina and extended the scoping period to December 10, 2015. We conducted two public scoping meetings in the Project area to provide an opportunity for agencies and the general public to learn more about the Project and to participate in the environmental analysis by identifying issues to be addressed in the EA. Two speakers provided verbal comments at the meetings held on November 18, 2015, in Duncan, South Carolina and on November 19, 2015, in Laurens, South Carolina.

The transcripts of the public scoping meetings and all written scoping comments are part of the public record for the Project and are available for viewing on the FERC Internet website (http://www.ferc.gov)[3]. Table A.4-1 provides a general listing of topics raised by the public and where they are addressed in the document. We also received two letters of support for the Project.

TABLE A.4-1
Issues Identified During Scoping

Issue	EA Section Addressing Issue
Proposed Action	
Purpose and need for the Project	A.2.1
Need for an Environmental Impact Statement	A.2.2
Pipeline construction procedures	A.7.1
HDD procedures	A.7.2
Road restoration	A.7.2
Soils	
Erosion control on steep slopes	A.7.2; B.1.2
Water Resources and Wetlands	
Impacts on streams	B.2.2
Wildlife	
Impacts on wildlife habitat	B.3.2
Land Use, Visual Resources, and Recreation	
Impacts on pine plantations	B.4.1, C.4
Impacts on Natural Resources Conservation Service Easement land	B.3.1
Impacts on Upstate Forever Conservation Focus Areas	B.4
Impacts on residential areas, including the Graystone community	B.4.1
Socioeconomics	
Impacts of pipeline on property value	B.5
Cultural Resources	
Impacts on historic and archaeological resources	B.6
Safety and Security	
Pipeline safety and integrity	B.8
Alternatives	
Consideration for route variations	C.3; C.4
Consideration for routing along I-95	C.3.2

[3] 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., PF15-29 and CP16-98). Select an appropriate date range.

4. Proposed Facilities

Project facilities are listed in tables A.4-2 and A.4-3. Figure A.4-1 depicts the location of the proposed pipelines, compressor stations, and associated aboveground facilities. Detailed U.S. Geological Survey (USGS) maps showing the locations of all Project facilities are included in appendix A.

TABLE A.4-2
Pipeline Facilities

Pipeline / Diameter	County/State	Mileposts a/		Miles a/
		Begin	End	
Moore to Chappells Pipeline 12-inch-diameter	Spartanburg, Laurens, Newberry, and Greenwood Counties, SC	0	53.5	54.88
Dillon Pipeline 4-inch-diameter	Dillon County, SC	0	5.3	5.3

a Mileposts are reference points and may not equal total length due to rounding.

TABLE A.4-3
Aboveground Facilities

Facility Type and Name	Approximate Milepost	County, State	Description
Compressor Stations			
Moore Compressor Station	1.7 **a**/	Spartanburg County, SC	Existing Compressor Station: Install two 1,400-hp centrifugal turbine-driven compressor units and additional gas cooling units
Dorchester Compressor Station	n/a	Dorchester County, SC	New Compressor Station: Install three 1,200-hp centrifugal turbine-driven compressor units
Southern Compressor Station	n/a	Aiken County, SC	Existing Compressor Station: Convert one existing 1,200-hp centrifugal turbine-driven compressor unit from standby to utilize the unit for service
Metering and Regulating (M&R) Stations			
Moore M&R Station	1.7 **a**/	Spartanburg County, SC	New M&R station at the Moore Compressor Station
Chappells Tie-in M&R Station	53.5 **a**/	Greenwood County, SC	New regulating station with OPP at the Chappells Tie-in
Caldwell Drive M&R Station	5.3 **b**/	Dillon County, SC	New measurement station at the terminus of the Dillon Pipeline
Mainline Valve (MLV) Sites			
MC-MLV-1	1.6R **c**/	Spartanburg, SC	Install 11 MLVs at select points along the Moore to Chappells Pipeline
MC-MLV-2	1.7	Spartanburg, SC	
MC-MLV-3	7.5R **c**/	Spartanburg, SC	
MC-MLV-4	14.9R **c**/	Spartanburg, SC	
MC-MLV-5	21.9	Laurens, SC	
MC-MLV-6	29.0R **c**/	Laurens, SC	
MC-MLV-7	29.1R **c**/	Laurens, SC	
MC-MLV-8	32.1R **c**/	Laurens, SC	
MC-MLV-9	32.3	Laurens, SC	
MC-MLV-10	39.3R **c**/	Laurens, SC	
MC-MLV-11	47.3	Newberry, SC	

TABLE A.4-3
Aboveground Facilities

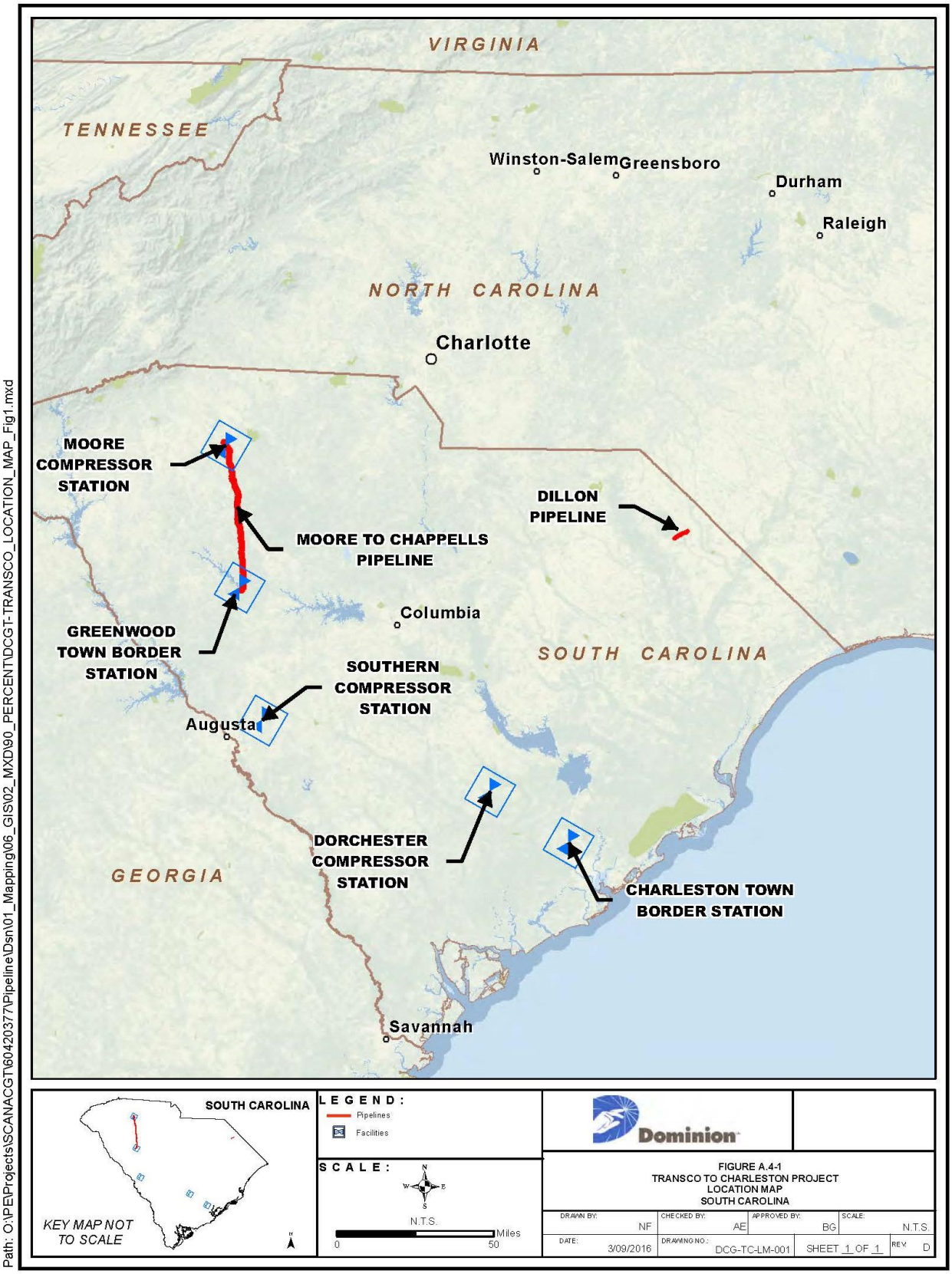
Facility Type and Name	Approximate Milepost	County, State	Description
AC-MLV-1 **d**/	53.5	Greenwood County, SC	Install one MLV on the Line N pipeline at the Chappells Tie-in location
D-MLV-1	0.0 **b**/	Dillon County, SC	Install one MLV at the beginning of the Dillon Pipeline at the Reedy Creek Takeoff
Pig Launchers/Receivers			
Pig Launcher	0.0 **a/**	Spartanburg County, SC	Add one pig launcher assembly at the beginning of the pipeline within the Moore Purchase facility
Pig Receiver	53.5 **a/**	Greenwood County, SC	Add one pig receiver assembly with OPP system at the Chappells Tie-in
Overpressure Protection (OPP) Systems			
Charleston Town Border Station – OPP System	n/a	Charleston County, SC	Install an OPP system, controls, and upgrades at the Charleston Town Border Station
Greenwood Town Border Station – OPP System	n/a	Greenwood County, SC	Install an OPP system, controls, and upgrades at the Greenwood Town Border Station
Cathodic Protection (CP) Systems			
CP1	15.6R **a/ c**/	Spartanburg, SC	Install a CP system on Charles Street (State Rd. S-42-343) approximately 150 feet southeast of State Road S-42-423.
CP2	41.1R **a/ c**/	Laurens, SC	Install a CP system on State Highway 560 East, approximately 2,000 feet west of Mountville Road.
Interconnects			
Moore Purchase Facility Take-off	0.0	Spartanburg County, SC	Install an interconnect (i.e., take-off) to connect with new facilities being installed by Transcontinental Gas Pipeline Company, LLC (Transco) at the existing Moore Purchase facility
Chappells Tie-in	53.5 **a/**	Greenwood County, SC	Install an interconnect (i.e., tie-in) to Dominion's existing 12-inch-diameter pipeline
Reedy Creek Take-off	0.0	Dillon County, SC	Install interconnect at the terminus of the Dillon Pipeline connecting to Dominion's existing 6-inch-diameter Line D pipeline

a Moore to Chappells Pipeline

b Dillon Pipeline

c "R" designates mileposts that were modified from the original application as a result of minor route variations (see section C.4).

d "AC" refers to the tie-in location between the Moore to Chappells Pipeline and the existing Dominion Carolina Gas Line N.


VIRGINIA
TENNESSEE
Winston-Salem
Greensboro
Durham
Raleigh
NORTH CAROLINA
Charlotte
MOORE COMPRESSOR STATION
MOORE TO CHAPPELLS PIPELINE
DILLON PIPELINE
Columbia
GREENWOOD TOWN BORDER STATION
SOUTHERN COMPRESSOR STATION
SOUTH CAROLINA
Augusta
DORCHESTER COMPRESSOR STATION
CHARLESTON TOWN BORDER STATION
GEORGIA
Savannah
SOUTH CAROLINA
KEY MAP NOT TO SCALE
LEGEND:
Pipelines
Facilities
SCALE:
N.T.S.
0
50
Miles
Dominion
FIGURE A.4-1
TRANSCO TO CHARLESTON PROJECT
LOCATION MAP
SOUTH CAROLINA
DRAWN BY: NF
CHECKED BY: AE
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4.1 Pipeline Facilities

Dominion proposes to construct two segments of natural gas pipeline: the Moore to Chappells Pipeline and the Dillon Pipeline.

Moore to Chappells Pipeline

The Moore to Chappells Pipeline would consist of approximately 54.8 miles of 12-inch-diameter natural gas steel transmission pipeline from the existing Moore Purchase facility[4] in Spartanburg County, South Carolina, near the intersection of Pearson Town Road and Moore Duncan Highway. The new interconnect at the Moore Purchase facility would be constructed by Transco and would stem from an existing 30-inch and 36-inch-diameter pipeline. Dominion would install a 10-inch flange to connect the Transco pipeline to the start of the Moore to Chappells Pipeline. The Moore to Chappells Pipeline would be approximately 14 percent (i.e., approximately 7.3 miles) collocated with existing electric transmission and/or other natural gas pipeline rights-of-way.

Dillon Pipeline

The Dillon Pipeline would consist of approximately 5.3 miles of 4-inch-diameter natural gas steel transmission pipeline from a new take-off (Reedy Creek Take-off) with Dominion's existing 6-inch-diameter natural gas pipeline Line D in Dillon County, South Carolina, near the intersection of Centerville Road and Reedy Creek Road. The proposed pipeline would traverse a cross-country route in a northeasterly direction, terminating at the new Caldwell Drive Metering and Regulating (M&R) Station. The Dillon Pipeline right-of-way would be approximately 27 percent (i.e., approximately 1.4 miles) collocated with existing electric utility rights-of-way.

Table A.4-4 summarizes the Project pipeline facilities and length of collocation.

4.2 Aboveground Facilities

In addition to the proposed pipeline facilities, the Project would require construction of several aboveground facilities, as summarized in table A.4-3. The compressor station facilities are further described below.

Moore Compressor Station

The existing Moore Compressor Station currently has two 1,300-hp natural gas-driven centrifugal engines. The proposed expansion at this compressor station includes installation of two 1,400-hp centrifugal turbine-driven compressor units and additional gas cooling units. The compressor units would be housed in a new building installed within the limits of the existing station property. A gas cooling system would be installed to control the temperature of the natural gas transported from the facility.

Appurtenant systems and equipment (i.e., piping, electrical, and controls) would also be installed. All workspace required for installation and construction of these facilities would be contained within the 33.1-acre property of the existing compressor station.

[4] Dominion's Moore Purchase M&R Station is located inside the Transco-Williams meter station site.

TABLE A.4-4
Collocation of Proposed Pipeline Facilities for the Project

Pipeline	County, State	Mileposts		Collocated Length (miles)	Type of Existing ROW	Width of Existing ROW (ft)	Width Used for Temporary Construction ROW (ft)	Width Used for Permanent Operation ROW (ft)
		Begin	End					
Moore to Chappells Pipeline	Spartanburg, SC	0.00	1.85	1.84	Dominion Gas Pipeline	40	0	40
	Spartanburg, SC	2.05R	2.42	0.41	Dominion Gas Pipeline	40	0	40
	Spartanburg, SC	2.68R	3.83R	1.17	Powerline	40	0	0
	Spartanburg, SC	5.56R	5.71R	0.14	Powerline	40	0	0
	Spartanburg, SC	6.17R	6.55R	0.41	Powerline	40	0	0
	Spartanburg, SC	11.64	11.81R	0.18	Laurens Electric Powerline	40	0	0
	Laurens, SC	28.55	29.01R	0.43	Laurens Electric Powerline	40	0	0
	Laurens, SC	30.26	30.45R	0.20	Duke Energy Powerline	128	0	0
	Laurens, SC	36.85R	38.02R	1.16	Laurens Electric Powerline	40	0	0
	Newberry, SC	49.43R	49.99R	0.55	Duke Energy Powerline	68	0	0
	Newberry, SC	51.42	52.28R	0.85	Duke Energy Powerline	68	0	0
Total				*7.35*				
Dillon Pipeline	Dillon, SC	3.83	4.35	0.52	South Carolina Electric & Gas Electric Powerline	20	15	0
	Dillon, SC	4.39	5.28	0.90	South Carolina Electric & Gas Electric Powerline	20	15	0
Total				*1.42*				

Dorchester Compressor Station

The proposed new Dorchester Compressor Station would be located approximately 2 miles northeast of the Town of St. George in Dorchester County, South Carolina, and would be constructed on Dominion-owned property. There is an existing 0.5 acre aboveground facility on the property, which contains a chromatograph. Dominion would expand the existing facility to install three 1,200-hp centrifugal turbine-driven compressor units that would be relocated from the existing Southern Compressor Station in Aiken County, South Carolina. The compressor units would be housed in two new buildings; a third new building would house an operations system. A gas cooling system would also be installed.

The Dorchester Compressor Station buildings would contain appurtenant systems and equipment (i.e., piping, electrical, and controls) that would also be installed. Existing communications towers would be used. Approximately 9.8 acres would be required for construction of this facility, and 5.5 acres for operation of this facility, including the access road.

Southern Compressor Station

The existing Southern Compressor Station is located in Aiken County, South Carolina, on a 9.6-acre parcel. The three 1,200-hp centrifugal turbine-driven compressor units (currently standby units) would be relocated to the proposed new Dorchester Compressor Station. Additionally, one 1,200-hp centrifugal turbine-driven compressor unit would be converted from standby to service. Dominion is not requesting an increase in certificated horsepower at this station. All activities would take place within the existing Southern Compressor Station.

5. Non-jurisdictional Facilities

Under Section 7 of the NGA, the Commission is required to consider, as part of the decision to approve facilities under Commission jurisdiction, 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, such as a power plant at the end of a jurisdictional pipeline, or they may be minor, non-integral components of the facilities under the Commission's jurisdiction.

Electrical service distribution lines would be required for the new Dorchester Compressor Station; however, these electrical service distribution lines would be added to existing poles connecting the Dorchester Compressor Station site to the electric distribution system. Because there would be no new land disturbance and the only change would be an additional line or lines to the existing poles, no impacts are expected; therefore, these facilities are not addressed further in this EA. The existing powerline is owned and operated by South Carolina Electric and Gas; the additional line or lines would be under the jurisdiction of state and local agencies.

No new or expanded power or industrial facilities were identified in association with this Project. There are no plans for future expansion of the Project at this time.

6. Land Requirements

Construction of the Project would affect approximately 697.6 acres of land, including the permanent pipeline rights-of-way, temporary construction rights-of-way, aboveground facility sites, additional temporary workspace (ATWS), laydown areas, and temporary and permanent access roads. Approximately 286.9 acres, including the permanent pipeline easement, permanent aboveground facility sites, and access roads, would be retained for operation of the Project. Following construction,

approximately 410.7 acres, including the temporary construction rights-of-way, ATWS, and laydown areas would revert to pre-construction conditions and uses.

Tables A.6-1 and A.6-2 summarize the construction and operation impacts associated with the Project facilities.

6.1 Pipeline Facilities

In areas where the Moore to Chappells Pipeline would be collocated with the existing Dominion pipeline (approximately MP 0.0 to 2.4), Dominion proposes to use a 65-foot-wide construction right-of-way, with a 30-foot-wide spoil side and 35-foot-wide working side. The remainder of the Moore to Chappells Pipeline would use a 75-foot-wide construction right-of-way, with a 25-foot-wide spoil side and 50-foot-wide working side.

For the Dillon Pipeline, the width of the construction corridor would be 65 feet wide, with a 30-foot-wide spoil side and 35-foot-wide working side. See appendix C for right-of-way configurations.

The proposed construction corridors include ATWS, which would provide space to store topsoil during full width topsoil segregation, if required (e.g., agricultural areas). Following construction, a 50-foot-wide permanent easement would be maintained for operation of each pipeline.

Additional Temporary Workspace

ATWS would be required for various road, wetland, and waterbody crossings; contractor staging areas; an off right-of-way contractor yard, in conjunction with the new and modified aboveground facilities; and where special construction procedures are used. A list of ATWS associated with the Project is included in appendix D. Although Dominion has identified areas where extra workspace would be required, additional or alternative areas could be identified in the future due to changes in site-specific construction requirements. Dominion would be required to file information on each of those areas for our review and approval prior to use.

Temporary laydown yards would be needed to store equipment and stage construction activities. Dominion has identified four laydown areas for the Project. The laydown yards, currently classified as open land and industrial/commercial land use (see section B.4) range in size from approximately 1 acre to 18 acres. Following construction, the laydown yards would be restored to pre-existing conditions and uses.

Cathodic Protection System

Cathodic protection is a process whereby steel pipelines are protected from electrochemical corrosion through use of an electrical current. The Moore to Chappells Pipeline would be cathodically protected by two impressed current cathodic protection systems. The first system would be located on Charles Street (State Rd. S-42-343) approximately 150 feet southeast of State Road S-42-423, near Milepost (MP) 15.6. The second cathodic protection system would be located on State Highway 560 East, approximately 2,000 feet west of Mountville Road near MP 41.1. Each groundbed would be a 10-inch-diameter, 300-foot-deep well-groundbed powered by a rectifier located on the same road. Dominion would not add cathodic protection to the Dillon Pipeline as the Dillon Pipeline would connect with an existing cathodically protected pipeline system. There is existing electrical service in the vicinity of each cathodic protection system. The cathodic protection systems would be designed in accordance with the National Association of Corrosion Engineers (NACE International) and U.S. Department of Transportation (USDOT) standards.

Access Roads

Dominion would use existing and new temporary and permanent access roads to provide access to the proposed pipeline rights-of-way and other facilities during construction and operation of the Project (appendix B).

Dominion would utilize 96 access roads during construction, of which 81 access roads would be retained for permanent access to the aboveground facilities as well as operation and maintenance activities along the pipelines. Dominion would use existing roads to the extent practicable; however, seven new roads would be necessary. Most of the existing roads are forest or farm roads that would require minimal modifications within the existing roadway corridor (i.e., blading and stone placement in potholes, ruts, and rough areas) to create a more stable construction road.

Construction and improvement of access roads associated with the Moore to Chappells and Dillon Pipelines would result in temporary impacts on approximately 98.3 acres of land, and permanent impacts on approximately 12.8 acres of land; many permanent access roads are existing and would not be widened. Additionally, approximately 2.1 acres would be temporarily impacted by access roads for the aboveground facility sites (i.e., compressor and M&R stations, mainline valves (MLVs), and pig launcher/receiver assemblies). Of those, approximately 0.3 acre would be permanently impacted by the construction and improvement of access roads needed to provide access to aboveground facility sites during operations. In total, approximately 100.4 acres would temporarily be impacted by access roads during construction of the Project, and approximately 13.1 acres would be impacted during operation. Approximately 88 acres of road would remain after construction as permanent access roads. The location, existing land use, upgrade requirements, and approximate length and width of the Project access roads are provided in appendix B.

TABLE A.6-1
Summary of Land Requirements for the Project Pipeline Facilities a/

Facility	County, State	Length of Pipeline (miles) or Number of Sites	Land Temporarily Affected During Construction b/ c/ (acres)	Land Permanently Affected During Operation (acres) b/ d/
Moore to Chappells Pipeline				
Pipeline right-of-way	Spartanburg, Laurens, Newberry, and Greenwood, SC	54.8 miles	466.6	254.9
ATWS	Spartanburg, Laurens, Newberry, and Greenwood, SC	385 sites	46.4	0
MC-Laydown Yard 1	Spartanburg, SC	1 site	1.2	0
MC-Laydown Yard 2	Laurens, SC	1 site	18.1	0
Subtotal			*532.9*	*255.4*
Dillon Pipeline				
Pipeline right-of-way	Dillon, SC	5.3 miles	34.2	4.1
ATWS	Dillon, SC	18 sites	2.7	0
D-Laydown Yard 1	Dillon, SC	1 site	1.1	0
D-Laydown Yard 2	Dillon, SC	1 site	1.3	0
Subtotal			*39.9*	*4.5*
Total			*571.5*	*258.9*

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

b Dominion has proposed a typical 65-foot-wide construction right-of-way from MP 0.0 to 2.4 of the Moore to Chappells Pipeline and all of the Dillon Pipeline, a typical 75-foot-wide construction right-of-way for the remainder of the Moore to Chappells Pipeline, and a 50-foot-wide permanent right-of-way, including lands that may not be impacted because of the use of horizontal directional drill (HDD)/bore.

c Land affected during construction includes both temporary and permanent work areas.

d Land affected during operation includes only new permanent impacts (i.e., change in land use). Permanent easements without change in land use (e.g., open land, non-forest agriculture, HDD/bore, etc.) are not included in this total.

6.2 Aboveground Facilities

Compressor Stations

Construction of one new compressor station (Dorchester) and modifications to two existing compressor stations (Moore and Southern) would temporarily impact 20.2 acres and would result in 12.7 acres of permanent disturbance (see table A.6-2).

Metering and Regulating Stations

Construction of the Chappells Tie-in M&R Station would permanently impact 0.3 acre of land. Construction of the Caldwell Drive M&R Station would temporarily impact 0.3 acre of land, of which 0.2 acre would be permanently impacted.

Mainline Valves

Construction and operation of 11 MLVs at select points along the length of the Moore to Chappells Pipeline would result in permanent impacts on 0.4 acre of land. Dominion would install one MLV along the Dillon Pipeline within the permanent right-of-way and would not disturb any additional land. No additional land would be affected by construction and operation of MLVs on the Line N pipeline at the Chappells Tie-in location and the Reedy Creek Take-off. Following construction, a 40-foot by 40-foot area would be maintained within the permanent pipeline easement for MLVs installed along the pipelines.

Pig Launchers and Receivers

The proposed pig launcher and pig receiver facilities would be constructed within the Moore Purchase facility and the Chappells Tie-in at the existing Greenwood Town Border Station; therefore, no additional land would be affected by construction and operation of these facilities.

Over-pressure Protection Systems

Over-pressure protection systems would be modified within existing facilities within the Charleston Town Border Station and the Greenwood Town Border Station; therefore, no additional land would be affected by construction and operation of these facilities.

Interconnect Facilities

Dominion would install two interconnect facilities at MP 0.0 and 53.5 of the Moore to Chappells Pipeline and one interconnect at MP 0.0 of the Dillon Pipeline. The interconnect at MP 0.0 of the Moore to Chappells Pipeline would be constructed at the existing Moore Purchase Facility, and the other interconnects would be constructed within the permanent right-of-way.

7. Construction Procedures

The Project would be designed, constructed, tested, operated, and maintained in accordance with USDOT regulations 49 CFR 192, *Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards*; with FERC regulations 18 CFR 380.15, *Siting and Maintenance Requirements*; and with other federal and state regulations/permits as applicable. Both the Moore to Chappells Pipeline and the Dillon Pipeline would be designed to meet 49 CFR 192 requirements for Class 3 locations.

Dominion would implement its Transco to Charleston Project Upland Erosion Control, Revegetation, and Maintenance Plan (T2C Plan) and Wetland and Waterbody Construction and Mitigation Procedures (T2C Procedures)[5]. Dominion would also implement its Soil Erosion and Sediment Control Plan[6], which includes specific measures for soil stabilization and minimization of sediment movement near construction areas.

TABLE A.6-2
Summary of Land Requirements for the Project Aboveground Facilities a/

Facility	County, State	Length of Access Roads (miles) or Property Size (acres) b/, d/	Land Affected During Construction (acres) a/, d/	Land Affected During Operation (acres) b/, d/
Moore to Chappells Pipeline				
Moore Purchase Station	Spartanburg, SC	0.9 acre	0.3	0.2
Chappells Tie-in M&R Station	Laurens, SC	N/A c/	0.3	0.3
MLVs (11)	Several	N/A c/	0.4	0.4
AC-MLV-1	Greenwood, SC	N/A c/	0	0
CP Systems (2)	Spartanburg and Laurens, SC	N/A c/	0.9	0.2
Pig Launcher Site	Spartanburg, SC	N/A c/	0	0
Pig Receiver Site	Laurens, SC	N/A c/	0	0
Access Roads	Several	25.5 miles	92.5	12.7
	Subtotal		*94.4*	*13.8*
Dillon Pipeline				
Reedy Creek Take-off	Dillon, SC	N/A c/	0.3	0.2
Caldwell Drive M&R Station	Dillon, SC	N/A c/	0.3	0.2
D-MLV-1	Dillon, SC	N/A c/	0	0
Access Roads	Dillon, SC	1.6 miles	5.8	0.2
	Subtotal		*6.3*	*0.6*
Aboveground Facilities *Moore Compressor Station*				
Facility	Spartanburg, SC	33.1 acres	11.0	7.4
Moore M&R Station		0.1 acre	0.1	0.1
Access Roads		0.3 mile	0.9	<0.1
	Subtotal		*12.0*	*7.5*
Dorchester Compressor Station				
Facility		20.8 acres	9.2	5.3
Access Roads		0.2 mile	0.6	0.2
	Subtotal		*9.8*	*5.5*
Southern Compressor Station				
Facility		9.6 acres	0	0
Access Roads		0.1 mile	0	0
	Subtotal		*0*	*0*

[5] FERC eLibrary Accession number 20160602-5125.

[6] FERC eLibrary Accession number 20160602-5125.

TABLE A.6-2
Summary of Land Requirements for the Project Aboveground Facilities a/

Facility	County, State	Length of Access Roads (miles) or Property Size (acres) b/, d/	Land Affected During Construction (acres) a/, d/	Land Affected During Operation (acres) b/, d/
Charleston Town Border Station – OPP System				
Facility		0.2 acre	1.4	0.3
Access Roads		0.1 mile	0.3	0
Subtotal			1.7	0.3
Greenwood Town Border Station – OPP System				
Facility		56.1 acres	1.8	0.2
Access Roads		0.1 mile	0.2	0.1
Subtotal			*2.0*	*0.3*
Total			*126.1*	*27.9*

a Land affected during construction includes both temporary and permanent work areas.

b Land affected during operation includes only new permanent impacts.

c Facilities located within pipeline ROW; individual property acreage not provided.

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

The T2C Plan and T2C Procedures are based on the 2013 FERC Plan and Procedures with minor modifications. Dominion modified section V.B.1.b of the Procedures to remove warmwater fisheries from the time of year restriction period. We address Dominion's proposed alternative measure further in section B.2.2.

7.1 General Pipeline Construction Procedures

Construction of the proposed pipelines would follow industry-standard practices and procedures as described in this section. The proposed pipelines would be constructed in a standard sequential process with specific tasks occurring concurrently (see appendix C for typical right-of-way configurations). Pipeline crossings of wetlands, certain waterbodies, roads, railroads, and additional areas of concern would be constructed as individual tasks using site-specific techniques, such as horizontal directional drill (HDD)/bore, which would avoid impacts on these resources to the extent practicable. The following provides generalized procedures that are expected to be employed. Site characteristics at the time of construction may guide method selection, timing, and use.

Survey and Staking

The pipeline alignments would be surveyed and identified prior to beginning construction activities. Alignment identification includes staking the centerline of the pipeline, foreign pipeline crossings, and the limits of the construction work area. Wetland boundaries and other environmentally sensitive areas would also be marked at this time.

Clearing and Grading

Vegetation would be cut and cleared from the construction right-of-way, compressor station sites, access roads, and ATWS, where needed. With the exception of areas where it is necessary to create a safe and level work surface, trees and shrubs would be cut flush with the ground surface with root structures left intact. Cleared vegetation would be chipped and spread across the work area or hauled off-site to a commercial disposal facility. Spreading of chipped vegetation would be controlled so as not to impact the

ability to re-establish herbaceous cover within the right-of-way during restoration. After clearing, and where necessary, the upland portions of the construction right-of-way would be graded to create a safe and level work surface. Sediment control devices including silt fence and other best management practices (BMPs) would be installed at wetlands, waterbodies, roads, and other sensitive areas during clearing and grading, in accordance with the T2C Plan and T2C Procedures, and Dominion's Soil Erosion and Sediment Control Plan.

Topsoil segregation BMPs would be employed throughout the Project where required. These BMPs include the following:

- Topsoil would be segregated from the construction work areas in cultivated or rotated agricultural lands, managed pastures, wetlands, residential property, and other areas at the landowner's request.
- To prevent the mixing of topsoil with subsoil, topsoil would be stripped from either the full work area or from the trench and subsoil storage area (ditch plus spoil-side method).
- Every effort would be made to segregate the entire topsoil layer in soils with less than 12 inches of topsoil.
- At least 12 inches of topsoil would be segregated in soils with more than 12 inches of topsoil.
- Gaps would be left in the topsoil piles to allow water to be diverted off the construction work areas.
- No topsoil would be used for padding over the pipe, to backfill the trench, or for trench plugs across the trench.

The pipeline would be installed using a combination of traditional trenching methods and trenchless technologies including HDDs and bores. Traditional methods involve the use of backhoes and trenching machines to excavate a trench for pipe installation. Trench depths would be established to provide the required cover between the top of the pipe and finished ground surface (minimum of 4 feet). Trench spoil (topsoil and subsoil) would be segregated and deposited on the spoil storage portion of the right-of-way. Trench width would be determined based on the type of soils. The trench may be wider in unstable soils (wet or sandy areas) to allow for a sloped trench wall.

Temporary trench plugs would be used to segment open trench and thereby reduce potential for erosion and volume/velocity of trench water flow. Although not anticipated, blasting may be required and would be determined following completion of geotechnical investigations. Dominion would use trenchless technology to cross railroads, paved public roads, wetlands, and some waterbodies.

Stringing, Welding, and Installation

Stringing, welding, and installation tasks would be performed in accordance with 49 CFR 192, Project engineer specifications, and Dominion's regulations and procedures. Where possible, trucks would be off-loaded within the right-of-way, placing (stringing) joints of pipe end-to-end adjacent to the trench. Pipe would be supported by padded skids to protect coating.

Pipe segments would be adjusted, as necessary to conform to the trench contour. Prior to welding, pipe ends (bevels) would be cleaned (filing or wire brushing) removing rust, scale, and dirt. Once pipe joints are aligned, multiple passes of welds would be applied by qualified/tested welders.

Typically, multiple weld passes would be required to establish the required metal. Welds would be mechanically cleaned of slag by wire brush and/or grinding disc, and tested by radiography for defects. Weld defects that exceed code limits would be removed and the area of the defect would be re-welded if practicable, or cut out and the joint reestablished and welded.

Welding would be performed in accordance with Dominion's *Welding Procedures*, which incorporate the American Petroleum Institute Standard Number 1104 and 49 CFR 192. Completed welds would be visually and radiographically or ultrasonically inspected in accordance with the same standards to determine the integrity of the welds.

Following quality control inspections and confirmation, weld areas (field joints) would be field coated. The pipe would be visually checked for damaged coating (holidays), and all defects would be repaired.

Completed pipe sections would be installed (lowered) into the trench by hoisting equipment using nylon straps and wheeled cradles. Prior to placement, the pipe would be inspected for defects using an electrical coating tester. This device, which would be passed along the entire length of pipe, emits an audible signal if coating defects are present. Lowering operations would be halted until defects are repaired. Prior to backfilling, inspection of pipe depth would be completed to confirm that minimum required cover has been attained.

Backfilling

After lowering is completed, the pipe and trench would be backfilled with suitable padding material and the previously excavated material. Subsoil would be backfilled first and then the topsoil would be replaced in accordance with the T2C Plan and T2C Procedures. Although not anticipated, if rock conditions exist, a layer of rock-free soil would be placed over the pipe to protect the coating before completing the backfill operation. Permanent trench plugs would be installed, where needed, to help maintain existing groundwater flow patterns. A soil mound would be left over the trench to allow for soil settlement, unless otherwise specified by the landowner.

Hydrostatic Testing

Prior to operation, completed pipeline sections would be hydrostatically tested to confirm system integrity at operation levels for designed natural gas pressures and with the required margin of safety above that operation level. Hydrostatic testing would be conducted in accordance with the requirements of 49 CFR 192 and Dominion testing specifications. Dominion would obtain test water from existing public water supplies and/or use filtered river water. See section B.2.4 for more information on hydrostatic testing.

Hydrostatic test water discharges are permitted under South Carolina Department of Health and Environmental Control's National Pollution Discharge Elimination System (NPDES) General Permit (SCG670001) for Hydrostatic Test Water Discharges (table A.9-1).

As required, a notice of intent would be submitted in advance of any hydrostatic test water discharge. Hydrostatic test water discharges would be performed in compliance with NPDES permit limits, and would comply with all associated monitoring and reporting requirements. Due to the short residence time of the test water in the pipeline system, the use of biocides or other hydrostatic test water additives would not be required. No chemical agents would be used to dry the pipeline after testing.

After testing is completed, the line would be depressurized and the water removed. Appropriate energy dissipation devices, containment structures or other measures would be implemented to minimize

erosion and sedimentation at the point where this water is discharged. Any potential environmental impacts associated with the withdrawal and discharge of test water would be minimized by applying the measures in the T2C Plan and T2C Procedures and complying with state discharge permit conditions. Test water would be discharged into well-vegetated upland areas.

Restoration and Cleanup

Restoration and cleanup of the construction site would begin immediately following trench backfilling or as soon as weather and site conditions permit. Disturbed areas would be regraded to pre-construction contours. Pre-construction topographic survey has been obtained, as well as contours generated from point data gathered from the ground run effort and supplemental light detection and ranging (LIDAR) data. These would enable the contractor to grade the ground surface along the constructed pipeline to closely match the pre-construction existing conditions.

Trash/refuse would be removed and disposed of in accordance with applicable regulations. Organic debris unsuitable for reuse within the right-of-way would be disposed of at an authorized facility.

Other disturbed areas, fences, and roads would be restored to their original condition or in accordance with landowner agreements. Temporary and permanent erosion control measures would be installed and re-vegetation measures would be implemented in accordance with the T2C Plan and T2C Procedures.

Pipeline markers and cathodic protection stations would be located along the length of the pipeline at fences, roadways, pipeline crossings, canals, and any other locations deemed necessary to identify the route and location of the new pipeline. An alternating current (AC) mitigation survey and design would be developed and appropriate AC mitigation measures would be installed for the pipeline. AC mitigation would be required in areas where the proposed pipelines cross or parallel buried AC power cables to prevent excess current from traveling along the new pipeline.

7.2 Special Construction Areas

Where the proposed pipeline crosses wetlands, waterbodies, roads, active agricultural areas, steep terrain, karst areas, and residential areas, special construction techniques would be used, as described below. Dominion would use HDD/bore to cross wetlands and several waterbodies, as identified in appendices E and F. If site-specific conditions preclude the use of HDD/bore, Dominion would file a variance for our review and approval.

Wetland Construction

The Project would cross ten wetlands. Construction across wetlands would be in accordance with the T2C Procedures and the conditions of applicable permits. The wetland crossing procedures are designed to avoid and minimize construction-related disturbance within wetlands. Wetland crossings would be completed using trenchless technology (HDD/bore), which would preclude the need for surface soil disturbances through wetland areas. Each HDD/bore would be completed such that wetlands would be crossed for the width of the direct overlay plus 50 feet on the entry and exit sides of the regulated resource. At multiple crossings, the use of HDD/bore may eliminate or minimize the need for vegetation clearing over the centerline if HDD/bore establishes pipeline depths determined to be protective from vegetation tap roots (approximately 10 feet). Under certain conditions, hand pruning on the centerline of the proposed pipeline may be necessary for HDD construction purposes, such as electric guide wires.

Horizontal Directional Drilling (HDD) / Horizontal Bore Methods

Dominion would use HDD/bore technology to cross roads and/or railroads, and avoid impacts at multiple waterbody and all wetland crossings. Using these methods, the area between the HDD/bore drill pads would remain undisturbed. During construction, there would be no vegetation mowing or clearing in the areas between the HDD entry and exit points and no impact on stream flow. Appendices G, H, and I list the waterbody, wetland, and roadway and railroad HDD/bore crossings, respectively.

Dominion submitted crossing-specific drawings for each proposed HDD[7], which we have reviewed and find acceptable. Dominion would use ATWS at the HDD/bore entry and exit points. At the entry point, site preparation of the extra workspace would be required for the drilling rig, control buildings, cranes, track vehicles, pumping equipment, and a mud (bentonite/slurry) handling system.

During the first stage of each HDD crossing, electric guide wires may be hand-laid along the pipeline right-of-way across the feature being crossed. Selective hand clearing of wetland and upland vegetation may be necessary for proper installation of guide wires. Following guide wire installation, in HDD a slant drill unit would establish a small-diameter pilot hole under the feature being crossed along a prescribed profile. Electromagnetic sensors may be used to guide the drill bit along the path of the guide wires.

Once the pilot hole is completed, it would be enlarged using reaming tools to a width adequate for accepting the pipeline. The reaming tools are attached to the drill string at the exit point of the pilot hole and are rotated and drawn back to the drilling rig, thus enlarging the pilot hole with each pass. During this process, non-toxic bentonite (a naturally occurring mineral) clay drilling mud would be continuously pumped into the hole to remove cuttings and maintain the integrity of the hole. Once the hole has been sufficiently enlarged, a prefabricated segment of pipeline would be attached behind the reaming tool on the exit side of the crossing and pulled back through the drill hole toward the drill rig, completing the crossing. Before and after installation, the entire HDD section would be hydrostatically tested in accordance with the requirements of 49 CFR 192, Dominion testing specifications, and applicable permits.

In rare instances, fractures in the underlying sediments could result in a loss of down-hole mud pressure with the potential for release of drilling fluid to surface waters. In the unlikely event of such a release, Dominion would implement its Horizontal Directional Drill Contingency and Inadvertent Release Plan[8], which we have reviewed and find acceptable.

The horizontal bore method would primarily be used for road crossings, but would also be used to cross some waterbodies and wetlands. Horizontal boring would involve the excavation of two pits, one on either side of the bore feature (e.g., on each side of a road) and the completion of a connecting bore hole. During pipeline construction, the pits would be established by excavation and a boring machine would then be lowered into one pit. A horizontal hole would then be bored with a diameter that is approximately 2 inches greater than the diameter of the pipe, and at the design depth of the pipeline installation. The pipeline section would then be pushed through the bore to the opposite pit.

Depending on the length of the bore, additional pipeline sections may be required to complete the span of the feature. If additional pipeline sections are required to span the length of the bore, the additional sections would be welded together in the bore pit before being pushed through the bore.

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[7] FERC eLibrary Accession numbers 20160822-5229 and 20160602-5125.

[8] FERC eLibrary Accession number 20160309-5161.

Horizontal bore construction is a dry method that does not use drilling fluids and, as such, there is no potential for inadvertent return of fluids.

Waterbody Construction[9]

The Project would cross 2 major waterbodies, 45 minor waterbodies, and 37 intermediate waterbodies. Of the 84 pipeline waterbody crossings, 33 (including the 2 major waterbody crossings) would be completed using HDD methodology.

For the intermediate and minor waterbodies, the flow characteristics of the waterbody at the time of construction would determine the methodology of the crossing. Dominion intends to cross seasonal and ephemeral waterbodies, including ditches, only when dry and using standard upland construction techniques. For those minor and/or intermediate waterbodies that do not warrant HDD, a trench would be excavated across the waterbody using backhoes operating from the banks. Dominion proposes to use the flume or dam and pump method for these crossings in the event that features are flowing at the time of construction and where such flow can be adequately transferred around work areas.

There would be a minimum setback of 50 feet from the water's edge for necessary workspace to protect the riparian area and as described in the T2C Procedures, except where Dominion has proposed alternative measures as described in sections A.7 and B.2.2. To reduce impacts from sedimentation, vegetation would be used for filtration. Temporary bridges would be installed, in accordance with the T2C Procedures. Fueling, storage of fuel, or overnight parking would be at least 100 feet from the waterbody being crossed.

Temporary trench plugs would be installed at waterbody crossings in accordance with the T2C Procedures, and Project engineering plans and specifications. These devices would help prevent diversion of water into upland portions of the pipeline trench, and minimize the potential for accumulated trench water being released into the waterbody.

HDD Method

Dominion plans to use HDD to cross several waterbodies as described in the Wetland Construction discussion above to avoid impacts at multiple waterbody crossings. HDD depths would be a minimum of 15 feet under waterbody channels. The length of HDD is determined by many characteristics including depth and size of pipe.

Flume Crossing Method

The flume crossing method allows for continuous stream flow without impediment during construction. An adequate water flow rate is maintained to protect aquatic life and prevent the interruption of existing downstream uses.

In accordance with the T2C Procedures, the flume crossing method requires implementation of the following steps: 1) install flume pipe after blasting (if necessary), but before trenching; 2) use a sand bag diversion structure or sand bag and plastic sheeting diversion structure or equivalent to develop an effective seal and to divert stream flow through the flume pipe (some modifications to the stream bottom may be required to achieve an effective seal); 3) properly align flume pipe(s) to prevent bank erosion and

[9] Milepost locations for waterbody crossings are presented in appendix E.

streambed scour; 4) do not remove flume pipe during trenching, pipe lowering, or backfilling activities, or initial streambed restoration efforts; and 5) remove all flume pipes and dams that are not also part of the equipment bridge as soon as final cleanup of the stream bed and bank is complete.

Dam-and-Pump Method

In accordance with the T2C Procedures, the dam-and-pump method may be used without prior approval for crossings of waterbodies where pumps can adequately transfer streamflow volumes around the work area, and there are no concerns about sensitive species passage.

Road and Railroad Crossings[10]

The Project would cross 4 railroads, 1 interstate road, 37 state roads, 18 county roads, and 50 private or unknown roads. The road crossings are asphalt-paved, gravel, and dirt roads; residential and commercial entrance drives; and parking areas.

A combination of bore and HDD techniques would be used for road and railroad crossings. Boring is the preferred method for dry crossings of roads and railroads. One commenter questioned the crossing method for Pearson Town Road (bore), Old Spartanburg Highway (bore), Graystone Drive (HDD), and State Route 221 (open cut). HDDs under state and county roadways would be 10 feet under the lowest right-of-way feature (ditches, pavement, etc.). Bores under state and county roadways would be 5 feet under the lowest right-of-way feature (ditches, pavement, etc.).

All paved public roads are state/county-owned and would be crossed by HDD/bores. The horizontal spread of the crossing would be extended a minimum of 10 feet past the road right-of-way. The remaining dirt and gravel roads crossed by the pipeline would be open-cut using conventional upland construction techniques. During these crossings, the roads would be closed and appropriate safety measures, such as warning signs, would be posted to keep the roads safe and identify any detours. Road crossing construction would be completed as quickly as possible (typically less than 24 hours), and roads would be restored to pre-construction condition immediately following installation. For additional protection, metal plates and/or other temporary crossing means would be installed at each road crossing for use during emergency access needs, as necessary. The crossing specifications would conform to or exceed the South Carolina Department of Transportation guidelines for road crossings.

Pipes installed under railroads and railroad rights-of-way would be installed at a minimum depth beneath the bottom of rail of 25 feet (HDD) and 10 feet (bore), depending on the requirements of the specific railroad company. The horizontal spread of the crossing would be extended a minimum of 10 feet past the railroad right-of-way. The crossing specifications would conform to or exceed the State of South Carolina guidelines for railroad crossings, as well as meeting or exceeding CSX's and Norfolk Southern Corporation's guidelines.

Steep Terrain

Several classes of soils in the Project footprint have been classified as having slopes greater than 25 percent, which would be considered steep terrain. In areas of steep and rugged terrain along the

[10] Milepost locations for road and railroad crossings can be found in Dominion's March 2016 application, table 1C-2 of Resource Report 1 (Accession numbers 20160822-5229 and 20160602-5125).

Project, specialized construction techniques may be implemented. These techniques may include, but not be limited to: hand clearing the right-of-way and removing the cut timber with the use of a "yarder" type apparatus; use of cabled bulldozers to safely lower and retrieve construction machinery; specialized methods for stabilizing downslope pipe strings; and use of slope and trench breakers to minimize soil erosion.

Agricultural Areas

The Project would temporarily impact 311.2 acres of agricultural land use, and would permanently impact 89.8 acres. Dominion would construct the pipeline in cropland in accordance with the T2C Plan unless otherwise specified by the landowner. Topsoil would be stripped to a minimum depth of 12 inches, or per landowner stipulation agreement, over the entire right-of-way including the trench line and subsoil storage areas, and would be stored separately from excavated ditch subsoil along the edge of the construction right-of-way to prevent mixing of topsoil with subsoil. In areas where topsoil is less than 12 inches deep, an effort would be made to separate the entire amount of topsoil. After the trench is backfilled with subsoil, the topsoil would be replaced.

Prior to construction, cropland soil compaction testing would be conducted to document baseline conditions for restoration purposes. Following construction, backfilled soils would again be tested for compaction and, as necessary, mitigating de-compaction measures would be implemented to restore baseline conditions. Unless requested by the landowner, Dominion would not reseed active cropland.

Karst Areas

Based on desktop evaluation of USGS data, neither the Moore to Chappells Pipeline nor the Dillon Pipeline cross karst zones (USGS 2004). However, the Dorchester Compressor Station and the Charleston Town Border Station sites are located in karst zones that are characterized by areas with fissures, tubes, and caves generally less than 1,000 feet long, 50 feet or less vertical extent, in gently dipping to flat-lying beds of carbonate rock. Karst areas contain features such as sinkholes, caves, and caverns. Dominion's surveys did not identify any sinkholes or karst features within the Project area. A preliminary geotechnical report on the results of the karst assessment was included in Resource Report 6, and the full geotechnical report was submitted as a supplemental filing on June 1, 2016. To the extent practicable, Dominion would avoid sinkholes or karst features encountered. If avoidance is not possible, Dominion would incorporate preventative construction techniques into the pipeline design to alleviate potential safety concerns.

Additionally, Dominion would monitor clearing, grading, and trenching activities to identify potential karst features that may have been unidentifiable on the surface during the pre-construction survey. If conditions that could lead to a sinkhole are encountered, Dominion would remediate the sinkhole by excavating the sinkhole to expose the throat and plugging the throat using graded rock fill.

Residential Areas

The Moore to Chappells Pipeline and Dillon Pipelines would temporarily affect approximately 14.2 acres and 0.5 acre of residential areas, respectively. An additional 0.1 acre would temporarily be affected by aboveground facilities. A total of 2.9 acres of residential areas would be maintained as permanent pipeline right-of-way along the Moore to Chappells Pipeline, while no permanent impacts on such areas are proposed along the Dillon Pipeline. Pipeline construction activities in residential areas would be limited to the greatest extent practicable to minimize disturbance to residents. Dominion would preserve access to residences during construction. Where Project construction activities would impact residential access roads and no alternative entrances exists, Dominion would implement measures such as plating over the open portion of the trench to maintain passage for landowners and emergency vehicles.

Temporary safety fences would be erected along the construction right-of-way in areas where construction activities would occur within 100 feet of residences.

In areas where the Moore to Chappells Pipeline would be within the Graystone neighborhood, the proposed pipeline would be collocated with the existing Dominion pipeline. In this area, Dominion would use a 65-foot-wide construction right-of-way, with a 30-foot-wide spoil side and 35-foot-wide working side. See appendix C for right-of-way configurations.

Dominion has identified 42 residences and associated structures within 50 feet of the Project construction area. Where residences are within 50 feet of construction, Dominion would reduce the construction right-of-way width to minimize impacts. Dominion would use standard and special construction techniques where appropriate, including topsoil segregation. Dominion prepared site-specific construction and mitigation plans for the residences within 50 feet of the construction work area, which are included as appendix H. The plans identify the mitigation measures Dominion would implement at each residence to promote safe and efficient pipeline installation with minimal impact on residents. We have reviewed the site-specific residential construction plans and find them acceptable. However, we encourage the owners of each of these residences to provide us comments on the plan for their individual property. Dominion would not remove mature trees and landscaping from within the construction right-of-way unless necessary for the safe operation of construction equipment. Lawn and landscaping would be restored immediately following backfilling, weather permitting. Fences, mailboxes, and other structures would be replaced. Sidewalks, driveways, and roads would be restored as soon as practical and in accordance with agreements between landowners and Dominion. Following construction, debris would be removed and residential areas would be restored to pre-construction conditions. Dominion would coordinate with residential landowners to attempt to meet any special requests concerning restoration.

Residential areas are described further in section B.4.1.

Blasting

Dominion does not anticipate the need for blasting at this time; however, we have reviewed Dominion's Blasting Plan[11], and find it acceptable. If blasting is required, Dominion would comply with all appropriate regulatory and permit requirements.

7.3 Compressor Station Construction Procedures

This section describes typical activities associated with construction and/or modifications of compressor stations.

The compressor station workspace locations would be surveyed and identified prior to beginning construction activities. Identification includes staking the perimeter of the facilities, foreign pipeline crossings, and the limits of the construction work area. Wetland boundaries and other environmentally sensitive areas would also be marked at this time.

Site clearing and grading would begin with the installation of erosion and sedimentation control BMPs and stormwater management structures. The proposed workspace would be cleared and graded to

[11] FERC eLibrary Accession number 20160309-5161.

accommodate materials, equipment, and construction activities. Excavated soil would be stockpiled on site.

Following clearing and grading, excavation would be completed for building/compressor foundations and pipe supports. Site preparation, excavation, and foundation design would be supported by geotechnical investigations to evaluate soil conditions. Structure foundations would be formed using reinforced concrete, per geotechnical recommendations. Foundations would be constructed using American Society for Testing and Materials (ASTM) procedures.

At each compressor station location, buildings would be erected to house new machinery. At existing sites, buildings would be constructed to expand existing facilities. Site-fabricated metal buildings would be used, and would be bolted directly to concrete foundations. Required machinery and appurtenant components (e.g., electrical conduit and piping) would be installed.

The piping system installation and foundation work are likely to be integrated. Underground piping would be installed in trenches using established welding, x-ray, and coating procedures. Aboveground piping would be installed on concrete or metal supports. Associated valves and fittings would be installed and hydrostatic testing completed to document system integrity.

Systems and components would be tested and/or certified for operation. Tests may be completed using inert gas or liquid (i.e., water). In accordance with 49 CFR 192, piping would be tested in sections for specified time periods to pressures that are reflective of requisite maximum allowable operating pressure (MAOP). Test water would be disposed of in accordance with regulatory requirements. Equipment start-up would follow the successful testing of all components and systems.

Cleanup and stabilization would be completed as part of construction activities. Site areas would be stabilized with a combination of rock cover, asphalt, or seed/mulch. Permanent erosion controls would be installed, as necessary. Final grading and restoration would be done in accordance with the T2C Plan. Temporary erosion control devices would be removed once the site has been permanently stabilized in accordance with applicable requirements.

7.4 Construction Schedule and Workforce

Construction of the Project would require multiple construction spreads. A temporary workforce of approximately 400 workers would be utilized to construct the proposed pipelines, aboveground facilities, and associated ancillary facilities. One new permanent employee is expected to be hired for operation of the Dorchester Compressor Station facility. Section B.5 provides additional details about the anticipated workforce for the Project.

Dominion would construct the pipeline and aboveground facilities between 7 a.m. and 10 p.m. However, Dominion does not intend to work beyond 7 p.m. If the need arises, Dominion would work with the communities to minimize impacts. Construction is proposed to begin on or about January 1, 2017, and is expected to take approximately 10 months.

7.5 Construction Environmental Inspection and Compliance

Dominion would construct and operate the Project in compliance with applicable laws, regulations, permits, and approvals. The T2C Plan and T2C Procedures, other environmental plans and requirements, and permit conditions would be incorporated into specifications and drawings issued with the construction bid documents. The construction contractor would be provided with copies of each of these environmental permits and documents.

Prior to construction, Dominion would conduct environmental training for company and contractor supervisory personnel to familiarize them with the Project's environmental requirements. The training would cover:

- project environmental requirements, such as the T2C Plan and T2C Procedures;
- project-specific conditions contained in the FERC Certificate; and
- other applicable federal and state permits and approvals, and any Project-specific mitigation plans.

In addition, Dominion would provide group training to construction personnel prior to beginning construction activities to make them aware of environmental requirements. Once construction is underway, Dominion's Environmental Inspector (EI) would provide periodic follow-up training as necessary for newly assigned personnel.

Dominion would assign one EI per spread to monitor environmental compliance. The EI would have peer status with other inspectors and would report directly to Dominion's Environmental Consultant. The EI would be present throughout construction and restoration of the Project, and would have the authority to enforce permit conditions. The EI's roles and responsibilities are described in the T2C Plan. The EI would be responsible for monitoring and documenting compliance with the T2C Plan and T2C Procedures, as well as mitigation measures required by permits, certificates, and other environmental approvals. The EI would be authorized to issue stop-work orders and to require corrective actions to maintain environmental compliance. Additionally, FERC staff would conduct periodic inspections of Project activities during construction and restoration of the Project to confirm compliance with all Commission orders and approvals.

8. Operation and Maintenance

Operational activity associated with the Project would be limited primarily to maintenance of the right-of-way and inspection, repair, and cleaning of the pipeline itself. Periodic aerial and ground inspections by pipeline personnel would identify soil erosion, which may expose the pipe; 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 which could present a safety hazard or require preventative maintenance or repairs. The pipeline's cathodic protection system would also be monitored and inspected periodically to ensure proper and adequate corrosion protection. Annual MLV inspections would be conducted. Appropriate responses to conditions observed during inspections would be taken as necessary.

The pipeline facilities would be clearly marked at crossings of roads, railroads, fence lines, pipeline intersections, and other key points. The markers would indicate the presence of the pipeline and the material transported, and would provide a telephone number where a company representative can be reached in the event of an emergency, and a number to call prior to any excavation in the area of the pipeline by a third party. Dominion participates in all One-Call systems.

Dominion would operate and maintain the Project in accordance with applicable federal and state requirements. Dominion would operate and maintain the proposed aboveground facilities in compliance with USDOT regulations provided in 49 CFR 192, the Commission's guidance in 18 CFR 380.15, and maintenance provisions of the T2C Plan and T2C Procedures. Dominion would operate and maintain the proposed aboveground facilities, including valve settings and pressure controls. Personnel would perform routine checks of these facilities, including calibration of equipment and instrumentation, inspection of

critical components, and scheduled and routine maintenance of equipment and grounds. Corrective actions would be taken as necessary if problems are identified.

9. Consultations, Approvals, and Permits

Table A.9-1 lists the federal, state, and local regulatory agencies that have permit or approval authority or consultation requirements and the status of that review for the Project. Dominion would be responsible for obtaining all necessary permits, licenses, and approvals required for its Project.

TABLE A.9-1
Federal, State, and Local Permits and Approvals

Permit/Approval/Consultation	Administering Agency	Status
Federal		
Certificate of Public Convenience and Necessity	FERC	Submittal Date: March 9, 2016
Section 404 Wetland Permit / Section 10 Rivers and Harbors Act	U.S. Army Corps of Engineers - Charleston District	Submittal Date: March 9, 2016 Date Received: May 11, 2016
Endangered Species Act - Section 7 Consultation	U.S. Fish and Wildlife Service	Submittal Date: June 9, 2015 Consultation Completed: April 18, 2016
	National Oceanic and Atmospheric Administration - National Marine Fisheries Service	Submittal Date: July 8, 2015 Date Received: August 6, 2015
State		
Notice of Intent (NOI) to Discharge Storm Water Associated with Construction Activities	South Carolina Department of Health & Environmental Control (SCDHEC) a/	Submittal Date: April 15, 2016
Coastal Zone Consistency Certification	SCDHEC – Office of Ocean and Coastal Resource Management	Submittal Date: February 16, 2016
National Pollutant Discharge Elimination System (NPDES) General Permit for Hydrostatic Test Water Discharges (Permit No. SCG670001)	SCDHEC	SCDHEC Permit number SCG670001 is still in effect. Date Received: February 2016

TABLE A.9-1
Federal, State, and Local Permits and Approvals

Permit/Approval/Consultation	Administering Agency	Status
Section 401 Water Quality Certification	SCDHEC	Submittal Date: March 9, 2016
Construction In South Carolina Navigable Waters	SCDHEC	*Anticipated Submittal Date: October 2016*
NRCS Conservation Easement Consultation	Natural Resource Conservation Service	Submittal Date: February 15, 2016 Date Received: March 18, 2016
State Endangered Species Consultation	South Carolina Department of Natural Resources	Submittal Date: June 9, 2015
National Historic Preservation Act Section 106 Consultation	South Carolina Department of Archives and History	Submittal Date: June 9, 2015
Application for State Easement to Tidelands or Submerged Lands (Navigable River Crossing)	South Carolina Budget & Control Board **b/**	Submittal Date: April 15, 2016
Air Quality Construction Permit	SCDHEC	Submittal Date: December 21, 2015 Date Received: April 8, 2016
Title V Operating Permit	SCDHEC	*Anticipated Submittal Date: Six months after start of operation based on current Project schedule.*
State Road Crossing Permits (Utilities / Driveways)	SCDOT - Dillon	Submittal Date: April 29, 2016
State Road Crossing Permits (Utilities / Driveways)	SCDOT - Dorchester	Submittal Date: April 29, 2016
	SCDOT - Greenwood	Submittal Date: April 29, 2016
	SCDOT - Laurens	Submittal Date: April 29, 2016
	SCDOT - Newberry	Submittal Date: April 29, 2016
	SCDOT - Spartanburg	Submittal Date: April 29, 2016

TABLE A.9-1
Federal, State, and Local Permits and Approvals

Permit/Approval/Consultation	Administering Agency	Status
County / Local		
County Road Crossing Permits (Utilities / Driveways)	SCDOT - Dillon	Submittal Date: April 29, 2016
	SCDOT - Dorchester	Submittal Date: April 29, 2016
	SCDOT - Greenwood	Submittal Date: April 29, 2016
	SCDOT - Laurens	Submittal Date: April 29, 2016
	SCDOT - Newberry	Submittal Date: April 29, 2016
	SCDOT - Spartanburg	Submittal Date: April 29, 2016
County Floodplain Permit	Newberry County Department of Planning & Zoning	Submittal Date: April 29, 2016
	Spartanburg County Engineering Department	Submittal Date: April 29, 2016
Other		
Railroad Crossing	Norfolk Southern Railway	Submittal Date: April 29, 2016
Railroad Crossing	CSX Transportation	Submittal Date: April 29, 2016
Electric Transmission Crossing	South Carolina Electric & Gas	Submittal Date: April 29, 2016
Gas Transmission Crossing	South Carolina Electric & Gas	Submittal Date: April 29, 2016

a Although Spartanburg and Newberry Counties have Municipal Separate Storm Sewer System review authority, those counties have accepted SCDHEC's offer to review the entire project, and thus have relinquished their review authority to SCDHEC for this Project.

b Written approval has been received from the South Carolina State Budget and Control Board, pending final execution of the easement document by both parties.

B. ENVIRONMENTAL ANALYSIS

1. Geology and Soils

1.1 Geology

The Project is located within the Piedmont and Coastal Plain physiographic provinces. The Piedmont region consists of gently undulating hills and monadnocks, and is underlain by metamorphic rocks of various origin that were folded during the Paleozoic Era, as the North American and African plates converged. The predominant underlying bedrock of the Piedmont region is metamorphic-slates, schists, gneisses, and granite with occasional diabase intrusions.

The Coastal Plain region makes up approximately 66 percent of South Carolina's land area, and contains floodplains, marshland, swamps, savannahs, and Carolina Bays. The Coastal Plain region is comprised of sand and clay formations of late Cretaceous and Tertiary ages that overlie the crystalline basement rock. More recent alluvial deposits of Holocene age occur at the surface along the flanks of rivers and major streams.

Elevations in the Project area range from mean sea level to 1,200 feet above mean sea level (USGS 2016a), and topography ranges from nearly level to slopes ranging from zero to 50 percent.

Mineral Resources

Pipeline Facilities

The primary mined material in the vicinity of the Moore to Chappells Pipeline is vermiculite; sand/gravel mines are also present in the area. Historically, there had been gold mining operations in the study area; however, the gold mines are no longer active and the locations are undocumented. Table B.1-1 identifies active surface mines in the vicinity of the Moore to Chappells Pipeline.

There are no known asbestos issues in the vermiculite mines located in the vicinity of the Project; therefore, we do not anticipate asbestos issues within the Project area.

TABLE B.1-1
Active Surface Mines in the Vicinity of the Moore to Chappells Pipeline Project Area

County	Name	Type	MP	Distance (miles)	Direction
Spartanburg	South Carolina Department of Transportation	Borrow pit	2.0	1.0	Northeast
	Rogers Mine	Vermiculite	9.7	0.7	Northeast
	Fannie Young Mine	Vermiculite	11.0	0.7	East-northeast
	Johnson Mine	Vermiculite	11.0	2.6	East
	Thompson Mine	Vermiculite	12.3	0.3	West
	Browns Dirt Mine	Borrow pit	12.5	2.3	West
Laurens	Gideon Mine	Vermiculite	18.0	2.8	East
	Wright Mine No. 1 and No. 2	Vermiculite	18.5	2.9	West
	Templeton Mine	Vermiculite	22.0	1.0	West
	Donna Mine NO. 1	Vermiculite	22.4	1.8	East
	Wingo Mine	Vermiculite	26.4	1.0	West

The primary mined material in the vicinity of the Dillon Pipeline is sand/gravel. There are no current or historical underground mines in the vicinity of the Dillon Pipeline, nor are there any active surface mines within 3 miles.

Aboveground Facilities

The primary mined material in Aiken, Dorchester, Charleston, and Greenwood Counties is sand/gravel. There are no current or historical underground mines in these counties, nor are there any active surface mines within 3 miles of the Project area in these counties.

Dominion has stated the following measures would be implemented should an undocumented mine be discovered during construction of the Project:

- Geophysical methods, such as ground penetrating radar, would be used to map the aerial extent of the mine, depth of mine roof below existing grade, and depth of mine floor.
- The Project would be rerouted to avoid the mapped footprint, or horizontal directional drill technology would be utilized to bore under the mine.

Based on these measures, the relatively shallow excavations required for construction, and Dominion's statement that no blasting would be used during construction of the Project, we conclude that the Project would not impact mines nor mineral resources.

Oil and Gas

There is no oil or natural gas production in South Carolina; therefore, there are no oil or natural gas wells in the Project area. We conclude that the Project would not impact oil and gas resources.

Blasting

No blasting is anticipated during construction of the Project. Standard excavation equipment would be used during excavation in all areas associated with the Project.

Natural Hazards

Geologic hazards that could potentially affect the Project include landslides, karst slumping, soil liquefaction, earthquakes, flooding, or volcanic eruptions.

Earthquake Ground Motions and Soil Liquefaction

Peak ground accelerations in the Project vicinity, expressed as a percentage of the acceleration of gravity (%g), for a 50-year time interval with a 2 percent probability of exceedance range from 16-20%g (Moore to Chappells Pipeline; Moore Compressor Station, and Greenwood Town Border Station), 20-30%g (Dillon Pipeline and Southern Compressor Station), 60-80%g (Dorchester Compressor Station), and 120-160%g (Charleston Town Border Station). There have been no mapped epicenters with magnitudes greater than 3.0 on the Richter Scale in the immediate vicinity of any of the Project areas, except for the Charleston Town Border Station, where numerous earthquakes have been recorded with magnitudes above 6.0 on the Richter Scale. The probability of an earthquake occurring in the Project area is generally low, and if one did occur, the severity of such an earthquake also would likely be low.

The areas of South Carolina with the highest potential for soil liquefaction are along the coastline, where the underlying geology is comprised of less consolidated sand than inland areas. The Project is not located in any zones of high potential for soil liquefaction.

Based on the low probability of a seismic event in the Project area, Dominion's commitment to construct the Project in accordance with USDOT's safety requirements, and the unlikely potential for occurrence of soil liquefaction within the Project vicinity, we conclude that earthquakes and liquefaction are not likely to affect construction or operation of the Project.

Faulting

One potential geologic fault has been identified in South Carolina: Charleston liquefaction features (Class A) No. 2657 (USGS 2016b). The evidence for faulting at this location in central coastal South Carolina consists of eyewitness reports of widespread liquefaction during an earthquake in 1886, middle to late Holocene craters, sand blows, and sand fissures produced by large, prehistoric earthquakes, and the recognition that the liquefaction and paleoliquefaction features are attributable to strong shaking caused by seismic faulting. These liquefaction features are evidence of strong shaking, but do not identify a specific fault. No individual Quaternary faults were identified in South Carolina; therefore, seismic impacts on the Project would be unlikely.

Ground Subsidence

No Project facilities are proposed in geologic units with shallow depth that have the potential to result in karst-related hazards, with the exception of the Dorchester Compressor Station, which is located in an area where the shallow geology includes unconsolidated calcareous sediments. Dissolution of the unconsolidated calcareous sediments may result in subtle, subsidence sinkholes. Review of test boring data collected at the Dorchester Compressor Station site did not identify karst concerns such as voids, decreasing density with depth, or excessive moisture changes. Site reconnaissance of the Project site also did not encounter evidence of karst related subsidence events.

The Project is not located in an area where sinkholes are prevalent. Subsidence may also occur due to mining operations. There are no known active or abandoned underground mines near the Project area. Based on the lack of geologic units at shallow depth, karst topography, low incidence of unconsolidated calcareous sediments, and the proposed mitigation for unmapped mines, we conclude that subsidence is unlikely within the Project area.

Landslides

Unconsolidated soil and sediment on steep slopes can cause landslides to occur when saturated. None of the Project areas are located in a region where there is a high susceptibility of landslides; therefore, we do not anticipate that the Project area would be susceptible to landslides.

Flash Flooding

Executive Order (EO) 11988: Floodplain Management, issued on May 24, 1977, requires federal agencies to avoid adverse effects on the 100-year floodplain, when possible. It also states that growth and development within the floodplain should not be encouraged, unless there are no alternatives, and functions and habitat associated with floodplains should be protected. EO 11988 defines floodplains as "the lowland and relatively flat areas adjoining inland and coastal waters, flood-prone areas of offshore islands that, at a minimum, are subject to a 1 percent or greater chance of flooding in any given year." In other words, the 100-year floodplain is an area with a 1 percent chance of meeting or exceeding the base flood elevation in a given year.

The Federal Emergency Management Agency (FEMA) Flood Insurance Maps show that the majority of the Project area is classified as Zone A (areas with a 1 percent annual chance of flooding), Zone AE (areas inundated by 1 percent annual chance flooding), and Zone X (areas of minimal flood

hazard, usually depicted as above the 500-year flood line). The pipeline alignments pass through all three zones. With the exception of the Southern Compressor Station, all proposed aboveground facilities are located in Zone X. The Southern Compressor Station is located in Zones AE and X. It is possible for the Project to be affected by flash floods in areas where the pipeline route crosses, or is near, streams or rivers. At these locations, the Project pipelines would be installed well below the surface by drilling, or designed with a concrete coating as protection from damage due to high velocity flows and erosion from seasonal or flash flooding. Aboveground facilities associated with the Project would also be designed and constructed to protect against damage from high winds, erosion, and area flooding as a result of hurricanes.

While the pipelines could potentially rise toward the land surface as a result of the increase of buoyancy due to flooding, concrete coating would be employed to overcome buoyancy hazards. The Project would be designed and installed to provide adequate protection from washouts, floods, unstable soil, and landslides in accordance with 49 CFR 192.

Paleontology

It is unlikely that there would be significant paleontological resources located in the vicinity of the Project; therefore, we do not anticipate impacts on paleontological resources as a result of the Project.

Impacts and Mitigation

The Project would traverse a range of geologic conditions and resources. As discussed above, Dominion conducted studies to characterize geologic conditions and developed Project-specific plans and procedures that would minimize the potential for impacts on or by geologic conditions during construction and operation of the proposed facilities. By implementing the proposed construction and restoration plans and our recommendations discussed above, we conclude that the Project would not significantly impact geologic resources in the region and that geologic hazards, including karst activity, would not pose a significant risk to the proposed action.

1.2 Soils

Existing Soil Conditions

Table B.1-2 summarizes the soils that would be impacted by the Project based on soil characteristics.

TABLE B.1-2
Acres of Soil Characteristics Impacted by Facility Type a/

	Total Acres in County b/	Prime Farmland c/	Farmland of Statewide Importance	Hydric Soils d/	Compaction Prone	Highly Erodible e/		Re-vegetation Concerns	Shallow Depth to Bedrock g/
						Water	Wind f/		
Pipeline Facilities									
Moore to Chappells Pipeline									
Spartanburg	178.0	39.2	52.7	0	25.8	58.6	0	2.0	0
Laurens	340.4	133.7	95.1	23.9	0	291.6	12.3	28.0	30.8
Newberry	100.2	70.6	18.9	0.4	0	24.7	1.9	10.9	3.0
Greenwood	6.2	3.4	1.5	0	0	2.8	0	0	0
Dillon Pipeline									
Dillon	45.0	29.6	15.2	31.7	0	0	2.9	0	0
Moore Compressor Station									
Spartanburg	11.9	0	1.5	0	0	11.0	0	0	0
Dorchester Compressor Station									
Dorchester	9.8	9.8	0	9.8	0	0	0	9.8	0
Southern Compressor Station									
Aiken	0	0	0	0	0	0	0	0	0
Other Aboveground Facilities									
Metering and Regulating (M&R) Stations									
Spartanburg	0.1	0	0	0	0	0.1	0	0	0
Mainline Valve (MLV) Sites									
Spartanburg	0.1	0	0	0	0	0.1	0	0	0
Laurens	0.2	0.1	0.1	0	0	0.2	0	0	0
Newberry	0	0	0	0	0	0	0	0	0
Cathodic Protection									
Spartanburg	0.5	0.5	0	0	0	0	0	0	0
Laurens	0.4	0.4	0	0	0	0.4	0	0	0
OPP System									
Charleston	1.7	0	1.7	0.8	0	0	0.9	0.8	0
Greenwood	2.0	2.0	0	0	0	2.0	0	0	0
Interconnection Facility – Moore Purchase									
Spartanburg	0.3	0.3	0	0	0	0	0	0	0
Interconnection Facility – Chappells Tie-in									
Greenwood	0.3	0	0.3	0	0	0.3	0	0	0
Interconnection Facility – Reedy Creek Take Off									
Dillon	0.3	0.3	0	0	0	0	0.3	0	0
Interconnection Facility – Caldwell Drive M&R									
Dillon	0.3	0.1	0.2	0.3	0	0	0	0	0
Total	***697.7***	***290.1***	***187.2***	***66.9***	***25.8***	***391.8***	***18.2***	***51.5***	***33.7***

a The area affected includes the permanent pipeline ROW, temporary workspace, and additional temporary workspace. The soils data in the table does not include areas of open water.

b The numbers in this table have been rounded for presentation purposes. As a result, the totals may not reflect the sum of the addends. The values in each row do not add up to the total acreage for each County/City because the soils may occur in more than one characteristic class or may not occur in any class listed in the table.

c As designated by the NRCS. Prime farmland includes those soils that are considered prime if a limiting factor is mitigated (e.g., through artificial drainage).

d Soils in somewhat poor to very poor drainage classes with surface textures of sandy clay loam and finer.

e Soils in land capability subclasses 4e through 8e and soils with an average slope greater than 8 percent. Land capability classification shows, in a general way, the suitability of soils for most kinds of field crops. The soils are grouped according to their limitations for field crops, the risk of damage if are used for crops, and the way they respond to management. Class 4 soils have very severe limitations that restrict the choice of plants or that require very careful management, or both. Class 5 soils are subject to little or no erosion but have other limitations, impractical to remove, that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat. Class 6 soils

TABLE B.1-2
Acres of Soil Characteristics Impacted by Facility Type a/

	Total Acres in County b/	Prime Farmland c/	Farmland of Statewide Importance	Hydric Soils d/	Compaction Prone	Highly Erodible e/		Re-vegetation Concerns	Shallow Depth to Bedrock g/
						Water	Wind f/		

have severe limitations that make them generally unsuitable for cultivation and that restrict their use mainly to pasture, rangeland, forestland, or wildlife habitat. Class 7 soils have very severe limitations that make them unsuitable for cultivation and that restrict their use mainly to grazing, forestland, or wildlife habitat. Class 8 soils and miscellaneous areas have limitations that preclude commercial plant production and that restrict their use to recreational purposes, wildlife habitat, watershed, or esthetic purposes. The letter e indicates that the main hazard is the risk of erosion unless close-growing plant cover is maintained.

f Soils with a wind erodibility group classification of 1 or 2. A wind erodibility group is a grouping of soils that have similar properties affecting their resistance to soil blowing in cultivated areas. The groups indicate the susceptibility to blowing. The wind erodibility index (I), used in the wind erosion equation, is assigned using the wind erodibility groups. Soils with a wind erodibility group classification of 1 consist of very fine sand, fine sand, sand, or coarse sand surface layers with a wind erodibility index ranging from 160 to 310 tons per acre per year. Soils with a wind erodibility group classification of 2 consist of loamy very fine sand, loamy fine sand, loamy sand, and loamy coarse sand; very fine sandy loam and silt loam with 5 or less percent clay and 25 or less percent very fine sand; and sapric soil materials with a wind erodibility index of 134 tons per acre per year.

g Soils identified as containing bedrock within 60 inches of the soil surface.

Impacts and Mitigation

Several general soil characteristics have the potential to affect, or be affected by, construction and operation of the Project. These include prime farmlands, soil compaction, soil erosion, shallow depth to bedrock, and low revegetation potential. Dominion would avoid and minimize impacts on soils through implementation of the T2C Plan and the T2C Procedures, which includes erosion and sediment control and restoration measures.

To reduce soil impacts during construction and operation activities, Dominion would minimize the amount of disturbed area utilized for the Project to the maximum extent practical. Grading and clearing of vegetation would be conducted to provide adequate construction and operational staging and access to the Project area. To the extent possible, grading would be conducted in such a way as to limit soil disturbance and to preserve existing vegetation. Dominion would coordinate with the local soil conservation authorities to minimize impacts and to develop restoration strategies for the Project.

Temporary workspace would be used for equipment storage, topsoil storage, equipment parking, and other staging activities. Topsoil would be segregated from agricultural and residential areas and at other locations as requested by the landowner. Following construction, topsoil would be restored to all disturbed areas and the area restored to pre-construction land use. To reduce impacts on soil resources, Dominion would implement applicable provisions of the T2C Plan.

Cropland

Prime farmland is a designation assigned by USDA defining land that has the best combination of physical and chemical characteristics for producing food, feed, forage, fiber, and oilseed crops and is also available for these land uses. Farmland of statewide importance is comprised of land that does not meet the criteria for prime farmland. Generally, this land includes areas of soils that nearly meet the requirement for prime farmland and that economically produce high yields of crops when treated and managed according to the acceptable farming methods.

Dominion estimates the Project would impact approximately 290.1 acres of prime farmland (97.1 acres of permanent easement), 187.2 acres of farmland of statewide importance (80.1 acres of permanent easement), 12.2 acres of prime farmland if drained (6.4 acres of permanent easement), and 4.0 acres of prime farmland if protected from flooding (2.1 acres of permanent easement). Most of the permanent easement along the pipeline corridors would be restored and allowed to revert back to its land use, including agricultural land. Dominion would segregate topsoil from the entire right-of-way in agricultural areas. Following construction, topsoil would be restored to all disturbed areas and the areas would be restored to pre-construction land use. Therefore, we conclude that impacts on prime farmland from the Project would be minimized and not significant.

To address poor drainage, soils in agricultural land may be artificially drained by drain tile systems. Dominion would contact landowners prior to commencing construction activities in the area, regarding the potential presence of drain tiles and irrigation systems in affected agricultural fields. In addition, observations would be made before and during construction for evidence of the presence of drain tiles and irrigation systems. In fields with drain tiles and irrigation systems, pipeline construction would be conducted in accordance with the T2C Plan and T2C Procedures. The pipe would be installed below agricultural drainage lines, except in the rare circumstance of a deep main drainage line. Agricultural drainage features would be repositioned in a manner consistent with drainage orientation.

Where soils are artificially drained with subsurface tile systems, construction may result in damage to the drainage system. Dominion would implement the steps identified in the T2C Plan to minimize or mitigate impacts on drainage systems. Should drainage tiles or irrigation piping be damaged during construction, Dominion would repair and restore their function. Dominion would mark the location of the damage in a prominent manner, such as a securely staked lath with survey tape attached. Drain tiles used for replacement would be of the same size and quality as the original tile encountered on site. If original tile is not available, replacement tiles would be of appropriate size and materials to connect with the existing line without loss of function. Operation of the pipeline following construction and repair of any damaged tiles is not expected to affect operation of the drainage systems.

Soil Compaction and Damage to Soil Structure

Soil compaction occurs when soil particles are compressed, thereby increasing the soil bulk density. Compaction and associated damage to soil structure can inhibit infiltration of rainwater and snowmelt, increase runoff, and impede vegetation root establishment. Soils with widely graded (i.e., loamy) textures and higher silt and clay contents are the most compaction-prone soils. The risk for compaction is greatest when soils are saturated or utilized for agricultural and residential lands (USDA NRCS 2015a).

Due to the predominantly sandy nature of the soils in the Project area, the risk for compaction is considered relatively low. Dominion would utilize mats or geo-textile fabric as appropriate to reduce the potential of compaction or rutting. During site restoration, disturbed areas used for temporary workspace would be tested for soil compaction. Areas found to be exhibiting compaction, as compared to adjacent undisturbed soils, would be subjected to deep tillage. We conclude that implementation of the proposed

BMPs outlined above and in Dominion's Soil Erosion and Sediment Control Plan would mitigate the hazards associated with compaction-prone soils.

Soil Erosion

Soil erosion potential is dependent on site conditions such as slope, climate, vegetative cover, and surface roughness. Other relevant factors include soil texture, organic matter, rock content, and aggregate stability. Soils have the potential to erode from rain events, periods of surface water runoff, and wind transport (Brady and Weil 1996). Temporary exposure of bare or sparsely vegetated soil during Project construction could potentially pose a risk of soil erosion in some areas.

Dominion identified soils within the Project area with high potential for erosion by their soil erodibility factor (K Factor) - a measure of the susceptibility of soil particles to detachment and transport by rainfall and runoff, eroded phase designation, and slope. Soils in land capability subclasses 4E through 8E, soils with an average slope greater than 8 percent, and soils with a wind erodibility group classification of 1 or 2 were identified as having high erosion potential.

Dominion would implement applicable provisions of the T2C Plan to reduce soil erosion. Dominion would construct BMPs at all sites immediately after initial disturbance of the soil and would maintain them throughout construction. To reduce potential for erosion, denuding of vegetation would only be performed when necessary for safe construction conditions.

During construction, the effectiveness of temporary erosion control devices would be monitored by Dominion's EIs. The EIs would also monitor the revegetation and restoration of temporary construction areas through completion of site restoration. The effectiveness of revegetation and permanent erosion control devices would be monitored by Dominion's operating personnel during the long-term operation and maintenance of each pipeline system in accordance with applicable permits and approvals. Except in active agricultural areas, temporary erosion control devices would be maintained until the rights-of-way are revegetated to pre-construction conditions. Following revegetation of construction areas, Dominion would remove temporary erosion control devices.

Poor Revegetation Potential

Some soils crossed by the Project were identified as having a poor revegetation potential based on the surface texture, drainage class, and slope. Droughty soils which have a coarse surface texture and are somewhat excessively or excessively drained could prove difficult to revegetate. Drier soils have less water to aid in the germination and eventual establishment of new vegetation. Coarser textured soils also have a lower water-holding capacity following precipitation, which could result in moisture deficiencies in the root zone creating unfavorable conditions for many plants. In addition, steep slopes along some parts of the pipeline routes could make the establishment of vegetation difficult. Highly acidic soils can also be difficult to revegetate. Revegetation of areas disturbed by construction is generally dependent on maintaining a stable soil surface and maintaining sufficient soil moisture for plants to grow. Rainfall is abundant within the Project area, and sufficient for supporting natural vegetative growth.

Successful restoration and revegetation is important for maintaining agricultural productivity and to protect the underlying soil from potential damage, such as erosion. Dominion would promote revegetation as described in the T2C Plan and Dominion's Soil Erosion and Sediment Control Plan. Following final grading and cleanup, Dominion would condition the construction right-of-way for planting, including the preparation of a seedbed and application and incorporation of soil amendments at rates agreed to by the landowner or land managing agency, or as specified in writing by an appropriate soil conservation authority. Seeding and mulching in cultivated areas would conform to the adjacent off-right-of-way area unless otherwise requested in writing by the landowner. Dominion would seed areas in

accordance with written recommendations for seed mixes (including native species recommended for non-native invasive plant management, described in section B.3.2), rates, and dates obtained from the appropriate soil conservation authorities or land managing agencies.

Dominion would segregate topsoil in cultivated or rotated croplands, managed pastures, hayfields, residential areas, and in other areas requested by the landowner or land managing agency. Implementation of proper topsoil segregation would help promote post-construction revegetation success, thereby minimizing loss of crop productivity and the potential for long-term problems with erosion. We conclude that implementation of the proposed BMPs outlined above and in Dominion's Soil Erosion and Sediment Control Plan would minimize impacts on land with poor revegetation potential.

Introduction of Rock into Topsoil

Dominion evaluated the potential for Project construction to introduce rock fragments into the topsoil from mechanized-ripping of bedrock and subsequent re-grading based on the depth (within 60 inches of the soil surface) to firm or weathered bedrock (lithic or paralithic contact). Adding rock fragments into the topsoil can be a potential management problem for future land uses. The risk for rock introduction into the topsoil is greatest for agricultural and residential lands.

During construction, topsoil and subsoil would be disturbed as a result of topsoil removal, grading, trench excavation, and by heavy equipment moving along the right-of-way. The potential mixing of topsoil or surface soil with the subsoil from these activities could result in a loss of soil productivity. To prevent mixing of the soil horizons or incorporation of additional rock into the topsoil, Dominion would segregate topsoil in cultivated or rotated croplands, managed pastures, hayfields, residential areas, and in other areas requested by the landowner or land managing agency. Topsoil would be segregated, as appropriate, from the subsoil and would be replaced in the proper order during backfilling and final grading. We conclude that implementation of the proposed BMPs outlined above would mitigate the potential for introduction of rock into the topsoil.

Soil Contamination

Dominion searched federal and state environmental databases with records of hazardous waste sites, landfills, leaking underground storage tank (LUST) sites, spill sites, and other sites where there have been documented or potential impacts on soil and groundwater within 2,000 feet of the Project limits of disturbance. The database search identified 19 records of waste sites, landfills, LUST sites, spill sites, and other sites within the search radius of the Moore to Chappells Pipeline. Four sites were identified within 1,000 feet of the Project footprint:

- Seay's Store – A LUST site, 225 feet from the proposed pipeline, which was granted a No Further Action status by South Carolina Department of Health & Environmental Control (SCDHEC) on September 20, 1994.

- Timken US Corporation – Resource Conservation and Recovery Act Corrective Action site, 750 feet from the proposed pipeline, which has an actively controlled chlorinated volatile organic compound plume up-gradient of the pipeline.

- Consolidated Fabricators (currently operating as a Shaw facility) – A state Brownfields site, 700 feet from the proposed pipeline, with metal contamination of soil and groundwater at concentrations below Industrial Screening Levels. The contaminated area is capped and considered an institutional control maintained under a SCDHEC Voluntary Cleanup Contract.

- Continental Machine – LUST site that is proposed as Moore to Chappells Pipeline Laydown Yard 2, which was granted a No Further Action status by SCDHEC on September 15, 2015. Because Project activities at this laydown yard do not include subsurface excavation, residual hydrocarbon contamination would not be disturbed.

Although groundwater at these sites is contaminated, the pipeline trench is not anticipated to exceed 5 feet, and the laydown yard activities would not involve excavation. Therefore, it is not anticipated that the pipeline or pipeline construction activities would intercept the water table in these areas.

Three LUST sites were identified within the search radius for the Dillon Pipeline, approximately 2,000 feet southeast of the eastern terminus. These sites include:

- Stuckeys – LUST site, 1,200 feet from the Dillon Pipeline Laydown Yard 2. Soil and groundwater at the site are contaminated with petroleum hydrocarbons.

- Webster 66 and Carousel Amoco – LUST sites whose known addresses (I-95 and Hwy 34) could not allow for precise location. Both sites are likely within ¼ mile of the laydown yards. One of these locations may be the same location as Laydown Yard 2. Although the sites were granted a no further action status by SCDHEC on February 28, 2013, and January 5, 2004, respectively, residual petroleum hydrocarbons remain within the soil and groundwater.

Because Project activities at Laydown Yard 2 would not include subsurface excavation, residual subsurface hydrocarbon contamination would not be disturbed.

In the event that contamination, or indicators of the presence of contaminants are discovered during construction, Dominion would handle them according to their Spill Prevention and Hazardous Materials Management (SPHMM) Plan[12]. This would include halting work operations and notifying appropriate state/federal agencies and local municipalities. Based on the information provided regarding the current status of these seven contaminated sites, and the impact minimization and mitigation measures described above, we conclude that construction and operation of the Moore to Chappells Pipeline and the Dillon Pipeline would not disturb contaminated soils.

2. Water Resources and Wetlands

2.1 Groundwater Resources

Existing Groundwater Resources

The Moore to Chappells Pipeline and its associated aboveground facilities (Moore Compressor Station and Greenwood Town Border Station) are located within the Piedmont physiographic province and overlie the Piedmont and Blue Ridge Aquifer Systems. The Piedmont and Blue Ridge Aquifer Systems are crystalline-rock aquifers composed of crystalline rock forming the basis of the bedrock, and overlain by regolith, an unconsolidated material consisting of saprolite, soil, and alluvium (USGS 1990). Saprolite comprises the largest portion of the regolith and in places reaches 150 feet in thickness. The predominant underlying bedrock of the Piedmont region is metamorphic, including slates, schists,

[12] FERC eLibrary Accession number 20160523-5181.

gneisses, and granite with occasional diabase intrusions (Hilton 1995). Recharge of these aquifers is primarily the result of region-wide surficial infiltration of precipitation throughout the Piedmont and Blue Ridge Region, except in the lower parts of valleys. Due to the diversity of rock types and topography in the area, water level depth varies significantly, ranging from tens to hundreds of feet below land surface on hills and steep ridges at or near land surface in valleys (USGS 2010, USGS 1990).

The saprolite and fractured areas of the crystalline rock are capable of yielding groundwater at rates ranging from several gallons of water per minute for wells screened in saprolite to between 10 and 20 gallons per minute for wells screened in deeper, fractured rock (USGS 2002, USGS 2010). Water from the aquifers discharges as springs, seeps, and baseflow to streams. Surface water withdrawals from local rivers serve as the primary source of public water supply in the communities through which the Moore to Chappells Pipeline would pass and in which the Moore Compressor Station and Greenwood Town Border Station would be located. Groundwater is used to a lesser degree, as a local supply source for industrial use, livestock, and irrigation.

The Dillon Pipeline and the Project's remaining aboveground facilities (Southern Compressor Station, Dorchester Compressor Station, and Charleston Town Border Station) are or would be located within the Atlantic Coastal Plain physiographic province. More specifically, the Dillon Pipeline and the Southern Compressor Station would be or are located in the province's upper Coastal Plain and the Dorchester Compressor Station and Charleston Town Border Station would be located in the province's lower Coastal Plain.

The Atlantic Coastal Plain province is underlain by six regional aquifers and associated confining layers. The aquifers include, in order of increasing depth, the Surficial Aquifer, Floridan Aquifer, Tertiary Sand Aquifer, Black Creek Aquifer, Middendorf Aquifer, and Cape Fear Aquifer. Confining units intervene between individual aquifers, with the exception of the Floridan and Tertiary Sand Aquifers, which function as a single hydrologic unit. Confining units are primarily composed of clay, silt, or low-permeability limestone. Aquifers located within the Atlantic Coastal Plain area of South Carolina are recharged primarily through infiltration of precipitation at outcrop locations. Discharge from regional aquifers in South Carolina occurs primarily as base flow to rivers of the upper Coastal Plain, by confining unit leakage to overlying aquifers, and to nearby groundwater wells (USGS 2010).

The Surficial Aquifer is an unconfined surficial unit comprised of coastal terrace deposits of unconsolidated sand and shells. Recharge of this aquifer system is primarily the result of infiltration of precipitation, but in some places upward leakage can occur from the underlying Tertiary Sand Aquifer System. Tertiary Sand Aquifer sediments are characterized as fine to medium sand and clays of light greenish yellow to orange color. Aquifer recharge to the Tertiary Sand Aquifer is the result of infiltration of precipitation at the outcrops, but in some places recharge comes from the Surficial Aquifer system. Water from the Tertiary Sand Aquifer is commonly discharged to streams, rivers, and other waterbodies.

The Floridan Aquifer ranges in thickness from a feather edge, where it pinches out, to more than 700 feet in Beaufort County. In South Carolina, the aquifer is described as white to creamy-yellow limestone of late to middle Eocene age, and is composed of Ocala and Santee Limestone (USGS 2010). Recharge of the Floridan Aquifer occurs primarily through percolation through areas of unconfined or semiconfined well-drained uplands adjacent to areas of poorly developed stream drainage and many closed depressions (sinkholes). In 2000, an average of 63 million gallons per day (mgd) were withdrawn from wells located in the South Carolina portion of the Floridan Aquifer (USGS 2005).

The Black Creek Aquifer is composed of thin, laminated layers of permeable sediments consisting of fine to medium, grayish micaceous sands, and dark-gray to black clays. The aquifer outcrops in the upper Coastal Plain, near the Fall Line. Depth of the Black Creek Aquifer is variable between 300 and 600 feet throughout much of its extent, except the location where it pinches out at its

updip near the Fall Line (USGS 2010). Recharge of this aquifer is primarily the result of infiltration of precipitation at the outcrops in the upper Coastal Plain. Water from the Black Creek Aquifer flushes to the Middendorf Aquifer, and other large waterbodies in the vicinity of the aquifer outcrop in the upper Coastal Plain.

The Middendorf Aquifer System shares similar physical properties, characteristics, and geographic extent with the Black Creek Aquifer System; however, the composition of the Middendorf Aquifer System differs in that its geology consists of more massive sand. Sediments of this aquifer are primarily light gray, white, and buff sands with lenses of white, pink, or purple clays. The Middendorf Aquifer reaches thicknesses of 400 feet, but typically is around 200 feet thick.

The Cape Fear Aquifer System is the deepest or basal aquifer in the Coastal Plain system in South Carolina. The aquifer is composed of sand, silt, and gravel layers separated by thick layers of silt and clay (USGS 2010). Because of the depth of the system, it has not been well defined in South Carolina; although it is suspected that this aquifer system does not outcrop in South Carolina. The Cape Fear aquifer is rarely penetrated for well use because overlying, shallower aquifers produce more water, which is less mineralized (USGS 2010).

The upper Coastal Plain area in which the Dillon Pipeline would be located is underlain, in order of increasing depth, by the Surficial Aquifer, Tertiary Sand Aquifer, Black Creek Aquifer, Middendorf Aquifer, and Cape Fear Aquifer (USGS 2010). Each aquifer unit is separated from the underlying aquifer by a confining unit. The Middendorf Aquifer serves as the primary water supply aquifer in this area. The publically-owned City of Dillon Water and Sewer Department withdraws approximately 1.4 mgd from 5 wells and the privately-owned Trico Water Company withdraws approximately 3.0 mgd from 15 wells. Lesser supplies of water are withdrawn locally from the Surficial Aquifer and Black Creek Aquifer.

The Southern Compressor Station is also located in the upper Coastal Plain, in an area underlain, in order of increasing depth, by the Surficial Aquifer, Upper Floridan Aquifer, Floridan Aquifer, Tertiary Sand Aquifer, Black Creek Aquifer, and Middendorf Aquifer (USGS 2010). Each aquifer unit is separated from the underlying aquifer by a confining unit. Groundwater withdrawals for water in Aiken County in the vicinity of the Southern Compressor station are primarily from the Middendorf Aquifer.

The Dorchester Compressor Station and Charleston Town Border Station would be located in the lower Coastal Plain, in an area underlain, in order of increasing depth, by the Surficial Aquifer, Upper Floridan Aquifer, Floridan Aquifer, Tertiary Sand Aquifer, Black Creek Aquifer, and Middendorf Aquifer (USGS 2010). Each aquifer unit is separated from the underlying aquifer by a confining unit. Water supply in Dorchester County in the vicinity of the proposed site is derived from a mix of surface water withdrawals and groundwater withdrawals. Groundwater withdrawals in this area are primarily from the Tertiary Sand Aquifer (referred locally as the Black Mingo formation) and Black Creek Aquifer.

Sole Source Aquifers and Wellhead Protection Areas

The U.S. Environmental Protection Agency (USEPA) oversees the Sole Source Aquifer (SSA) Protection Program to protect high production aquifers that supply 50 percent or more of the region's water supply (USEPA 2015a). The program is administered under Section 1424(e) of the Safe Drinking Water Act of 1974 and requires the USEPA to review and approve federal financially assisted projects located within SSA regions that have the potential to create a significant hazard to public health. The USEPA Region 4 SSA map indicates that there are no SSAs in the Project area. The nearest SSA is the Volusia-Floridan Aquifer located in Volusia County, Florida, over 400 miles south of the Project area (USEPA 2015a).

Based on a review of mapping provided in the SCDHEC Watershed Atlas (SCDHEC, 2016) and Dominion's consultation with SCDHEC Bureau of Water, there are no wellhead protection areas within 150 feet of Project construction.

Public and Private Water Supply Wells

Based on a review of mapping provided in SCDHEC's Watershed Atlas (SCDHEC, 2016) and Dominion's consultation with the SCDHEC Bureau of Water, there are no public water supply wells within 150 feet of the limits of Project construction. Dominion identified 9 private water supply wells within 150 feet of the Moore to Chappells Pipeline and 4 wells within 150 feet of access roads, based on Dominion's consultation with landowners and field (civil) surveys (see table B.2-1).

TABLE B.2-1
Private Water Supply Wells Within 150 Feet of the Transco to Charleston Project a/

Facility	County	Approximate MP	Approximate Distance from Construction Area (feet)	Parcel Number
Moore to Chappells Pipeline				
Pipeline	Spartanburg	5.5R	47.5	Old Switzer Rd./
Pipeline	Spartanburg	15.4	31.3	S-199 ROW
Pipeline	Spartanburg	5.6R	95.7	4-21-00-001.00
Pipeline	Spartanburg	15.4	31.3	4-55-00-076.00
Pipeline	Spartanburg	15.4	9.8	4-55-00-076.00
Pipeline	Spartanburg	15.5	64.4	4-55-00-076.00
Pipeline	Spartanburg	15.8R	5.6	4-55-00-072.01
Access Road	Laurens	18.8R	8.9	525-00-00-001
Permanent Access Road	Laurens	20.4	4.3	526-00-00-003
Permanent Access Road	Laurens	20.5R	51.8	526-00-00-003
Temporary Access Road	Laurens	22	15.6	528-00-00-016
Pipeline	Newberry	51.2	143.8	--
Pipeline	Newberry	51.3	144.2	--

a No private water supply wells were identified within 150 feet of the Dillon Pipeline or aboveground facilities.

Dominion would perform pre-construction and post-construction testing of water quality and yield on water supply wells within 150 feet of the proposed construction work area, in accordance with Dominion's Well Testing Plan[13]. If the results of testing indicate a water supply's quantity or quality is impacted during construction, Dominion would provide an alternate water supply source or pay damages to the landowner for a new, analogous well. Dominion would file a report with the Secretary of the Commission within 30 days of completion of construction detailing any landowner complaints received regarding well quality and yield. Reports would further describe how the complaints were addressed and/or resolved. Because Dominion would implement these protective measures, we conclude that the Project would not have a significant impact on public and private water supply wells.

[13] FERC eLibrary Accession number 20160309-5161.

Impacts and Mitigation

The majority of the activities associated with the Project's pipelines and associated aboveground facilities would involve shallow, temporary, and localized excavations that are not likely to result in significant impacts to groundwater resources in the Project area. However, trench excavation could intersect the water table in low-lying areas where groundwater is near the surface, such as immediately adjacent to surface waterbodies and wetland areas. Clearing and grading activities within pipeline rights-of-way and similar activities and addition of impervious surfaces at aboveground facilities can affect overland flow patterns and recharge rates. Soil compaction, both intentional and inadvertent by heavy construction vehicles, can also reduce water infiltration and recharge rates. Trenching, backfilling, and trench dewatering activities could affect local groundwater table elevations, and possibly temporarily impact water supply wells located in the immediate vicinity of the construction area.

The direct and indirect impacts on groundwater resources would be temporary and would not significantly affect groundwater resources. Impacts would be avoided or minimized by the use of construction techniques contained in the T2C Plan and T2C Procedures (e.g., temporary and permanent trench plugs, decompaction, and revegetation). Upon completion of construction, Dominion would restore the ground surface as closely as practicable to original contours and revegetate the right-of-way to ensure restoration of pre-construction overland flow and recharge patterns. Dominion would also conduct compaction testing in residential and agricultural areas and mitigate severely compacted soils through the use of deep tillage operations to increase the water infiltration and groundwater recharge.

Groundwater resources could also be potentially adversely affected by contamination from spills or leaks of fuels, lubricants, hydraulic fluids, and coolant from construction equipment. However, the impacts of such contamination are typically minor and localized due to the low frequency of occurrence and limited volumes of spills and leaks. Measures outlined in Dominion's SPHMM Plan would be implemented to reduce potential impacts from spills of hazardous materials used during construction. These measures include: daily inspection of equipment for signs of leaks, damage, and signs of deterioration which could result in a leak; appropriate management of hazardous material, chemical, and petroleum containers and tanks to prevent, minimize, and control a potential spill or release; storage of such materials at least 100 feet from a wetland or waterbody boundary and at least 200 feet from a private water well; properly training employees regarding the handling of fuels and other hazardous materials; easily accessible spill kits to contain and clean up inadvertent spills; and promptly reporting any spills to the appropriate agencies.

Based on Dominion's proposed construction techniques and the implementation of minimization and mitigation measures, we conclude that construction and operation of the Project would not significantly impact groundwater resources in the Project area.

2.2 Surface Water

Existing Surface Water Resources

The Moore to Chappells Pipeline would cross 73 waterbodies, including 41 perennial streams, 24 intermittent streams, 6 ephemeral streams, and 2 jurisdictional ditches. The 73 waterbody crossings along the Moore to Chappells Pipeline would consist of 2 major crossings (greater than 100 feet wide), 34 intermediate crossings (between 10 and 100 feet wide), and 37 minor crossings (less than 10 feet wide).

The Dillon Pipeline would cross 11 waterbodies, including 2 perennial streams, 1 pond, and 8 jurisdictional ditches. The 11 waterbody crossings along the Dillon Pipeline would consist of 3 intermediate crossings (between 10 and 100 feet wide), and 8 minor crossings (less than 10 feet wide). No waterbodies would be affected by construction or operation of proposed aboveground facilities.

The milepost location, feature ID, waterbody name, waterbody type (flow regime), approximate crossing width, FERC classification, state water quality classification, fisheries classification, and proposed method of crossing for all surface waters that would be crossed by the Project are provided in appendix E.

Project pipelines and aboveground facilities would be located within the following major river basins: Broad River Basin, Saluda River Basin, Pee Dee River Basin, Edisto River Basin, Savannah River Basin, and Santee River Basin. Table B.2-2 indicates the major river basins and the specific USGS Hydrologic Unit Code 10-digit (HUC 10) watersheds in which Project pipelines and aboveground facilities would be located.

TABLE B.2-2
Watersheds Crossed by the Project

Facility	Major River Basin	HUC 10 Watershed	HUC 10 No.	Approximate Milepost (MP) Location
Moore to Chappells Pipeline				
Pipeline	Broad River Basin	North Tyger River	305010702	MP 0.0 – MP 0.3
Pipeline and Access Roads	Broad River Basin	South Tyger River	305010703	MP 0.3 – MP 8.9R
Pipeline and Access Roads	Broad River Basin	Tyger River	305010705	MP 8.9R – MP 11.6
Pipeline and Access Roads	Broad River Basin	Middle Enoree River	305010802	MP 11.6 – MP 23.3
Pipeline and Access Roads	Broad River Basin	Duncan Creek	305010803	MP 23.3 – MP 29.0R
Pipeline and Access Roads	Saluda River Basin	Little River - Saluda River	305010909	MP 29.0R – MP 49.0R
Pipeline	Saluda River Basin	Bush River - Saluda River	305010912	MP 49.0R – MP 49.7R
Pipeline and Access Roads	Saluda River Basin	Lake Greenwood - Saluda River	305010908	MP 49.7R – MP 51.6
Pipeline and Access Roads	Saluda River Basin	Bush River - Saluda River	305010912	MP 51.6 – MP 53.5
Dillon Pipeline				
Pipeline and Access Roads	Pee Dee River Basin	Buck Swamp	304020404	MP 0.0 – MP 5.0
Pipeline	Pee Dee River Basin	Middle Little Pee Dee River	304020405	MP 5.0 – MP 5.28
Aboveground Facilities *Moore Compressor Station*				
Compressor Station	Broad River Basin	South Tyger River	305010703	MP 2.0R
Dorchester Compressor Station				
Compressor Station	Edisto River Basin	Indian Field Swamp	305020602	NA
Southern Compressor Station				
Compressor Station	Savannah River Basin	Horse Creek	306010602	NA
Charleston Town Border Station				
OPP Station	Santee River Basin	Cooper River	305020107	NA

TABLE B.2-2
Watersheds Crossed by the Project

Facility	Major River Basin	HUC 10 Watershed	HUC 10 No.	Approximate Milepost (MP) Location
Greenwood Town Border Station				
OPP Station	Saluda Basin	Bush River - Saluda River	305010912	NA

State waters in South Carolina are classified based on their designated use. All of the waterbodies crossed by Project pipelines are classified as freshwater (FW). Waters classified as FW are designated as suitable for primary and secondary contact recreation and as a source for drinking water supply after conventional treatment in accordance with SCDHEC requirements. FW waters are suitable for fishing and the survival and propagation of a balanced indigenous aquatic community of fauna and flora and are also suitable for industrial and agricultural uses.

Sensitive Surface Waters

The Project would not cross waterbodies listed on the SCDHEC 2014 Section 303(d) list of impaired waters. The Project would cross several waterbodies that are located within a watershed with an approved total maximum daily load (TMDL) report but are not achieving designated use attainment status. Proposed crossings of the Moore to Chappells Pipeline of the South Tyger River (MP 4.6R), Jimmies Creek (MP 9.7), and the Little River (MP 38.7) are stream crossings that are in an approved TMDL watershed, but not achieving attainment for their designated use due to fecal coliform contamination. All three crossings would be achieved via HDD.

Project pipelines and facilities would not cross or otherwise affect any Outstanding National Resource Water, Outstanding Resource Water, South Carolina State Scenic River, National Wild and Scenic River, or waters of particular ecological and recreational importance.

Dominion identified several waterbodies with adjacent riparian areas with the following criteria:

- perennial stream features or named streams or rivers that were a minimum of 20 feet wide, with the presence of associated bottomland hardwood floodplain habitat; and
- perennial stream features or named streams or rivers that were a minimum of 20 feet wide, with the presence of associated bottomland hardwood floodplain habitat; and unnamed tributaries of perennial or named features greater than 5 feet wide that were connected to perennial or named streams and associated bottomland hardwood floodplain habitat. A list of these crossing locations is provided in table B.2-3.

TABLE B.2-3
Riparian Areas Crossed by the Project

Milepost	Waterbody /Ditch ID	Waterbody Name	Waterbody Type	Channel Width (feet)	Proposed Crossing Method
Moore to Chappells Pipeline					
4.6R	2070-TP	Unnamed Tributary to South Tyger River	Perennial	5	HDD

TABLE B.2-3
Riparian Areas Crossed by the Project

Milepost	Waterbody /Ditch ID	Waterbody Name	Waterbody Type	Channel Width (feet)	Proposed Crossing Method
4.6R	5007-TP	South Tyger River	Perennial	80	HDD
6.8	2004-TP	Ferguson Creek	Perennial	50	HDD
9.7	1032-TP	Jimmies Creek	Perennial	20	HDD
10.2R	1048-TP	Unnamed Tributary to Jimmies Creek	Perennial	10	Flume/Dam-and-Pump
10.3R	1097-TP	Unnamed Tributary to Jimmies Creek	Perennial	7	Within the Project's temporary workspace
10.9R	1089-TP	Unnamed Tributary to Jimmies Creek	Perennial	10	Flume/Dam-and-Pump
12.3	2001-TP	Unnamed Tributary to Two Mile Creek	Perennial	10	Flume/Dam-and-Pump
15.0	2014-TP	Hannah Creek	Perennial	20	HDD
16.9R	4001-TP	Enoree River	Perennial	110	HDD
17.7	4008-TP	Unnamed Tributary to Enoree River	Perennial	35	Flume/Dam-and-Pump
20.2	1079-TP	Warrior Creek	Perennial	30	HDD
22.4 **a/**	3025-TP	Unnamed Tributary to Enoree River	Perennial	18	HDD
24.6	2018-TP	Duncan Creek	Perennial	25	HDD
25.5	2017-TP	Long Branch	Perennial	15	HDD
26.8	2022-TP	Unnamed Tributary to Enoree River	Perennial	8	Flume/Dam-and-Pump
53.2	1043-TP	Saluda River	Perennial	237	HDD
Dillon Pipeline					
2.1	3031-PFO	Reedy Creek	Forested Wetland	Braided undefined channel	HDD

a Also crossed by Access Road AR-119.00

Source Water Protection Areas

The Moore to Chappells Pipeline would cross source water protection areas (SWPAs) of public water supply intakes at several locations, including intakes for the Woodruff Roebuck Water District, the City of Clinton, and the City of Newberry.

The Woodruff Roebuck Water District has water supply intakes on the South Tyger River and North Tyger River. The Moore to Chappells Pipeline would also cross the South Tyger River and its tributaries (including Ferguson Creek and its tributaries) between MP 1.2 and MP 8.6 within the Woodruff Roebuck Water District SWPA. Each of these crossings would be HDD except for a crossing of an unnamed tributary of Ferguson Creek that would be dry cut or crossed using flume or damp-and-pump methods. The minimum distance from one of these crossings to the downstream intake (crossings of Ferguson Creek and its tributaries) is 2.5 miles.

The City of Clinton has a primary water supply intake on the Enoree River and an emergency intake on Duncan Creek (a tributary of the Enoree River). The Moore to Chappells Pipeline would cross

the Enoree River and its tributaries (including Hannah Creek, Buckhead Creek, Warrior Creek, Duncan Creek, and their tributaries) between MP 12.3 and MP 25.0 within the City of Clinton SWPA. The minimum distance from one of these crossings to the downstream Enoree River intake (crossing of Warrior Creek) is more than 3 miles. The minimum distance from one of these crossings to the downstream Duncan Creek emergency intake (crossing of Duncan Creek) is 1.7 miles. The crossing of Duncan Creek would be by HDD. If no water is flowing at the time of the crossing, the crossing of the Duncan Creek tributary would be by an open cut method. If flow is present, the crossing would be achieved by flume or dam-and-pump crossing methods.

The City of Newberry has a water supply intake on the Saluda River. The Moore to Chappells Pipeline would cross the Saluda River and its tributaries (including Mills Creek and Pages Creek and their tributaries) by HDD between MP 45.5R and MP 53.2 within the City of Newberry SWPA. The minimum distance from one of these crossings to the downstream intake (crossing of Pages Creek) is 10 miles.

Clean Water Rule

Dominion acknowledges that on June 29, 2015, the U.S. Environmental Protection Agency (USEPA) published the final Clean Water Rule in the Federal Register. It became effective on August 28, 2015, and has the potential to alter the jurisdictional classification of headwater drainage features and/or Carolina Bays that the Project may cross. However, on October 9, 2015, the U.S. Court of Appeals for the Sixth Circuit stayed the Rule pending further review by the Courts.

To address potential implementation of the Rule, Dominion would conduct additional evaluation of the desktop analysis and field survey results and reclassify features, as necessary, to comply with the Clean Water Rule. Presently, Dominion does not anticipate the need to change the Project construction methods for these crossings and would conduct these activities in accordance with the T2C Plan and T2C Procedures.

Impacts and Mitigation

Pipeline construction could affect surface waters in several ways. Clearing and grading of stream banks, in-stream trenching, trench dewatering, and backfilling could affect waterbodies through modification of existing aquatic habitat, an increased rate of in-stream sediment loading, increased turbidity levels, reduced dissolved oxygen concentrations, and introduction of chemical discharges from fuels/lubricants.

The clearing and grading of the waterbody banks would disturb the riparian vegetation and soils, exposing the sites to erosion/deposition. Heavy equipment used during construction could compact upland and riparian soils, which could reduce infiltration and cause greater runoff to waterbodies. Refueling of vehicles and storage of fuel, oil, or other hazardous materials near surface waters and spills from equipment working in waterbodies could create a potential for contamination, which, if a spill were to occur, could degrade downstream water quality and aquatic habitat.

The greatest potential impacts of pipeline construction would result from an increase in sediment loading to surface waters and an increase in internal sediment loading due to channel/floodplain instability as a result of a change in erosion/deposition patterns. The level of impact of the Project on surface waters would depend on the duration of construction activities, precipitation events, sediment loads, stream area/velocity, channel integrity, and bed material.

As discussed in more detail below, the primary means by which the Project would avoid sediment-related impacts associated with waterbody crossings would be by using HDD or conventional bore method to conduct the crossings. The Project would use HDD methods at the crossings of major

waterbodies (Enoree River and Saluda River) and many intermediate waterbodies. Dominion would use a conventional bore method for crossing of several jurisdictional ditches along the Dillon Pipeline route.

Waterbodies not crossed by HDD or bore methods would be crossed using a dry-ditch method (e.g. flume or dam-and-pump). The highest levels of sediment associated with waterbody crossings would be typically generated when using a wet open-cut crossing method; however, Dominion would not use a wet open-cut method. The Project would only use an open-cut trenching method when no water is flowing at the time of the crossing. If water is flowing and there are sensitive species known to be present in the waterbody, the crossing would be achieved using flume methodology. If water is flowing and sensitive species are not known to be present in the waterbody, the crossing would be achieved using dam-and-pump methodology. Section A.7.2 of this EA describes these crossing methods in further detail.

Use of the HDD, bore, flume, or dam-and-pump methods would minimize the amount of sedimentation that would occur during the crossing. The amount of sediment would depend on the characteristics at the crossing location, including depth and width of the stream, which affects mixing of the sediment plume in the water column. Sedimentation would also be influenced by the current velocity and local turbulence at and downstream of the crossing location; concentrations of suspended sediment initially at the crossing location and at some distance downstream; particle diameter; specific weight; and, settling velocity of the excavated and backfilled materials. Sediment releases would be greatest when installing and removing the dam and/or flume from the waterbody. Turbidity usually peaks during removal of the dam and/or flume and declines rapidly when the streambed disturbance ceases. Dominion would restore the contours of the streambed to approximate pre-construction contours.

While implementation of the HDD method would avoid sediment related impacts, a potential for inadvertent release of drilling fluid could result in direct or indirect impacts on the waterbody. HDD failures and inadvertent releases can occur if certain geologic and soil conditions are encountered. These conditions could potentially cause the hole to collapse or the drilling fluid to be released to the surface. Dominion conducted geotechnical studies to evaluate the subsurface conditions and the potential risks of using the HDD method. The results from the geotechnical studies indicate that with implementation of appropriate construction techniques, the conditions are favorable and suggest that the HDD method can be successfully used. In the unanticipated event that the HDD method fails and proves infeasible, Dominion would notify the FERC, SCDHEC, and the U.S. Army Corps of Engineers (USACE) to discuss alternative crossing methods.

Although drilling mud consists of nontoxic materials, if drilling mud were to be released into a waterbody in large quantities, it could affect fisheries or other aquatic organisms by causing turbidity in a waterbody, temporarily coating the waterbody bed with a layer of clay, and/or affecting the gills of fish and other aquatic organisms (see section B.2.4). The probability of an inadvertent release is greatest when the drill bit is working near the surface (i.e., near the entry and exit points). Because the staging areas for the HDDs would be set back from the banks of the waterbodies, the potential for an inadvertent release to occur in the water would be minimized. To further minimize potential impacts of inadvertent releases of drilling fluids, Dominion would implement the measures identified in its Horizontal Directional Drill Contingency and Inadvertent Release Plan, which we have reviewed and find acceptable. These measures include:

- visually inspecting the drill path (ground surface and surface water) for evidence of a release;
- monitoring of the drilling mud pressures and return flows;
- storing containment equipment on-site including portable pumps, hand tools, hay bales, and silt fencing; and

- notifying the FERC, SCDHEC, USACE, and other appropriate agencies if a release occurs.

Pipeline waterbody crossings upstream of SWPAs maintained by the Woodruff Roebuck Water District, City of Clinton, and City of Newberry are not likely to affect the quality of public surface water in these areas. All but one of these crossings (an unnamed tributary of Ferguson Creek 1.7 miles upstream of a source water intake in the City of Clinton) would be accomplished via HDD. The unnamed tributary of Ferguson Creek would be crossed using open cut methods (if dry) or flume or dam-and-pump methods (if water is flowing). Dominion's proposed crossing methods would avoid or minimize direct disturbance to these waterbodies. In areas where the HDD method is proposed, hand-clearing of small-diameter vegetation in heavily vegetated areas would be required for laying the HDD telemetry cable. A temporary, localized increase in turbidity could occur in the event of an inadvertent release (frac-out) of drilling fluid (bentonite and water). To minimize the potential impacts of a frac-out, Dominion would implement its HDD Contingency Plan. Given the proposed construction methods and implementation of the HDD Contingency Plan, we do not anticipate impacts on the source water intakes. However, to ensure coordination with the public water supply intake operators within 3 miles of Project waterbody crossings, we recommend that:

Prior to construction, Dominion should contact the Woodruff Roebuck Water District and the City of Clinton to determine notification procedures in regard to construction of the Project within 3 miles of the public water supply intakes, and file documentation of this consultation with the Secretary.

Long-term impacts associated with pipeline operations and maintenance would be relatively minor and limited to periodic clearing of the vegetation within the permanent right-of-way at waterbody crossings. Dominion would allow for riparian areas to revegetate. Clearing within 25 feet of waterbodies would be limited to a 10-foot-wide corridor over the pipeline being maintained in an herbaceous state, and trees within 15 feet of the pipeline with roots that could compromise the integrity of the pipeline coating would be selectively cut and removed. In addition, no routine vegetation mowing or clearing would be performed in riparian or wetland areas located between HDD entry and exit locations.

Dominion would locate extra workspaces at least 50 feet back from waterbody boundaries, except as specifically noted in the T2C Procedures. Dominion identified five locations along the Moore to Chappells Pipeline route (M.P 1.2, 10.8R, 13.3R, 17.5R, and 31.1R) where it could not establish a 50-foot setback between extra workspaces and waterbodies due to constructability constraints. In each of these cases, Dominion has proposed a 10-foot setback between the extra workspace and the top of bank of the waterbody. Dominion would install and maintain a double row of silt fencing at the edge of the workspace and at the top of bank of the waterbody. We have reviewed these each of these locations and find Dominion's proposed measures for these extra workspaces acceptable.

Dominion would minimize impacts on waterbodies by implementing measures outlined in the T2C Procedures, including:

- locating extra workspaces at least 50 feet back from waterbody boundaries unless a reduced setback is requested with sufficient justification on a site-specific basis;

- storing hazardous materials, chemicals, lubricating oils, and fuels used during construction in upland areas at least 100 feet from waterbodies;

- no parking or refueling of equipment within 100 feet of waterbodies. If no other practical alternative exists, EIs may approve refueling within 100 feet of a waterbody, provided that additional precautions such as continual monitoring of fuel transfer, secondary

containment structures, and utilization of spill kit readiness are employed;

- requiring temporary erosion and sediment control measures to be installed across the construction right-of-way as necessary to prevent the flow of spoil or heavily silt-laden water into any waterbody;

- maintaining adequate flow rates throughout construction to protect aquatic life and prevent the interruption of existing downstream uses;

- designing and maintaining equipment bridges to prevent soil from entering the waterbody;

- restricting spoil placement near surface waters within the construction right-of-way at least 10 feet from the water's edge or in other approved additional extra workspaces away from the water's edge; and

- restricting construction equipment operating in waterbodies to only that which is needed to clear the right-of-way, dig the trench, install the pipeline, backfill the trench, and restore the right- of-way.

Dominion would implement BMPs outlined in its T2C Procedures to minimize impacts during construction activities in the vicinity of all waterbodies. Based on Dominion's proposed construction techniques and the implementation of minimization and mitigation measures, we conclude that construction and operation of the Project would not significantly impact surface water resources in the Project area.

2.3 Wetlands

Wetlands are defined by the USACE (33 CFR 328.3, 1986) and USEPA (40 CFR 230.3, 1980) as "areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and that under normal conditions do support, a prevalence of vegetation typically adapted for life in saturated soil conditions."

Wetlands and other water features including seasonal, ephemeral, intermittent, and perennial waterbodies (as discussed in section B.2.2) may be jurisdictional Waters of the U.S. as regulated by the USACE. The USACE defines jurisdictional Waters of the U.S. as all waters that are currently used, or were used in the past, or may be susceptible to use in interstate or foreign commerce. Jurisdictional Waters of the U.S. include all waters that are subject to the ebb and flow of the tide, all interstate water including interstate wetlands, and all other waters such as intrastate lakes, rivers, streams (including intermittent streams and modified streams used as canals), mudflats, sandflats, wetlands, sloughs, prairie potholes, wet meadows, playa lakes, or natural ponds, the use degradation or destruction of which could affect interstate or foreign commerce. Wetlands adjacent to jurisdictional Waters of the U.S. are also under USACE jurisdiction.

To determine the spatial extent of wetlands within the Project area, Dominion conducted a wetlands and waterbodies determination and delineation using the USACE Wetlands Delineation Manual, Technical Report Y-87-1 (USACE 1987), the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Eastern Mountains and Piedmont Region (USACE 2012), and the Regional Supplement to the Corps of Engineers Wetland Delineation Manual: Atlantic and Gulf Coastal Plan Region (USACE 2010). Wetland types were assigned based on the National Wetlands Inventory (NWI) classifications as described in Cowardin et al. (1979) (Dominion 2016).

Table B.2-4 summarizes the wetlands identified within the Project footprint. In summary, the Moore to Chappells Pipeline would cross two palustrine emergent (PEM), one palustrine scrub-shrub (PSS), and five palustrine forested (PFO) wetlands; and the Dillon Pipeline would cross two PFO wetlands. These wetlands would be avoided by HDD or conventional-bore construction methods as discussed below. No wetlands were identified within any of the aboveground facility sites.

TABLE B.2-4
Wetlands Identified Within the Project Area

Facility	Wetland Type	Area (acres)	Wetland ID	Milepost	Length of Crossing (feet)	Construction Impacts (acres) a/	Operation Impacts (acres) a/	Proposed Crossing Method
Moore to Chappells Pipeline								
Pipeline	PSS	0.03	3011-PSS	20.8	16	0.0	0.0	Bore
Pipeline	PEM	0.39	2019-PEM	24.6	341	0.0	0.0	HDD
Pipeline	PFO	0.02	2026-PFO	28.3	35	0.0	0.0	HDD
Pipeline	PEM	0.14	1100-PEM	42.2R	142	0.0	0.0	HDD
Pipeline	PFO	0.05	8018-PFO	45.7	37	0.0	0.0	HDD
Pipeline	PFO	0.02	1046-PFO	52.7	15	0.0	0.0	HDD
Pipeline	PFO	0.07	9044-PFO	52.7	32	0.0	0.0	HDD
Pipeline	PFO	0.00	1041-PFO	53.1	23	0.0	0.0	HDD
Dillon Pipeline								
Pipeline	PFO	0.78	3002-PFO	0.3	706	0.0	0.0	HDD
Pipeline	PFO	2.03	3031-PFO	2.6	1,765	0.0	0.0	HDD
Total						*0.0*	*0.0*	--

a Dominion would cross all wetlands using the HDD or bore method; therefore, there would be no construction or operation impacts on these wetlands.

Impacts and Mitigation

The wetland crossing methods proposed for the Project include HDD and horizontal boring methodologies, and are described in detail in section A.7.2 and presented in appendix F. Construction activity in wetlands crossed by the HDD method would be limited to hand clearing of a small path to allow placement and surveying of an electric guide wire along the ground surface between the HDD entry and exit points, where necessary. Conventional bore methods would not require surface activity. The permanent right-of-way through forested wetlands would not require tree clearing per USDOT standards (49 CFR 192) because of the proposed depth of the pipeline. As such, no construction or operational-related impacts on wetlands are anticipated.

Construction near wetlands would be performed in accordance with T2C Procedures and applicable federal and state permits. Inadvertent spills of fluids used during construction, such as fuels, lubricants, and solvents, could contaminate wetland soils and vegetation. To reduce the risks associated with the handling, use, storage, transportation, generation, and disposal of hazardous materials and wastes typically associated with construction of pipeline facilities, Dominion would implement its SPHMM Plan. Measures presented in the aforementioned plans include, but are not limited to the following:

- hazardous materials, chemicals, lubricating oils, and fuels used during construction would be stored in upland areas at least 100 feet from wetland boundaries;

- no equipment would be parked and/or refueled within 100 feet of wetland boundaries. If no other practical alternative exists, EIs may approve refueling within 100 feet of a wetland, provided that additional precautions such as continual monitoring of fuel transfer, secondary containment structures, and utilization of spill kit readiness are employed;

- concrete coating activities would be performed at least 100 feet from wetland boundaries, unless the location is an existing industrial site designated for such use; and

- in rare instances, fractures in the underlying sediments can result in the loss of down-hole mud pressure resulting in a release of drilling fluid to surface waters. In this event, Dominion would implement its Transco to Charleston Project Horizontal Directional Drilling Contingency and Inadvertent Release Plan.

Based on the proposed construction techniques, implementation of the proposed avoidance and minimization measures, and the limited duration of construction activities, we conclude that impacts on wetlands would not be significant.

2.4 Hydrostatic Testing

Project pipeline components would be tested in accordance with the requirements of USDOT regulations in 49 CFR 192 and Dominion's testing specifications to verify integrity and to ensure the ability of the newly constructed pipeline to withstand designed MAOP. Hydrostatic testing would be conducted for the completed pipeline components and HDD sections prior to operation. Testing would involve filling a pipeline segment with water, pressurizing water in the segment, checking for losses due to pipeline leakage, depressurizing the water, and removing and discharging the water.

Approximately 1,842,000 gallons of water would be required to test the Moore to Chappells Pipeline and 22,556 gallons of water to test the Dillon Pipeline. Dominion would obtain hydrostatic test water for the Moore to Chappells Pipeline from existing potable public water distribution systems or by a surface water withdrawal from a major waterbody such as the South Tyger River, Enoree River, and/or Saluda River. Because Dominion has not described its plans for discharging water associated with hydrostatic testing, **we recommend that**:

> **Prior to construction, Dominion should file with the Secretary the locations, rates, and volumes of water that would be withdrawn from surface waters for hydrostatic testing activities. This should include the watershed associated with the source water, and the respective discharge location.**

Dominion would obtain hydrostatic test water for the Dillon Pipeline from existing potable public water distribution systems.

Dominion would be required to obtain SCDHEC's NPDES General Permit for Hydrostatic Test Water Discharges (No. SCG670000) prior to any withdrawal or discharge of test water. In accordance with the general permit and Dominion's Surface Water Withdrawal Plan[14], Dominion would implement the following measures to minimize potential impacts of surface water withdrawals:

[14] FERC eLibrary Accession numbers 20160523-5161 and 20160523-5181.

- screening the surface skimmer connect to intake hose to minimize the potential entrainment of fish;;

- minimizing the impingement of fish on the skimmer screen by controlling pumping rates so that the average approach velocity of intake water, calculated perpendicular to the screen, would not exceed 0.5 feet per second; and

- restricting withdrawal from a surface waterbody to periods when minimum in-stream flow (flow that provides an adequate supply of water at the surface water withdrawal point to maintain the biological, chemical, and physical integrity of the stream) are at least 40 percent of the mean annual daily flow for the months of January, February, March, and April; 30 percent of the mean annual daily flow for the months of May, June, and December; and 20 percent of the mean annual daily flow for the months of July through November.

Following completion of hydrostatic testing of pipeline facilities, test water would be discharged into a densely vegetated upland area in order to minimize environmental impacts. Appropriate BMPs (energy dissipation devices, containments structures, etc.) would be implemented to minimize erosion and sedimentation at designated discharge points per the T2C Procedures and any federal, state, or local requirements. The use of biocides or other hydrostatic test water additives would not be required due to the short residence time of the test water in the pipeline system and chemical agents would not be used to dry the pipeline after testing. We conclude that the withdrawal and discharge of hydrostatic test water would not result in significant impacts on waterbodies in the Project area.

3. Fisheries, Vegetation, Wildlife, and Special Status Species

3.1 Fisheries and Essential Fish Habitat

Existing Fisheries Resources

As discussed in section B.2.2, a total of 84 waterbodies, including 43 perennial streams, 24 intermittent streams, 6 ephemeral streams, 10 jurisdictional ditches, and 1 pond were identified within the Project area.

The fishery type of each waterbody can be classified by its physical, chemical, and biological characteristics, including salinity, temperature, and quality. All aforementioned waterbodies are classified by the SCDHEC as freshwater, and provide habitat for warmwater fish species only. No coldwater fisheries are present within the Project area.

There are four surface water classes for freshwaters in South Carolina: (1) outstanding national resource waters, (2) outstanding resource waters, (3) trout waters, and (4) freshwaters. No waterbodies within the Project area are classified as outstanding national resource waters, outstanding resource waters, or trout waters. Freshwaters are defined by SCDHEC as waters 'suitable for the survival and propagation of aquatic life; fishing and primary and secondary recreational contact and as drinking water source. Suitable also for industrial and agricultural uses.' Representative warmwater fish species, including game and commercial species, that may occur in the Project area are listed in table B.3-1.

Fisheries of Special Concern

Essential Fish Habitat

Essential Fish Habitat (EFH) is defined as "those waters and substrate necessary to fish for spawning, breeding, feeding or growth to maturity" and are managed by the National Oceanic and Atmospheric Administration - National Marine Fisheries Service (NOAA Fisheries), pursuant to the Magnuson-Stevens Fishery Conservation and Management Act.

No EFH was identified in the Project area, and the nearest EFH is located approximately 6 miles from the proposed Charleston Town Border Station. As a result, no impacts on EFH are anticipated as a result of the Project.

TABLE B.3-1
Representative Game and Commercial Warmwater Fish Species that may Occur Within the Project Area

Common Name	Latin Name
American shad	*Alosa sapidissima*
Black crappie*	*Pomoxis nigromaculatus*
Blue catfish	*Ictalurus furcatus*
Blueback herring	*Alosa aestivalis*
Bluegill*	*Lepomis macrochirus*
Chain pickerel	*Esox niger*
Channel catfish	*Ictalurus punctatus*
Flier*	*Centrarchus macropterus*
Gizzard shad	*Dorosoma cepedianum*
Green sunfish*	*Lepomis cyanellus*
Hickory shad	*Alosa mediocris*
Hybrid bass*	*Morone saxatilis*
Largemouth bass*	*Micropterus salmoides*
Pumpkinseed sunfish*	*Lepomis gibbosus*
Redbreast sunfish*	*Lepomis auritus*
Redear sunfish*	*Lepomis microlophus*
Redeye bass*	*Micropterus coosae*
Redfin pickerel*	*Esox americanus*
Smallmouth bass*	*Micropterus dolomieu*
Spotted bass*	*Micropterus punctulatus*
Spotted sunfish*	*Lepomis punctatus*
Striped bass*	*Morone saxatilis*
Threadfin shad	*Dorosoma petenense*
Walleye*	*Sander vitreus*
Warmouth*	*Lepomis gulosus*
White bass*	*Morone chrysops*
White crappie*	*Poxomis annularis*
Yellow perch*	*Perca flavescens*

* Indicates game fish.

Source: SCDNR 2015a.

Commercial Fisheries

In consultation with the SCDNR, Dominion identified two commercial fisheries within and near the Project area. Commercial fishing exists on Lake Greenwood and the Middle Reach of the Saluda River (defined by SC Code of Laws §50-1-50 and §50-13-675). The Moore to Chappells Pipeline would not cross Lake Greenwood, and Dominion would use the HDD method to cross the Middle Reach of the Saluda River below the Lake Greenwood dam; therefore, we do not anticipate any adverse effects to these fisheries.

Special Status Species

Special status fish and aquatic species, including federally listed, state endangered and threatened species, SCDNR Priority State Listed species, and At Risk Species are discussed in section B.3.3, Special Status Species.

Impacts and Mitigation

Dominion would cross streams that are dry at the time of construction using upland construction techniques. Dominion would cross small flowing waterbodies by flume and dam-and-pump techniques. Large waterbodies (e.g., rivers) would be crossed by HDD methods. These construction methods are described in section A.7.

A successful HDD crossing would avoid disturbance of the waterbody, which would avoid potential impacts on fishery resources. Sound or vibration from HDD activities may impact aquatic life in the waterbody; if the threshold sensitivity for a particular species is exceeded, it is expected that they would move away from the noise source, returning to the area following construction.

While implementation of the HDD method would avoid sediment-related impacts, a potential for inadvertent release of drilling fluid could result in direct or indirect impacts on the waterbody, and as a result fishery resources. Although drilling fluid consists of nontoxic materials, if drilling fluid were to be released into a waterbody in large quantities, it could affect fisheries or other aquatic organisms by causing turbidity in a waterbody, temporarily coating the substrate with a layer of clay, and/or affecting the gills of fish and other aquatic organisms.

The dam-and-pump or flume crossing methods would be implemented to allow for excavation and installation of the pipe under dry conditions while maintaining stream flow in flowing waterbodies. The determination of whether to use these methods or upland construction techniques would be made at the time of crossing, based on whether the stream is flowing. Temporary impacts from these crossing techniques could include disruption of food resources, increased sedimentation and water turbidity downstream from the construction workspace, and downstream scour, if pumps are utilized.

During use of the dam-and-pump method, it is possible that small fish, fish eggs, and larvae may be entrained in the water intake or impinged on screens over the intakes. Screen mesh size and water velocity across the screen would be controlled as needed to minimize impingement and entrainment. The SCDNR requested additional information in regard to intake screens. To minimize impacts on fish species as a result of the use of the dam-and-pump method, **we recommend that:**

> **<u>Prior to construction</u>, Dominion should file with the Secretary, for review and written approval by the Director of OEP, its proposed mesh size to minimize entrainment during hydrostatic test water withdrawals, and the proposed pump velocity to minimize impingement of smaller nongame fish, developed in consultation with the SCDNR.**

Dominion should include in its filing, documentation of its consultation with the SCDNR regarding both the proposed mesh size and pump velocity limits.

Both the dam-and-pump and the flume crossing methods have the potential to disrupt spawning runs and migration of fish; however, during fish spawning periods, the duration of crossing would be short, thereby minimizing disruption to migration and spawning. Passage would be restored after backfilling and waterbody restoration is complete and water flow bypass measures have been removed.

The T2C Procedures includes a requested modification from the FERC Procedures for section V.B.1. Dominion's proposed modification states, "Unless expressly restricted by the appropriate federal or state agency on a site-specific basis, in-stream work in warmwater fisheries may occur at any time." Dominion has not provided sufficient justification why this alternative measure is necessary or how it would ensure equal or greater protection. In accordance with FERC Procedures and to minimize impacts on warmwater fisheries, **we recommend that:**

Prior to construction, Dominion should revise its T2C Procedures to ensure consistency with the FERC Procedures at section V.B.1 to conduct all in-water work from June 1 through November 30, or file with the Secretary documentation of consultation with the SCDNR and any other applicable agencies in regard to alternative timing restrictions for crossing warmwater fisheries.

Clearing and grading of vegetation within the construction right-of-way and ATWS during construction could increase erosion along stream banks and turbidity levels in the waterbodies, as well as cause localized changes in water temperatures and light penetration, which could affect aquatic habitat, primary and secondary production, and fish use patterns. Localized changes in water temperature and light penetration caused by the removal of boulders, woody debris, stream bank vegetation, and undercut banks could temporarily displace fish that utilize these features for cover, spawning, and feeding. However, these impacts would be temporary and relatively minor due to the limited amount of total stream bank affected at each waterbody. Once installation activities are complete, disturbed areas would be stabilized to prevent erosion of exposed soils and sedimentation to on- and off-site resource areas.

Potential impacts on fishery resources would be avoided and minimized by adherence to the T2C Plan and T2C Procedures, coordination and compliance with any requirements of appropriate federal and state agencies, and through implementation of BMPs during construction of waterbody crossings. To the extent possible, pipeline construction would cross waterbodies perpendicularly to reduce the amount of vegetation removal necessary. Dominion would also implement its Soil Erosion and Sediment Control Plan and SPHMM Plan, which would further minimize risks from spills or leaks, erosion and sedimentation, and stormwater runoff from construction areas with exposed soils. Following construction, affected areas would be revegetated and restored to conditions as close to pre-construction as possible. Operation of the pipeline would require periodic vegetation maintenance, but this would not impact aquatic habitats.

Based on the proposed construction techniques, implementation of the proposed avoidance and minimization measures, and Project plans discussed above, the limited duration of construction activities, and our recommendations, we conclude that impacts on fishery resources would not be significant.

3.2 Vegetation

Existing Vegetation Resources

The following five vegetation cover types are present within the Project area: agricultural lands, upland forest (including floodplain forest and commercial silviculture), open lands (including residential

and ruderal communities), forested wetlands (including PFO wetlands), and non-forested wetlands (including PEM and PSS wetlands).

Agricultural Land

Agricultural lands are the primary vegetation cover type within the Project area. Common species within this vegetation cover type include cotton, corn, soybeans, sunflower, sorghum, and various grass species. During the time of Dominion's survey, some fields were fallow and dominated by weedy species such as dogfennel, pigweed, rattlebox, sicklepod, and Florida purslane.

Upland Forest

The upland forest vegetation cover type is comprised of a conglomerate of pine woodlands and pine-mixed hardwood forests, floodplain forests, and commercial silviculture tracts. Dominant species include loblolly pine, white oak, flowering dogwood, longleaf pine, mockernut hickory, water oak, southern red oak, American beautyberry, muscadine, common greenbrier, spotted wintergreen, and heartleaf. Shrub thickets of hollies and wax myrtle may be present in pine woodland areas. Floodplain forests are characterized by tree species including sweetgum, water oak, laurel oak, red maple, and willow oak. Understory species include Chinese privet, pawpaw, poison ivy, giant cane, and Japanese stiltgrass. Commercial silviculture tracts primarily consist of a loblolly pine overstory with a black cherry, water oak, trumpet creeper, Japanese honeysuckle, and blackberry understory.

Open Lands

The open lands cover type includes residential and ruderal communities. Residential areas comprise a small portion of the Project area, and consist of yards, subdivisions, and maintained lawns and golf courses. Dominant species in these areas may be exotic, native, or invasive. Ruderal communities are comprised of plants that grow where natural vegetation cover has been disturbed by man. This vegetation cover type includes upland portions of powerline easements, along roadsides, and edges of fields. Species in these areas include winged sumac, smooth sumac, winged elm, pokeweed, morning glory, dogfennel, blackberry, pineweed, broomsedge, plantain, Johnson grass, Brazilian verbena, wingstem, coastal Bermuda grass, crabgrass, rabbit tobacco, Bahia grass, goldenrod, and various other grasses and forbs.

Forested Wetlands

Forested wetlands, including PFO wetlands, are dominated by tree stratum, and to a lesser extent herbaceous and shrub stratums, as summarized for the non-forested wetland cover type. Dominant overstory species include sweetgum, red maple, tulip poplar, water oak, American elm, black cherry, black willow, and American holly.

Non-forested Wetlands

Non-forested wetlands, including PEM and PSS wetlands, are dominated by herbaceous and shrub stratums, respectively. Dominant herbaceous species include bottlebrush sedge, woolgrass, sugarcane plumegrass, redroot flatsedge, smartweed, Japanese stiltgrass, switchgrass, maidencane, arrowhead, arrowleaf tearthumb, meadow beauty, netted chain fern, royal fern, and false nettle. Dominant shrub and woody vine species include Chinese privet, poison ivy, muscadine, cinnamon fern, royal fern, giant cane, false nettle, common sweetleaf, lizard's tail, and common greenbrier.

Sensitive Vegetation Communities

Dominion identified one community of special concern along the Dillon Pipeline, the Atlantic Coastal Plain Blackwater Stream Floodplain Forest. The Atlantic Coastal Plain Blackwater Stream Floodplain Forest is characterized as a complex of wetland and upland vegetation on floodplains of coastal plain streams with acidic, sandy soils. The community is often dominated by bald cypress, water tupelo, oaks, and bottomland hardwoods, and small shrubby sloughs (TNC No Date).

In consultation with the SCDNR and Natural Resources Conservation Service (NRCS), one 170-acre Wetland Reserve Program (WRP) conservation easement was identified along the Dillon Pipeline route adjacent to the Reedy River. This area is located on private land managed by the NRCS and contains habitat within the Gulf and Atlantic Coastal Plain Blackwater Stream Floodplain Forest community, as previously discussed.

Upstate Forever Conservation Focus Areas

Upstate Forever expressed concerns regarding Project impacts to its Conservation Focus Areas (CFAs), particularly waterbodies, wetlands, cultural resources, and natural forested lands. The Moore to Chappells pipeline would cross the Ferguson Creek and North Tyger River CFA and the Enoree River CFA. Ferguson Creek, North Tyger River, and Enoree River and their associated floodplain wetlands would be crossed using HDD technology and would not be directly affected by the Project. Cultural resources identified by Upstate Forever in both CFAs would not be affected by the Project (see section B.6). Some temporary and permanent impacts on forested land would occur in the Ferguson and North Tyger River CFA (see section B.3.2). These impacts would primarily occur in southern Piedmont dry oak and pine forest communities. Dominion would implement its T2C Plan and Procedures to minimize impacts during construction and restoration in these areas. In addition, Dominion implemented six minor route variations in the Ferguson Creek and North Tyger River CFA (see section C.4) to minimize impacts on wetlands, waterbodies, forested land, and residential properties in the Ferguson Creek and North Tyger River CFA. Therefore, we conclude that the Project would not have a significant impact on Upstate Forever's CFAs.

Invasive Plant Species

Invasive plant species are generally defined as plants which quickly invade, out-compete, and replace native species that are indigenous, occur naturally within an ecosystem, and which existed prior to significant human impacts and alterations to the landscape of a region or particular habitat. The spread of invasive plant species disrupts newly revegetated areas in addition to established ecosystems or other habitat types, and often results in negative impacts on the overall biodiversity of an ecosystem, especially if the invasive plant species becomes a monoculture or significantly dominates the vegetation within a plant community. During field surveys, 58 invasive plant species were identified within the Project area, as shown in table 1 of Dominion's Non-native Invasive Species Management Plan[15].

Impacts and Mitigation

Construction and operation of the Project would result in approximately 667.0 acres of temporary impacts on vegetation communities; approximately 276.1 acres of those impacts would be permanent.

[15] FERC eLibrary Accession number 20160309-5161.

Several commenters (Mr. Jack Watts, Ms. Elizabeth Burton, Mr. Robert Shealy, Dr. Charles Smith, Mr. Jonathon Storm, Mr. Keith Block, Ms. Suzannah Smith, Johnson Entities, Upstate Forever, Mr. Thomas McCoy of USFWS, and Ms. Lorraine Riggins of SCDNR) asked that impacts on forested land be avoided or minimized. Dominion examined and implemented several minor route variations (see section C.4) which eliminated impacts on several properties (Ms. Elizabeth Burton, Mr. Robert Shealy, Dr. Charles Smith, Mr. Jonathan Storm, and Mr. Keith Block). Dominion implemented a minor route variation on Mr. Jack Watts' property which moved the pipe alignment closer to the property line and incorporated an HDD; therefore, the Watts property would not be directly impacted by the Project. In addition to implementing route variations, Dominion would cross forested wetlands using HDDs.

TABLE B.3-2
Vegetation Cover Types Impacted by the Project a/

Facility	Agricultural Lands		Upland Forest		Open Lands		Forested Wetlands		Non-Forested Wetlands		Total	
	Temp Impacts (acres) b/	Perm. Impacts (acres) c/	Temp Impacts (acres) b/	Perm. Impacts (acres) c/	Temp Impacts (acres) b/	Perm. Impacts (acres) c/	Temp Impacts (acres) b/	Perm. Impacts (acres) c/	Temp Impacts (acres) b/	Perm. Impacts (acres) c/	Temp Impacts (acres) b/	Perm. Impacts (acres) c/
Moore to Chappells												
Pipeline	198.6	80.3	225.8	150.7	30.2	19.9	0	0	0	0	454.6	250.9
ATWS	15.5	0	25.7	0	3.8	0	0	0	0	0	45	0.0
Aboveground Facilities	0.1	0.1	1.1	0.5	0.2	0	0	0	0	0	1.4	0.6
Access Roads	52.5	3.3	26.6	7.7	7.6	1.4	0	0	0	0	86.7	12.4
Laydown Yard	0	0	0	0	18.1	0	0	0	0	0	18.1	0.0
Subtotal	*266.8*	*83.7*	*279.3*	*159.0*	*59.9*	*21.3*	*0*	*0*	*0*	*0*	*605.9*	*264.0*
Dillon												
Pipeline	31.5	2.7	0	0	2.7	1.3	0	0	0	0	34.2	4
ATWS	2.5	0	0	0	0.2	0	0	0	0	0	2.7	0
Laydown Yard	0	0	0	0	2.4	0	0	0	0	0	2.4	0
Aboveground Facilities	0.5	0.4	0	0	<0.1	<0.1	0	0	0	0	0.6	0.5
Access Roads	3.6	0.2	0.4	0	1.2	<0.1	0	0	0	0	5.2	0.3
Subtotal	*38.1*	*3.3*	*0.4*	*0*	*6.5*	*1.3*	*0*	*0*	*0*	*0*	*45.1*	*4.8*
Aboveground Facilities												
Moore Compressor Station												
Compressor Station	0	0	6.8	3.5	0	0	0	0	0	0	6.8	3.5
Access Roads	0	0	0	0	0	0	0	0	0	0	0.0	0.0
Dorchester Compressor Station												
Compressor Station	6	2.6	0.1	0.1	0.9	0.9	0	0	0	0	7	3.6

TABLE B.3-2
Vegetation Cover Types Impacted by the Project a/

Facility	Agricultural Lands		Upland Forest		Open Lands		Forested Wetlands		Non-Forested Wetlands		Total	
	Temp Impacts (acres) b/	Perm. Impacts (acres) c/	Temp Impacts (acres) b/	Perm. Impacts (acres) c/	Temp Impacts (acres) b/	Perm. Impacts (acres) c/	Temp Impacts (acres) b/	Perm. Impacts (acres) c/	Temp Impacts (acres) b/	Perm. Impacts (acres) c/	Temp Impacts (acres) b/	Perm. Impacts (acres) c/
Access Roads	0.2	0.2	0	0	0	0	0	0	0	0	0.2	0.2
Southern Compressor Station												
Compressor Station	0	0	0	0	0	0	0	0	0	0	0	0
Access Roads	0	0	0	0	0	0	0	0	0	0	0	0
Charleston Town Border Station												
Town Border Station	0	0	0	0	0.6	0	0	0	0	0	0.6	0
Access Roads	0	0	0	0	0	0	0	0	0	0	0	0
Greenwood Town Border Station												
Town Border Station	0.1	0	0	0	1	0	0	0	0	0	1.1	0
Access Roads	0	0	0	0	0.1	0	0	0	0	0	0.1	0
Subtotal	*6.4*	*2.8*	*6.9*	*3.6*	*2.7*	*0.9*	*0*	*0*	*0*	*0*	*16.0*	7.3
TOTAL	*311.3*	*89.8*	*286.6*	*162.6*	*69.1*	*23.5*	*0*	*0*	*0*	*0*	*667.0*	*276.1*

a Values presented herein are conservatively rounded upward with table B.4-1 and to account for slight (+/-) 0.1 acre differences with land use acreages.

b Temporary areas consist of that portion of the construction ROW and additional temporary workspace areas that would be revegetated following construction.

c Permanently cleared areas consist of those portions of the construction ROW and aboveground facilities that would be maintained permanently free of woody vegetation during operation of the Project. Permanent agricultural impacts consist only of impacts on tree farms and areas that are converted to new access roads.

Construction activities would result in the alteration and loss of vegetation and could result in increased soil erosion, changes to surface water flow and infiltration, increased potential for the introduction and establishment of noxious weed species, and a localized decrease in available wildlife habitat. The degree of impact would depend on the type and amount of vegetation affected, the rate at which the vegetation would regenerate after construction, and the frequency of vegetation maintenance conducted during operation. For instance, herbaceous impacts would be short-term as these areas would be expected to revegetate quickly (one to three growing seasons). Scrub/shrub impacts would be moderate as these vegetation types would recolonize to previous condition in approximately three to five growing seasons. Forested areas would experience the greatest vegetation impacts due to the time required for woody vegetation to revert to pre-construction conditions (often up to 20 years) in temporary construction areas and the permanent conversion to herbaceous or shrub vegetation within the permanently maintained right-of-way. Permanently disturbed areas consist of those portions of the construction right-of-way that would be maintained free of woody vegetation during operation of the Project, and the permanent conversion of the existing cover type to industrial use at each new aboveground facility.

Impacts on wetland vegetation would be avoided through HDD and boring construction methods, as described in section B.2.3. Indirect impacts as a result of Project implementation may include the establishment of invasive plant species; and, where reclamation is unsuccessful or prolonged, higher soil erosion rates and reduced forage production. To avoid and minimize impacts during construction and aid in the restoration of disturbed areas, Dominion would implement measures outlined in the T2C Plan and T2C Procedures.

Revegetation Measures

Dominion would use native warm grass species for revegetation, such as big blue stem (*Andropogon geradii*), little blue stem (*Schizachyrium scoparium*), and indiangrass (*Sorghastrum nutans*). If revegetation occurs from March through September, 10-15 lb of browntop millet (*Urochloa ramosa*) would be used as a nurse crop to minimize the growth of weeds or other undesirable plants. If revegetation is in the winter (September through March), the nurse crop would be cereal rye (*Secale cereale*) (50 lb). The soil would be fertilized by adding phosphorous and potash according to needs determined through a soil test. Nitrogen would not be applied; the State Agronomist does not recommend it because nitrogen tends to promote the growth of invasive weeds and other nonnative grasses.

During Project operation and maintenance, mowers would be set no lower than 6 inches high so native herbaceous vegetation would not be damaged.

Sensitive Vegetative Communities

The Dillon Pipeline would intersect the WRP conservation easement and the Atlantic Coastal Plain Blackwater Stream Floodplain Forest community; however, this portion of the Dillon Pipeline would be constructed using HDD technology to avoid impacts on this area (NRCS 2016). One existing access road (Free States Road) would be widened for access to the right-of-way, which would have a temporary impact of 0.1 acre on the conservation easement. After construction activities, the wooded area would be allowed to naturally revegetate. Dominion received concurrence from the NRCS on March 18, 2016 for the proposed HDD under the conservation easement; however, the concurrence letter did not include the access road modifications on this property. Therefore, **we recommend that:**

Prior to construction, Dominion should consult with the NRCS in regard to the proposed access road modification and related disturbance on the WRP conservation easement along the Dillon Pipeline. Dominion should file copies of this consultation with the Secretary, and

any proposed avoidance or mitigation measures, for review and written approval by the Director of OEP.

Invasive Plant Species Management Measures

To minimize the introduction and spread of invasive plant species, Dominion would implement its Non-native Invasive Species Management Plan. The Non-native Invasive Species Management Plan identifies identification, herbicide and mechanical control measures, and monitoring standards to be implemented within the Project area during all phases of the Project. In addition, Dominion would implement the following measures:

- all equipment (including timber mats) would be cleaned prior to arriving on the construction site. The equipment would be inspected by the Contractor and EI to verify that it is clean of soil and debris, which are capable of transporting invasive plant propagules, prior to working on the Project;

- Dominion would install intermediate cleaning stations at additional locations based on invasive plant species survey results and other mitigating factors (such as accessibility). In selecting locations for cleaning stations, Dominion and its contractors would consider prevalence of invasive plants, the locations of sensitive resources (e.g., wetlands), landowner requirements, and/or recommendations from state and/or federal agencies;

- cleaning would be conducted using high-pressure washing equipment, compressed air, and/or manually to remove excess soil and debris from the tracks, tires, and blades of equipment;;

- the Contractor and EI would maintain logs documenting the cleaning history of each piece of equipment. The EI would use stickers or other visual markers to identify that equipment has been cleaned and that an inspection has been completed;;

- cleared vegetation and segregated topsoil from areas of invasive plant infestations would be maintained adjacent to the areas from which they were removed to eliminate the transport of soil-borne propagules to other areas along the right-of-way. The stockpiles would be identified as invasive plant species stockpiles with signs. The Contractor would install sediment barriers (e.g., silt fencing) around the stockpiles to ensure the material is not transported to adjacent areas. During reclamation, the materials would be returned to the areas from which they were obtained;

- equipment required for initial vegetation clearing and/or topsoil segregation in areas of invasive plant infestation would be cleaned prior to leaving the area. Once the topsoil has been segregated, subsequent equipment would not require cleaning as it would not come into contact with invasive plant species or the topsoil that potentially contains propagules. Equipment required for topsoil replacement during restoration activities would also be cleaned prior to moving out of an area of infestation; and

- materials used for erosion control (e.g., hay bales or straw mulch) would be certified as weed-free by the supplier.

While some permanent impacts on vegetation resources are anticipated, the Project would not permanently impact unique, sensitive, or communities of special concern. Based on Dominion's

proposed construction techniques and the implementation of minimization and mitigation measures, we do not anticipate significant impacts on vegetation resources as a result of the Project.

3.3 Wildlife

Existing Wildlife Resources

The Project traverses terrestrial and wetland habitats that support a diversity of wildlife species. The Project would cross four habitat types, including agricultural/open lands, upland forest (including floodplain forest and commercial silviculture), forested wetlands (including PFO wetlands), and non-forested wetlands (including PEM and PSS wetlands). Table B.3-3 summarizes representative mammal, bird, and herpetofauna species and their associated habitats that may be present within the Project area.

Protected and Sensitive Areas

One sensitive wildlife area was identified within or adjacent to the Project area. The Belfast Wildlife Management Area (WMA) is located approximately 0.12 mile northeast of the proposed Moore to Chappells Pipeline route in Newberry County. This WMA is managed by the SCDNR and consists of hardwood forest, pine forest, and wetland communities. No direct impacts on the WMA are anticipated as a result of Project-related activities. Temporary noise from construction could affect wildlife in areas located close to construction areas as discussed below. However, construction noise would be temporary and attenuate as distance increases from the construction area.

Impacts and Mitigation

Potential impacts on wildlife species as a result of Project implementation may include habitat disturbance, displacement, loss, alteration, localized fragmentation, and increased levels of noise, activity, and human presence. Animal displacement includes the avoidance or abandonment of an area, which may occur due to increased noise and activity caused by humans and equipment. The level of displacement is dependent on the sensitivity of the species, the surrounding topography, and the surrounding vegetation types. The anticipated displacement impacts on wildlife as a result of the Project would be short-term, localized, and minor. Individual mortality could occur if species are crushed or buried from vehicular traffic and vegetation clearing during construction or operation.

A total of four habitat types (agricultural/open lands, upland forest, forested wetlands, and non-forested wetlands) would be affected by the Project. The acreage of wildlife habitats that would be disturbed by the construction and operation of the Project are presented in table B.3-2. Construction within currently industrial/commercial areas (i.e., unvegetated) would have little or no direct impact on wildlife.

TABLE B.3-3
Representative Wildlife Species Within the Project Area

Species	Habitat Type			
	Agricultural/Open	Upland Forest	Forested Wetland	Non-Forested Wetland
Mammals				
American beaver			x	x
Big brown bat		x		
Black bear		x	x	x
Bobcat		x		
Eastern chipmunk		x		
Striped skunk	x	x		
Gray fox		x		
Red fox		x		
White-tailed deer	x	x		
Birds				
American kestrel	x	x		
Carolina wren		x	x	x
Great blue heron	x			x
Hooded warbler		x		
Mourning dove	x			
Northern cardinal		x		x
Red-tailed hawk	x	x		
Summer tanager		x		
Tufted titmouse		x		
Wild turkey		x		
Wood duck			x	x
Wood thrush		x		
Herpetofauna				
Broadheaded skink		x		
Common garter snake	x	x	x	x
Copperhead		x		
Cottonmouth			x	x
Eastern box turtle		x	x	x
Eastern hognose snake	x	x	x	x
Slender glass lizard	x			
Oak toad		x	x	x
Timber rattlesnake	x	x	x	x
Six-lined racerunner	x	x		

Sources: Cornell University 2015; Savannah River Ecology Laboratory 2016; SCDNR 2015b.

The removal and disturbance of vegetation would result in a small incremental decrease in the amount of cover and forage available for wildlife species. Indirect impacts could include soil erosion or compaction that hinders or prevents revegetation. Mobilization of construction equipment and clearing of vegetation may contribute to the spread and/or introduction of noxious weed species, thus reducing the amount of cover and forage available for wildlife species. Impacts would primarily occur in habitats that are already disturbed or dominated by herbaceous vegetation, including agricultural land and open land.

Wildlife species that use cleared and emergent habitats, including agricultural/open areas, are expected to return to the Project area. Species that utilize forested habitats would migrate to adjacent forested habitats. Although the Project would contribute to forest fragmentation, many of the small patches of forested area in the Project area already exhibit edge effects, as they have previously been fragmented by agricultural land and other developments including other maintained utility corridors. Portions of the construction right-of-way would be maintained free of woody vegetation during operation of the Project resulting in a permanent loss of available habitat. In addition, the construction and operation of new aboveground facilities would represent a permanent conversion of the existing cover type to industrial use, thereby resulting in a permanent loss of available habitat.

Five commenters were concerned about the Project's potential impacts on 1324 Hobbysville Road, which Dr. Charles Smith and Mr. Jonathon Storm identified as an important ecological research site and Mr. Keith Block suggested may contain cultural resources. Impacts on this property would be minor and limited to a portion of the property's non-forested frontage along Hobbysville Road. Significant impacts on biological, archaeological, and recreational resources associated with this property are not anticipated. Another commenter (Mr. Todd Scott) stated that his property was purchased as a wildlife preserve and suggested an alternative for Dominion to parallel the railroad near his property. This suggested alternative is evaluated in section C.4. Dominion would minimize impacts on Mr. Scott's property during construction, and ensure restoration, with the measures outlined in the T2C Plan and T2C Procedures. In addition, Dominion would work with landowners during easement negotiations with any special requests.

To avoid and minimize impacts during construction and aid in the restoration of disturbed areas, Dominion would implement measures outlined in its T2C Plan and T2C Procedures. Dominion's Revegetation Measures and Invasive Plant Species Management Measures, discussed in section B.3.2, would also serve to mitigate impacts on wildlife habitat.

While some permanent impacts on wildlife resources are anticipated, the Project would not permanently impact unique, sensitive, or communities of special concern. Based on Dominion's proposed construction techniques and the implementation of minimization and mitigation measures, significant impacts on wildlife resources as a result of Project implementation are not anticipated.

Migratory Birds

South Carolina, and specifically the Project area, is along the Atlantic flyway for migratory birds. The diverse habitats within the Project area provide important resources for migrating birds during spring and fall migration.

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) of 1918 (16 United States Code [USC] § 703-712, as amended) and Executive Order 13186 (66 Federal Register 3853 [2001]). Executive Order 13186: *Responsibilities of Federal Agencies to Protect Migratory Birds* (January 17, 2001) directs federal agencies to properly evaluate proposed actions for effects on migratory birds.

The USFWS Migratory Bird Program utilizes a number of different lists, including the Birds of Conservation Concern (BCC) list, to direct USFWS actions and priorities to manage and protect

migratory birds. The BCC list includes a subset of MBTA-protected birds and includes all species, subspecies, and populations of migratory nongame birds that are likely to become candidates for listing under the ESA of 1973 without additional conservation actions. Based on the USFWS BCC report (USFWS 2008), the Project is located within 2 Bird Conservation Regions – Piedmont and Southeastern Coastal Plain - which include a total of 54 bird species. Of these 54 bird species, 20 are identified as non-breeding within the Project area. Further, many species, such as those that use shorelines and open water, would not be found in the Project area due to lack of habitat. Table B.3-4 lists the BCC identified within the Piedmont and Southeastern Coastal Plain Bird Conservation Regions.

TABLE B.3-4
Birds of Conservation Concern in the Bird Conservation Regions Crossed by the Project

Habitat	Common Name	Scientific Name	Region
Forest	Southeastern American Kestrel	*Falco sparverius paulus*	Southern Coastal Plain
	Bachman's Sparrow	*Peucaea aestivalis*	Piedmont Southern Coastal Plain
	Bald Eagle	*Haliaeetus leucocephalus*	Piedmont Southern Coastal Plain
	Black-throated Green Warbler	*Setophaga virens*	Southern Coastal Plain
	Brown-headed Nuthatch	*Sitta pusilla*	Piedmont Southern Coastal Plain
	Cerulean Warbler	*Dendroica cerulea*	Piedmont Southern Coastal Plain
	Chuck-will's-widow	*Antrostomus carolinensis*	Southern Coastal Plain
	Kentucky Warbler	*Oporonis formosus*	Piedmont Southern Coastal Plain
	Painted Bunting	*Passerina ciris*	Southern Coastal Plain
	Peregrine Falcon	*Falco peregrinus*	Piedmont Southern Coastal Plain
	Red-headed Woodpecker	*Melanerpes erythrocephalus*	Southern Coastal Plain
	Rusty Blackbird*	*Euphagus carolinus*	Piedmont Southern Coastal Plain
	Whip-poor-will	*Caprimulgus vociferus*	Piedmont Southern Coastal Plain
Scrub Shrub	Bewick's Wren	*Thryomanes bewickii bewickii*	Piedmont Southern Coastal Plain
	Blue-winged Warbler	*Vermivora pinus*	Piedmont Southern Coastal Plain
	Loggerhead Shrike	*Lanius ludovicianus*	Piedmont Southern Coastal Plain
	Prairie Warbler	*Setophaga discolor*	Piedmont Southern Coastal Plain
Grassland / Pasture	Common Ground-Dove	*Columbina passerina*	Southern Coastal Plain
	Henslow's Sparrow	*Ammodramus henslowii*	Piedmont Southern Coastal Plain
	Long-billed Curlew*	*Numenius americanus*	Southern Coastal Plain

TABLE B.3-4
Birds of Conservation Concern in the Bird Conservation Regions Crossed by the Project

Habitat	Common Name	Scientific Name	Region
	Upland Sandpiper*	*Bartramia longicauda*	Southern Coastal Plain
Mudflat	Red Knot*	*Calidris canatus rufa*	Southern Coastal Plain
	Whimbrel*	*Numenius phaepus*	Southern Coastal Plain
	Roseate Spoonbill*	*Platalea ajaja*	Southern Coastal Plain
Wetland / Marsh	American Bittern*	*Botaurus lentiginosus*	Southern Coastal Plain
	Least Bittern	*Ixobrychus exilis*	Southern Coastal Plain
	LeConte's Sparrow*	*Ammodramus leconteii*	Southern Coastal Plain
	Limpkin	*Aramus guarauna*	Southern Coastal Plain
	Nelson's Sharp-tailed Sparrow*	*Ammodramus nelsoni*	Southern Coastal Plain
	Prothonotary Warbler	*Protonotaria citrea*	Southern Coastal Plain
	Saltmarsh Sharp-tailed Sparrow*	*Ammodramus caudacutus*	Southern Coastal Plain
	Seaside Sparrow	*Ammodramus maritimus*	Southern Coastal Plain
	Sedge Wren	*Cistothorus platensis*	Piedmont Southern Coastal Plain
	Short-eared Owl*	*Asio flammeus*	Piedmont
	Swallow-tailed Kite	*Elanoides forficatus*	Southern Coastal Plain
	Wood Thrush	*Hylocichea mustelina*	Piedmont Southern Coastal Plain
	Yellow Rail*	*Coturnicops noveboracensis*	Southern Coastal Plain
	Black Rail	*Laterallus jamaicensis*	Piedmont Southern Coastal Plain
	Solitary Sandpiper*	*Tringa solitaria*	Southern Coastal Plain
Flooded Swampland	Swainson's Warbler	*Limnothlypis swainsonii*	Piedmont Southern Coastal Plain
Shoreline / Open Water	American Oystercatcher	*Haematopus palliatus*	Southern Coastal Plain
	Audubon's Shearwater*	*Puffinus lherminieri*	Southern Coastal Plain
	Black Skimmer	*Rynchops niger*	Southern Coastal Plain
	Black-capped Petrel*	*Pterodroma hasitata*	Southern Coastal Plain
	Buff-breasted Sandpiper*	*Tryngites subruficollis*	Southern Coastal Plain
	Gull-billed Tern	*Gelochelidon nilotica*	Southern Coastal Plain
	Least Tern	*Sternula antillarum*	Southern Coastal Plain
	Marbled Godwit*	*Limosa fedoa*	Southern Coastal Plain
	Red-throated Loon	*Gavia stellata*	Southern Coastal Plain
	Sandwich Tern	*Thalasseus sandvicensis*	Southern Coastal Plain
	Semipalmated Sandpiper*	*Calidris pusilla*	Southern Coastal Plain
	Short-billed Dowitcher*	*Lumnodromus griseus*	Southern Coastal Plain
	Snowy Plover	*Charadrius nivosus*	Southern Coastal Plain
	Wilson's Plover	*Charadrius wilsonia*	Southern Coastal Plain

* Non-breeding species

Source: USFWS 2008.

Bald and golden eagles are afforded additional protection under the Bald and Golden Eagle Protection Act (BGEPA), which prohibits the take, possession, sale, purchase, barter, offer to sell, purchase or barter, transport, export or import, of any bald or golden eagle, alive or dead, including any part, nest, or egg, unless allowed by permit (16 U.S.C. 668(a); 50 CFR 22). Bald eagles are addressed in greater detail in the discussion of State Listed Species later in this section.

Impacts on migratory birds, including raptors, may include potential disturbance to breeding individuals during the breeding season, particularly if nests occur in or adjacent to the Project area. Impacts could include direct loss of eggs or nestlings; indirect displacement from increased noise and human presence in the vicinity of the Project area; and an incremental reduction in cover, nesting, and foraging habitat. Possible impacts on breeding birds would depend on a number of variables including species affected, nest location, topographical shielding, breeding phenology, type of construction activity, timing of construction, and the rate at which revegetation occurs after construction.

To minimize impacts on migratory birds, Dominion would conduct maintenance clearing activities outside of the breeding season (i.e., April 15 to August 1). In upland portions of the permanent right-of-way, vegetation maintenance would be limited to once every 3 years, except for a 10-foot-wide inspection corridor centered over the pipeline, which would be cleared annually or on an as-needed basis.

Given Dominion's anticipated construction start date, clearing for construction would likely occur outside the migratory bird nesting season. During operations, in accordance with the T2C Plan and Procedures, vegetation maintenance restrictions would ensure that clearing is performed outside the migratory bird nesting season (i.e., April 15 to August 1). Therefore, we expect that impacts would be temporary and minor. However, Dominion has not proposed any specific clearing schedule or provided documentation of consultation with the USFWS; therefore, **we recommend that**:

> **Prior to construction, Dominion should file with the Secretary documentation of consultation with the USFWS regarding project-related impacts on migratory bird species, including any additional conservation measures it would implement.**

Based on the proposed construction techniques, implementation of the proposed avoidance and minimization measures, and Project plans discussed above, the limited duration of construction activities, and our recommendation, we conclude that impacts on migratory birds as a result of the Project would be temporary and minor.

3.4 Special Status Species

Federal agencies are required under Section 7 of the ESA, as amended, to ensure that any actions authorized, funded, or carried out by the agency would not jeopardize the existence of any federally listed species listed under the ESA, or result in the destruction or adverse modification of the designated critical habitat of any federally listed species. As the lead federal agency authorizing the Project, FERC is required to consult with the USFWS for terrestrial and freshwater species and NOAA Fisheries for marine species to determine whether federally listed species or designated critical habitat are found in the vicinity of the Project, and to determine the Project's potential effects on those species or critical habitats. Federally listed species are defined herein as those listed as federally threatened, endangered, proposed, or candidate as determined by the USFWS South Carolina Field Office for Aiken, Charleston, Dillon, Dorchester, Greenwood, Laurens, Newberry, and Spartanburg Counties, South Carolina (USFWS 2015a-h).

State listed species including state endangered and threatened species afford protection pursuant to the South Carolina Nongame and Endangered Species Conservation Act (Code 1976 Statute 50-15-10 to 90). State listed species are defined herein as those listed as state threatened and endangered as

determined by the SCDNR for Aiken, Charleston, Dillon, Dorchester, Greenwood, Laurens, Newberry, and Spartanburg Counties, South Carolina (SCDNR 2014). All federally and state listed species are referred to herein as special status species.

Dominion, acting as FERC's non-federal representative for the purpose of complying with Section 7(a)(2) of the ESA, initiated informal consultation with the USFWS South Carolina Field Office, NOAA Fisheries, and SCDNR in November 2015. Dominion identified a total of 35 special status species and 39 At Risk Species as having the potential to occur within the Project counties (USFWS 2016a, b, 2015a-h; SCDNR 2014, 2006). We further analyzed this list of species and determined which species could occur within the Project area. These species are presented in appendix G. Table 1 in appendix G presents a summary of each species, and its habitat association, range, and potential for occurrence within the Project area. A habitat assessment, and in some cases species-specific surveys, were conducted within the Project area; results of these efforts are included in appendix G, as applicable.

We received comments on the Project's potential to affect the Carolina heelsplitter, frosted flatwoods salamander, persistent trillium, and mountain sweetpitcher plant. Based on the species current range and distribution, it was determined that these species would not occur in the Project area and, therefore, would not be affected by the Project.

Based on our analysis, a total of seven special status species may be affected by the Project (including three federally listed species, three state listed species, and two state-listed At Risk Species[16]).These species are addressed in the following discussion.

Federally Listed Species

Northern Long-eared Bat (Myotis septentrionalis)

On April 2, 2015, the USFWS published a final rule designating the northern long-eared bat as a threatened species under the ESA effective May 4, 2015. On January 14, 2016, USFWS published a final 4(d) rule, which went into effect on February 16, 2016.

The range of the northern long-eared bat spans much of eastern and north central United States and all of the Canadian provinces west to eastern British Columbia and southern Yukon Territory (Nagorsen and Brigham 1993). In South Carolina, the species is known to occur in the mountains of the Blue Ridge Ecoregion, located in the westernmost portion of the state (Bunch et al 2013). Project coordination with the USFWS indicates that the Moore to Chappells Pipeline route in Laurens, Newberry, and Spartanburg Counties may impact potentially suitable fall swarming, summer maternity, and/or spring staging habitat for the species (USFWS 2015i). To determine the potential for the species to occur along the Moore to Chappells Pipeline route, a Phase 1 Habitat Assessment was performed (Normandeau Associates 2015) pursuant to the April 2015 Range-Wide Indiana Bat Summer Survey Guidelines. Based on the Habitat Assessment results, approximately 94 percent of the Moore to Chappells Pipeline route contains forested habitat potentially suitable for use by roosting, foraging, and/or commuting bats.

No known occupied maternity roost trees are present within 150 feet of the Moore to Chappells Pipeline route, and no known occupied hibernacula are present within 0.25 mile of the Project (USFWS

[16] Species that the USFWS has been petitioned to list and for which a positive 90-day finding has been issued (listing may be warranted).

2016d, SCDNR 2016a, and b). Based on these findings, we conclude that the Project may affect, but would not likely adversely affect the northern long-eared bat. The USFWS provided concurrence with this determination on April 18, 2016 (USFWS 2016e). The USFWS did not impose any time-of-year clearing restrictions for the northern long-eared bat. Dominion would continue to coordinate with the SCDNR to develop minimization or mitigation measures, as appropriate.

Red-cockaded Woodpecker (Picoides borealis)

The red-cockaded woodpecker is a federally endangered and state endangered species, whose range is closely linked to the distribution of southern pines. Loblolly, longleaf pines, and other species of southern pine which are greater than 60 years old are generally selected for nesting sites. The red-cockaded woopdpecker usually excavates nest cavities in trees infected with a fungus that produces red-heart disease. Preferred nesting sites generally include relatively open, mature pine stands with an undeveloped or low understory layer. Foraging habitat is frequently limited to pine or pine-hardwood stands that are 30 years or older, with a preference for pine trees with a diameter of 10 inches or larger. The USFWS indicates that the maximum foraging range for the species is approximately 0.5 mile.

The USFWS and SCDNR indicated that the Project may impact suitable habitat for the species in Dorchester, Dillon, and Laurens Counties (USFWS 2016b, 2015i; SCDNR 2016c, 2015c). To determine the potential for the species to occur within the Project area, Dominion conducted a species-specific habitat evaluation and survey along the Moore to Chappells Pipeline route and within the Dorchester Compressor Station site. Based on field surveys, no individuals or cavity trees were observed; therefore, impacts on the species are not anticipated. Suitable foraging habitat was identified within the Project area in Dorchester, Newberry, and Laurens Counties (AES 2016a); therefore, direct impacts on the species' habitat and indirect impacts on the species (e.g., harassment) may occur as a result of Project construction. Both short-term and long-term habitat fragmentation associated with the construction and operation of the Dorchester Compressor Station and Moore to Chappells Pipeline would occur. The permanent loss of forested habitat as a result of operation and maintenance activities associated with the permanent pipeline rights-of-way and aboveground facility footprint are anticipated.

Based on these findings, we conclude the Project may affect, but would not likely adversely affect the red-cockaded woodpecker. The USFWS provided concurrence with this determination on March 16, 2016 (USFWS 2016b). Dominion would continue to coordinate with the SCDNR to develop minimization or mitigation measures, as appropriate.

Gopher Tortoise (Gopherus polyphemus)

The gopher tortoise is a federal candidate and state endangered species, known to occur in the sandhills and inner Coastal Plain ecoregions in seven South Carolina counties, including Aiken and Dorchester Counties. Suitable habitat for the species includes xeric longleaf pine sandhills where soils are ideal for creating burrows. Dominion conducted a habitat assessment within the Project area in Aiken and Dorchester Counties in 2015 and 2016. Suitable habitat was not present within the Project area in Aiken County; therefore, no impacts on the species or its habitat area anticipated as a result of Project implementation. Low quality suitable habitat was identified within the Project area in Dorchester County; however, no individuals or burrows were observed (URS 2016). As such, direct impacts on the species' habitat and indirect impacts on the species (e.g., harassment) may occur as a result of Project implementation in Dorchester County. As a federal candidate species, an effect determination from the USFWS is not required. Dominion would continue to coordinate with the SCDNR to develop minimization or mitigation measures, as appropriate.

Newberry Burrowing Crayfish (Distocambarus youngineri)

The Newberry burrowing crayfish is an At Risk Species and SCDNR Priority State Listed species. The species is a primary burrower which inhabits moist, terrestrial areas with leaf litter and mixed-hardwood overstory near stream headwaters or intermittent streams, and is known to occur in the Santee River Basin in Newberry County.

Freshwater mussel and burrow excavation surveys were conducted along the Moore to Chappells pipeline route between May and June 2016 (AES 2016b). The species was identified within the Project area in Newberry County within the following waterbodies: Unnamed Tributary to Pages Creek, Unnamed Tributary Sharps Branch, and two Unnamed Tributaries to Lake Greenwood. If present at the aforementioned locations at the time of construction, direct impacts on the species and its habitat would occur. To determine if avoidance, minimization, or mitigation measures for the species would be required, **we recommend that:**

Prior to construction, Dominion should file with the Secretary documentation of consultation with the USFWS and SCDNR for the Newberry burrowing crayfish.

Broad River Spiny Crayfish (Cambarus spicatus)

The Broad River spiny crayfish is an At Risk Species and SCDNR Priority State Listed species. The species inhabits streams and rivers where flash floods occur, and uses sand deposits, log jams and other debris for cover, and is known to occur in the Little and Broad River Basins in Spartanburg County.

Lotic crayfish species, such as the Broad River spiny crayfish, were surveyed in association with freshwater mussel and fish surveys along the Moore to Chappells pipeline route between May and June 2016 (AES 2016b). The species was identified within the Project area in Laurens County in Watkins Creek. If present at the aforementioned locations at the time of construction, direct impacts on the species and its habitat would occur. To determine if avoidance, minimization, or mitigation measures for the species would be required, **we recommend that:**

Prior to construction, Dominion should file with the Secretary documentation of consultation with the USFWS and SCDNR for the Broad River spiny crayfish.

State Listed Species

Bald Eagle (Haliaeetus leucocephalus)

The bald eagle is afforded protection under the BGEPA, the Migratory Bird Treaty Act, and is listed by the SCDNR as a state threatened species. The species prefers undisturbed areas near large lakes and reservoirs, marshes and swamps, or stretches along rivers where it can find open water for foraging. The bald eagle generally nests in mature or old growth trees, snags, cliffs, and rock promontories near coastlines, rivers, and large lakes where there is an adequate food supply. In forested areas, the bald eagle often selects the tallest trees with limbs strong enough to support a nest. Nest sites typically include at least one perch with a clear view of the water where individuals forage.

Based on consultation with the USFWS and SCDNR, the closest bald eagle nest is at Lake Greenwood, approximately 2.7 miles from the Moore to Chappells Pipeline route. Due to the proximity of the Moore to Chappells Pipeline route to Lake Greenwood, foraging or nesting bald eagles may be present. Dominion conducted a habitat assessment within the Project area from June to December 2015. No individuals or nests were observed during the habitat assessment; however, suitable habitat was identified within the vicinity of the Dorchester Compressor Station. Dominion would continue to

coordinate with the USFWS and SCDNR to develop avoidance, minimization, or mitigation measures for the species, as appropriate.

Swallow-tailed Kite (Elanoides forficatus)

The swallow-tailed kite is listed by the SCDNR as a state endangered species. The species is strongly associated with large tracts of forested wetlands of the Outer Coastal Plain in South Carolina. The species nests in loblolly pine, bald cypress, water tupelo, sweetgum, or willow oak, which are within or on the edges of wetland forests. Swallow-tailed kites are social, using shared areas for foraging, roosting, and nesting.

In South Carolina, the species has been documented in Charleston and Dorchester Counties. Dominion conducted a habitat assessment within the Project area in Charleston and Dorchester Counties between June and December 2015. No individuals or nests were observed during the habitat assessment; however, suitable habitat was identified within the Dorchester Compressor Station site. Direct impacts on the species' habitat and indirect impacts on the species (e.g., harassment) may occur as a result of Project implementation. Dominion would continue to coordinate with the SCDNR to develop avoidance, minimization, or mitigation measures for the species, as appropriate.

Rafinesque's Big-eared Bat (Corynorhinus rafinesquii)

The Rafinesque's big-eared bat is listed by the SCDNR as a state endangered species, and an At Risk Species. The species is a permanent resident of the Coastal Plains Ecoregion in South Carolina and characteristically roost in tree cavities and man-made structures. Roosting and foraging habitat includes black gum and water tupelo stands, bald cypress swamp forests, maritime forests, and mature forested bottomlands (hardwood or mixed).

In South Carolina, the species may occur in Charleston, Dillon, and Dorchester Counties. Dominion conducted a habitat assessment within the Project area in the aforementioned counties between June and December 2015. Suitable roosting habitat was identified along the Moore to Chappells Pipeline route in Dillon County. No hibernacula were identified within the Project area. Dominion would continue to coordinate with the SCDNR to develop avoidance, minimization, or mitigation measures for the species, as appropriate.

State Priority Species

At the request of the SCDNR, 28 state priority species, as presented in the South Carolina State Wildlife Action Plan (SWAP), are considered in the analyses herein for the Moore to Chappells Pipeline route (SCDNR 2015d). These state priority species are listed in the SWAP because they are (1) rare or designated as at-risk due to knowledge deficiencies; (2) species common in South Carolina but listed rare or declining elsewhere; or (3) species that serve as indicators of detrimental environmental conditions. These 28 state priority species were further evaluated to determine which species have the potential to occur in the Project area and could be affected by the Project. Table 2 in appendix G presents a summary of each species potentially affected by the Project.

As stated in the SCDNR consultation letter (SCDNR 2015c), impacts on two waterbody crossings associated with the Dillon Pipeline would be constructed using HDD technology; therefore, no additional priority species were requested for analyses.

Burrow, fish, and mussel surveys were conducted along the Moore to Chappells pipeline route between May and June 2016 (AES 2016b). Based on these survey efforts, the following ten state priority

species were identified in waterbodies within the Project area: Broad River spiny crayfish, Carolina needlenose crayfish, Chattahoochee crayfish, Newberry burrowing crayfish, eastern lampmussel, Carolina darter, fieryblack shiner, highfin shiner, sandbar shiner, and swallowtail shiner. The specific locations where each species was identified are included in appendix G.

If present at the time of construction, direct impacts on the aforementioned species and its associated habitat would occur. Where the HDD method is employed, impacts on the species and its habitat are not anticipated. The crossing methodology for waterbodies not crossed by HDD is dependent on whether water is present/flowing at the time of the crossing. If no water is flowing at the time of the crossing, the waterbody would be crossed using open-cut methodology. If water is flowing at the time of the crossing and there are no sensitive species known to be present in the waterbody, the waterbody would be crossed using the dam and pump methodology. If water is flowing at the time of the crossing and sensitive species are known to be present in the waterbody, the waterbody would be crossed using flume crossing methodology. Dominion would coordinate with the SCDNR to develop appropriate minimization and mitigation measures.

4. Land Use and Visual Resources

4.1 Land Use

The following six land use types are present within the Project area: open land, agricultural land, forest land, industrial/commercial land, residential, and open water. Open land consists of non-forested lands, maintained utility rights-of-way, roadways, and herbaceous wetlands; agricultural land consists of annual row crops and pine plantation; forest land consists of upland and wetland forests; industrial/commercial land consists of developed land that is not characterized as residential; residential land consists of existing developed residential areas and planned residential developments, including associated landscaping; and open water consists of non-forested lands, maintained utility rights-of-way, roadways, and herbaceous wetlands.

Impacts and Mitigation

Construction of the Project would disturb approximately 697.7 acres of land, including 500.8 acres for the pipeline right-of-way,49.2 acres for ATWS, 100.3 acres for access roads, 21.7 acres for laydown yards, and 23.3 acres for aboveground facilities. Following construction, approximately 286.9 acres would be retained for operation of the Project, including 259.0 acres for the permanent pipeline right-of-way, 13.2 acres for permanent access roads, and 15.0 acres for aboveground facilities. Table B.4-1 summarizes the acreage of each land use type that would be affected by construction and operation of the Project facilities.

Open Land

Open lands identified in the Project area include non-forested lands, maintained utility rights-of-way, roadways, and herbaceous wetlands. The Project would impact approximately 69.0 acres of open land during construction activities. The permanent rights-of-way, approximately 21.2 acres, in these areas would be maintained in an herbaceous state and would not result in a change in land use. However, the operation of aboveground facilities would require the conversion of 0.9 acre of open land to industrial uses. After construction, temporary workspaces would be restored and revegetated.

Agricultural Land

Agricultural uses identified in the Project area consist mainly of annual row crops such as corn, soybeans, wheat, and cotton, and timber farming. The Project would impact approximately 311.2 acres of agricultural land during construction. Dominion would implement measures outlined in the T2C Plan, including topsoil segregation and compaction mitigation, when constructing through agricultural lands to preserve soil productivity. Following construction, agricultural land would be restored to its original use, except at the aboveground facility sites and timber farms. Operation of the aboveground facilities would remove approximately 3.6 acres of agricultural land from future production, including areas that are converted to new access roads.

Pine Plantations

A total of 157.9 acres of pine plantation would be temporarily impacted by construction of the Project. These areas would be regraded to pre-construction conditions and replanted in pine. However, 86.4 acres of pine plantation would be permanently impacted and would not return to production. Dominion identified 27 individually-owned pine plantations that would be impacted by the Project. Dominion would compensate each specialty crop farmer for crop loss, which would be determined during the easement negotiations.

Eight commenters (Ms. Abney and Marybelle Smith, Mr. Robert Cobb, Ms. Dawn Weaver, Ms. Patricia Carmichael, Johnson Entities, Ms. Carol Cash, Mr. Dale Barwick, and Ms. Suzannah Smith) expressed concerns that the Moore to Chappells Pipeline would permanently impact specialty crop farms (specifically planted pine) currently in production, resulting in lost resources and future revenue to landowners.

Dominion evaluated 24 minor route variations for the Moore to Chappells Pipeline, and adopted 20 variations. At least 3 of the adopted minor route variations (16, 20, and 21; see section C.4) would result in fewer impacts on pine plantation (Mr. Abney and Marybelle Smith, Johnson Entities, and Mr. Robert Cobb).

We examined route variations to avoid or minimize pine plantation impacts on parcels owned by Ms. Carol Cash, Mr. Dale Barwick, Ms. Suzannah Smith, and Ms. Dawn Weaver (Clayton and Elizabeth Burton also commented on this property) and found that rerouting the pipeline in these areas would result in greater impacts on pine plantations on other properties.

Ms. Patricia Carmichael suggested routing the Dillon Pipeline along I-95 to minimize disruption to farming; this alternative is addressed in section C.3. Dominion would locate the pipeline adjacent to Reedy Creek Road on Ms. Carmichael's property. As stated above, agricultural land would return to pre-construction condition and use following installation of the pipeline. No aboveground facilities would be located on Ms. Carmichael's property.

Johnson Entities filed several comment letters in regard to Project impacts on its pine plantations. The letters included suggested alternative routes, and other concerns. Dominion analyzed the suggested alternative routes and provided an alternatives assessment in its June 2016 data response. Dominion incorporated minor route variation 16 between MP 3.1 and 6.2 to reduce impacts on the Johnson Entities' properties. This variation follows the property lines for a greater distance than dissecting the property as originally proposed. In subsequent comments, Johnson Properties suggested another alternative, the Johnson Reroute II, which we have analyzed in section C.4.

Johnson Entities also expressed concern for the adequate (additional) cover for the pipeline in areas of active and future logging operations to provide safe access for commercial lumbering equipment

and other vehicles. Dominion would install the pipeline in exceedance of USDOT regulations 49 CFR 192, which includes a minimum cover of 36 inches in normal soil and 24 inches in consolidated rock for Class 3 locations. Dominion would provide a minimum of four feet of cover and would construct all pipeline to Class 3 standards. In addition, Dominion would consult with the landowners during easement negotiations to determine any special requirements.

Open Water

Open water comprises less than 0.1 acre of the land use types crossed by the Moore to Chappells Pipeline; no open water is crossed by the Dillon Pipeline or other Project facilities. Dominion would cross all major waterbodies using HDD technology. Waterbodies in the Project area are discussed in more detail in section B.2.3.

Wetlands in the Project area include palustrine emergent wetlands, palustrine scrub-shrub wetlands, and palustrine forested wetlands. Dominion would HDD/bore to cross all wetlands located in the Project area to avoid potential impacts. No wetlands would be impacted by the construction of the aboveground facilities. Impacts on wetlands in the Project area are discussed in more detail in section B.2.3.

Industrial/Commercial Land

Industrial/commercial land encompasses most developed land that is not characterized as residential. The Project would impact approximately 16.2 acres of industrial/commercial land during construction and 7.8 acres of land during Project operations.

Forest Land

Approximately 286.6 acres of forest would be affected during construction of the Project. Impacts would range from long-term within temporary work areas to permanent within areas where forested land would be converted to other land use types. Temporary work areas would be allowed to revegetate following construction. Approximately 150.9 acres of forest land along the permanent pipeline right-of-way would be maintained in an herbaceous state, and approximately 11.8 acres of forest land would be permanently converted to industrial/commercial land for aboveground facilities.

TABLE B.4-1
Acreage Affected by Construction and Operation of the Project

County	Activity	Agricultural Land		Forest Land		Open Land		Industrial/ Commercial Land		Residential Land		Open Water		Total	
		Temp	Perm	Temp	Perm	Temp	Perm	Temp	Perm	Temp	Perm	Temp	Perm	Temp	Perm
Moore to Chappells Pipeline															
Spartan-burg	ROW	37.4	11.4	85.7	55.4	9.7	5.6	2	1.1	8.4	1.9	0	0	143.2	75.3
	ATWS	3.5	0	10.7	0	0.8	0	0.4	0	0.7	0	0	0	16.1	0
	Laydown Yard	0	0	0	0	0	0	1.2	0	0	0	0	0	1.2	0
	Aboveground Facilities*	0	0	0.4	0.1	0.1	0	0.4	0.3	0.1	0	0	0	0.9	0.4
	Access Roads	7.9	1.8	5.6	0.6	1.7	0.8	1.2	0	1.1	0	0	0	17.5	3.3
Laurens	ROW	121.4	46.5	102	69.4	14.4	10.2	0.3	0.1	1.1	0.7	0	0	239.1	126.9
	ATWS	9.6	0	11.1	0	2.6	0	0	0	0.1	0	0	0	23.5	0
	Laydown Yard	0	0	0	0	18.1	0	0	0	0	0	0	0	18.1	0
	Aboveground Facilities*	0.1	0.1	0.5	0.2	0	0	0	0	0	0	0	0	0.6	0.3
	Access Roads	38.5	1.4	13.7	7.1	5.4	0.3	0.1	0	2	0.2	0	0	59.7	9.1
Newberry	ROW	39.8	22.4	36.5	24.8	6.1	4.1	0.1	0.1	0.1	0.1	0	0	82.6	51.4
	ATWS	2.5	0	3.6	0	0.5	0	0.1	0	0	0	0	0	6.6	0
	Laydown Yard	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Aboveground Facilities*	0.1	0.1	0	0	0	0	0	0	0	0	0	0	0	0.3
	Access Roads	6.1	0	3.8	0	0.5	0.3	0	0	0.6	0	0	0	11	0.3
Green-wood	ROW	0	0	1.7	1.3	0	0	0	0	0	0	0	0	1.7	1.3
	ATWS	0	0	0.3	0	0	0	0	0	0	0	0	0	0.3	0
	Laydown Yard	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Aboveground Facilities*	0	0	0.2	0.2	0.1	0.1	0	0	0	0	0	0	0.3	0.3
	Access Roads	0	0	3.5	0	0	0	0.8	0	0	0	0	0	4.3	0
Total		*266.8*	*83.7*	*279.3*	*159*	*59.9*	*21.3*	*6.6*	*1.6*	*14.2*	*2.9*	*0*	*0*	*626.5*	*268.7*
Dillon Pipeline															
Dillon	ROW	31.5	2.7	0	0	2.7	1.3	0	0	0	0	0	0	34.2	4.1
	ATWS	2.5	0	0	0	0.2	0	0	0	0	0	0	0	2.7	0
	Laydown Yard	0	0	0	0	2.4	0	0	0	0	0	0	0	2.4	0
	Aboveground Facilities*	0.5	0.4	0	0	0	0	0	0	0	0	0	0	0.5	0.4
	Access Roads	3.6	0.2	0.4	0	1.2	0	0	0	0.5	0	0	0	5.8	0.2
Total		*38.1*	*3.3*	*0.4*	*0*	*6.5*	*1.4*	*0*	*0*	*0.5*	*0*	*0*	*0*	*45.5*	*4.7*

TABLE B.4-1
Acreage Affected by Construction and Operation of the Project

County	Activity	Agricultural Land		Forest Land		Open Land		Industrial/ Commercial Land		Residential Land		Open Water		Total	
		Temp	Perm	Temp	Perm	Temp	Perm	Temp	Perm	Temp	Perm	Temp	Perm	Temp	Perm
Aboveground Facilities															
Moore Compressor Station															
Spartan-burg	Compressor Station	0	0	6.8	3.6	0	0	4.2	3.9	0	0	0	0	11.1	7.5
	Access Roads	0	0	0	0	0	0	0.9	0	0	0	0	0	0.9	0
	Total	*0*	*0*	*6.8*	*3.6*	*0*	*0*	*5.1*	*3.9*	*0*	*0*	*0*	*0*	*12*	*7.5*
Dorchester Compressor Station															
Dorchester	Compressor Station	6	2.6	0.1	0.1	0.9	0.9	2.1	1.7	0	0	0	0	9.2	5.3
	Access Roads	0.2	0.2	0	0	0	0	0.4	0	0	0	0	0	0.6	0.2
	Total	*6.2*	*2.8*	*0.1*	*0.1*	*0.9*	*0.9*	*2.5*	*1.7*	*0*	*0*	*0*	*0*	*9.8*	*5.5*
Southern Compressor Station															
Aiken	Compressor Station	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Access Roads	0	0	0	0	0	0	0	0	0	0	0	0	0	0
	Total	*0*	*0*	*0*	*0*	*0*	*0*	*0.2*	*0*	*0*	*0*	*0*	*0*	*0.2*	*0*
Charleston Town Border Station – OPP System															
Charleston	Border Station	0	0	0	0	0.6	0	0.6	0.3	0.1	0	0	0	1.4	0.3
	Access Roads	0	0	0	0	0	0	0.3	0	0	0	0	0	0.3	0
	Total	*0*	*0*	*0*	*0*	*0.6*	*0*	*1*	*0.3*	*0.1*	*0*	*0*	*0*	*1.7*	*0.3*
Greenwood Town Border Station – OPP System															
Green-wood	Border Station	0.1	0	0	0	1	0	0.7	0.2	0	0	0	0	1.8	0.2
	Access Roads	0	0	0	0	0.1	0	0.1	0.1	0	0	0	0	0.2	0.1
	Total	*0.1*	*0*	*0*	*0*	*1.1*	*0*	*0.8*	*0.3*	*0*	*0*	*0*	*0*	*2*	*0.3*

* Aboveground facilities along the Moore to Chappells Pipeline include:

Spartanburg County – Moore Purchase (pig launcher), MC-MLV-1, MC-MLV-2, MC-MLV-3, MC-MLV-4, and Moore M&R Station Laurens County –MC-MLV-5, MC-MLV-6, MC-MLV-7, MC-MLV-8, MC-MLV-9, and MC-MLV-10

Newberry County – MC-MLV-11

Greenwood County – Chappells Tie-in (pig receiver)

Aboveground facilities along the Dillon Pipeline include:

Dillon County – Reedy Creek Table-Off (pig launcher), D-MLV-1, and Caldwell Drive M&R (pig receiver).

Residential Land

Residential land is developed land that includes both single and multiple family dwellings, which may be in developed subdivisions as well as rural areas. Residential land also includes landscaped areas associated with residential areas. Approximately 14.8 acres of the Project area is residential land. Construction near and/or within residential properties generally necessitates additional mitigation to address safety during construction and to minimize impacts on residences.

The majority of residential land that would be affected by the Project is along the Moore to Chappells pipeline route near Moore, South Carolina in the Graystone neighborhood. As described in its March 2016 application, Dominion analyzed several alternatives to avoid this residential area; however, these alternatives were not considered further due to an industrial development, a new railroad, and additional wetland impacts. In the Graystone neighborhood, the proposed pipeline is collocated with an existing pipeline. Dominion would minimize impacts in this area by reducing the construction right-of-way to 65 feet in this area, which includes the 40-foot-wide existing right-of-way. Dominion would use an additional 10 feet for the new pipeline's permanent right-of-way.

One commenter (Mr. Jerry Galloway) expressed several concerns regarding construction in the Graystone neighborhood of Moore, South Carolina. Mr. Galloway questioned the feasibility of an HDD in the neighborhood and later asked why the original proposed HDD had been replaced with open cut installation methods. Dominion conducted a feasibility analysis for its proposed HDDs and determined that open cut construction would have fewer impacts on the Graystone neighborhood due to space constraints and time of construction. Mr. Galloway also stressed the need for coordination with residents to minimize disruption during construction, include road damage during construction and subsequent repair. Dominion would maintain close coordination with residents of the Graystone neighborhood during construction. Dominion would also restore any roads damaged during construction to pre-construction conditions (see section A.7.2). Mr. Galloway also questioned the open cut of several road crossings in the Graystone neighborhood; each of those roads would be bored, not open cut. To ensure residents' concerns are addressed during construction, **we recommend that:**

Dominion should develop and implement an environmental complaint resolution procedure. The procedure should provide landowners with clear and simple directions for identifying and resolving their environmental mitigation problems/concerns during construction of the project and restoration of the right-of-way. Prior to construction, Dominion should mail the complaint procedures to each landowner whose property would be crossed by the project.

a. **In its letter to affected landowners, Dominion should:**

(1) provide a local contact that the landowners should call first with their concerns; the letter should indicate how soon a landowner should expect a response;

(2) instruct the landowners that if they are not satisfied with the response, they should call Dominion's Hotline; the letter should indicate how soon to expect a response; and

(3) instruct the landowners that if they are still not satisfied with the response from Dominion's Hotline, they should contact the Commission's Landowner Helpline at 877-337-2237 or at LandownerHelp@ferc.gov.

b. **In addition, Dominion should include in its biweekly status report a copy of a table that contains the following information for each problem/concern:**
   (1) the identity of the caller and date of the call;
   (2) the location by milepost and identification number from the authorized alignment sheet(s) of the affected property;
   (3) a description of the problem/concern; and
   (4) an explanation of how and when the problem was resolved, will be resolved, or why it has not been resolved.

Mr. Charles Jenkins expressed concerns about the potential impacts on his property, including boundary trees, wildlife, and visual resources. Following construction, Dominion would restore landscaping to the extent practicable and in accordance with landowner agreements. However, trees greater than 15 feet in height would not be allowed to revegetate in the permanent right-of-way for safety considerations. Wildlife and visual resources are addressed in sections B.3.3 and B.4.3 respectively.

There are 15 residential structures and 27 non-primary dwelling structures (including sheds, car ports, non-primary dwellings, and other structures) located within 50 feet of the Project along the Moore to Chappells Pipeline. There are no residential structures located within 50 feet of other Project facilities. All structures located within 50 feet of the Project and mitigation proposed by Dominion are listed in table B.4-2. There are 4 residential structures within 10 feet of construction work areas. To ensure appropriate coordination has occurred and impacts are minimized, **we recommend that:**

Prior to construction, Dominion should provide evidence of landowner concurrence for the construction work area and fencing located within 10 feet of the residences at MP 0.7, 1.0R, 15.6R, and 15.8R.

Dominion would maintain a minimum separation of 25 feet between residential structures and any construction work areas wherever feasible. Dominion has developed site-specific plans depicting the temporary and permanent rights-of-way for all residences located within 50 feet of the Project work areas (appendix H). We have reviewed the site-specific residential construction plans and find them acceptable. However, we encourage the owners of each of these residences to provide us comments on the plan for their individual property.

Dominion would ensure that construction proceeds quickly and landowners are informed prior to the commencement of construction.

Dominion would implement the following mitigation measures during construction:

- to the maximum extent practicable, property access and traffic flow would be maintained during construction activities, particularly for emergency vehicles;
- the edge of the construction work area within 50 feet of a residential structure would be fenced for a distance of 100 feet on either side of the residence to ensure that construction equipment and materials, including the spoil pile, remain within the construction work area;
- overnight, the portion of the trench containing the installed pipe would be backfilled and steel plates would be used to cover the remaining open trench;
- water trucks would be onsite to spray the construction area with water to reduce fugitive dust;
- litter and debris would be removed as needed from the construction site; and
- in specific cases, temporary accommodations would be provided.

TABLE B.4-2
Structures Within 50 Feet of the Moore to Chappells Pipeline Construction Work Area

County, State	Milepost	Distance From Construction Work Area (ft)	Distance From Pipeline Centerline (ft)	Structure Type	Number of Structures	Proposed Mitigation
Spartanburg, SC	0.0	0	85	Transco Structure	1	N/A
Spartanburg, SC	0.0	15	75	Transco Structure	1	N/A
Spartanburg, SC	0.0	15	101	Transco Structure	1	N/A
Spartanburg, SC	0.0	3	34	Transco Structure	1	N/A
Spartanburg, SC	0.2	33	76	Mobile home	1	Temporary Accommodations **a/**
Spartanburg, SC	0.2	15	48	Mobile home	1	Temporary Accommodations **a/**
Spartanburg, SC	0.2	5	25	Structure	1	N/A
Spartanburg, SC	0.3	48	83	Car port	1	N/A
Spartanburg, SC	0.5	15	64	House	1	Temporary Accommodations **a/**
Spartanburg, SC	0.6	14	44	House	1	Temporary Accommodations **a/**
Spartanburg, SC	0.7	40	70	House	1	Temporary Accommodations **a/**
Spartanburg, SC	0.7	3	23	House	1	Temporary Accommodations **a/**
Spartanburg, SC	0.7	18	48	Structure	1	N/A
Spartanburg, SC	0.7	11	41	Structure	1	N/A
Spartanburg, SC	0.7	9	29	Shed	1	N/A
Spartanburg, SC	0.9R	23	58	Structure	1	N/A
Spartanburg, SC	0.9R	0	7	Structure	1	N/A
Spartanburg, SC	1.0R	13	23	House	1	Temporary Accommodations **a/**
Spartanburg, SC	1.0R	41	76	Shed	1	N/A
Spartanburg, SC	1.0R	8	38	House	1	Temporary Accommodations **a/**
Spartanburg, SC	1.0R	0	9	Structure	1	N/A
Spartanburg, SC	1.7	0	10	ESD Valve Site	1	N/A
Spartanburg, SC	1.9R	31	162	Commercial	1	N/A
Spartanburg, SC	1.9R	11	61	Commercial	1	N/A
Spartanburg, SC	2.0	31	61	House	1	Temporary Accommodations **a/**
Spartanburg, SC	2.1	22	52	Structure	1	N/A
Spartanburg, SC	2.5R	13	63	Mobile Home	1	Temporary Accommodations **a/**
Spartanburg, SC	5.8R	27	52	Barn	1	N/A
Spartanburg, SC	5.9R	5	30	Shed	1	N/A
Spartanburg, SC	5.9R	0	0	Abandoned Shed	1	N/A
Spartanburg, SC	11.5	25	75	Structure	1	N/A

TABLE B.4-2
Structures Within 50 Feet of the Moore to Chappells Pipeline Construction Work Area

County, State	Milepost	Distance From Construction Work Area (ft)	Distance From Pipeline Centerline (ft)	Structure Type	Number of Structures	Proposed Mitigation
Spartanburg, SC	14.9R	35	85	House	1	Temporary Accommodations **a/**
Spartanburg, SC	15.6R	3	315	House	1	Temporary Accommodations **a/**
Spartanburg, SC	15.8R	0	32	House	1	Temporary Accommodations **a/**
Spartanburg, SC	16.3R	34	83	Structure	1	N/A
Spartanburg, SC	16.3R	0	4	Structure	1	N/A
Laurens, SC	18.6R	30	102	Structure	1	N/A
Laurens, SC	28.7R	28	53	Shed	1	N/A
Laurens, SC	29.0R	0	13	Non-primary dwelling	1	N/A
Laurens, SC	29.0R	31	81	Non-primary dwelling	1	N/A
Laurens, SC	29.0R	12	62	Non-primary dwelling	1	N/A
Laurens, SC	29.0R	49	136	Shed	1	N/A
Laurens, SC	29.6R	47	97	Structure	1	N/A
Laurens, SC	30.7R	33	58	Mobile home	1	Temporary Accommodations **a/**
Laurens, SC	30.7R	9	34	Car port	1	N/A
Laurens, SC	30.7R	0	25	Shed/Car port	1	N/A
Laurens, SC	30.7R	31	56	Structure	1	N/A
Laurens, SC	32.1R	13	100	Mobile home	1	Temporary Accommodations **a/**
Laurens, SC	32.1R	15	65	Shed	1	N/A
Laurens, SC	33.7R	3	53	Structure	1	N/A
Newberry, SC	49.8R	0	50	Trailer	1	N/A
Newberry, SC	52.5R	45	145	House	1	Temporary Accommodations **a/**

a As mitigation, overnight accommodations may be provided as requested by residents. Dominion and landowners would determine temporary accommodations during easement negotiations.

The Project would result in 2.9 acres of permanent impacts on residential properties. Following construction, Dominion would reseed and restore the temporary construction areas to pre-construction conditions. Property restoration would be in accordance with the T2C Plan and with agreements between Dominion and the landowner. Mature trees and landscaping would be preserved, to the extent practicable and to maintain safe conditions for operation of construction equipment. Immediately after backfilling the trench, lawn areas and landscaping within the construction work area would be restored.

The affected residential landowners would be allowed to use the permanent operational right-of-way provided they do not interfere with the rights granted to Dominion. No trees or bushes greater than 5 feet in height would be permitted on the permanent right-of-way because they may impair access to the Project right-of-way, and roots can damage the pipeline coating. No structures, including houses, sheds, barns, garages, poles, catch basins, swimming pools, trailers, leach fields, septic tanks, or any other objects not easily removed, would be permitted within the permanent right-of-way. Any leach fields or septic tanks determined to be within the construction right-of-way would be abandoned prior to construction (i.e., removed and remediated) in accordance with state/local requirements and worker health and safety standards.

Dominion's construction methods and site-specific residential construction plans would minimize the impact on residential land use to the extent practicable. We conclude that Project impacts on residential land would not be significant.

4.2 Public Land, Recreation, and Special Interest Areas

The Project is not within 0.25 mile of any National Park System Units, Indian reservations, National Wildlife Refuges, or registered National Landmarks. In addition, no state parks, forests, or registered state landmarks are within 0.25 mile of the Project.

The Moore to Chappells Pipeline is located within 0.25 mile of the South Carolina state designated Belfast WMA and the Price House, a historic property owned by the Spartanburg County Foundation and the Spartanburg Historical Association; however, these areas would not be affected by the Project. The Dillon Pipeline crosses 0.5 mile of a wetland conservation easement; however, Dominion would use HDD technology to cross this easement. No other natural, recreational, or scenic areas were identified within 0.25-mile of the Project area. The Belfast WMA and Price House are further addressed in section C.4.1.

We conclude that the Project would not impact public or conservation lands, or natural, recreation, and scenic areas.

Coastal Zone Management

South Carolina's coastal zone extends inland to include two counties within the Project area (Dorchester and Charleston). The Dorchester Compressor Station and Charleston Town Border Station are located within a CZMA. Dominion submitted a coastal zone consistency certification to the South Carolina Department of Health and Environmental Control's Office of Ocean and Coastal Resource Management, who is responsible for implementing the Coastal Zone Management Program. **We recommend that:**

> **<u>Prior to construction</u>, Dominion should file with the Secretary documentation of concurrence from the South Carolina Department of Health and Environmental Control's Office of Ocean and Coastal Resource Management that the Project is consistent with the South Carolina Coastal Zone Management Program.**

Planned Developments

Dominion consulted with county government planning officials regarding future developments scheduled to occur within 0.25 mile of the Project. One proposed development was identified: an industrial facility (Wyman-Gordon Manufacturing Plant) that would be constructed in the vicinity of the laydown areas for the Dillon Pipeline in Dillon County. The Project is not anticipated to contribute to cumulative impacts as discussed in section B.9.2.

4.3 Visual Resources

Pipeline Facilities

Impacts of the proposed pipelines on visual resources would occur primarily during active construction and would result from the removal of vegetation and the presence of heavy equipment. After completion of construction, the temporary rights-of-way would be restored to approximately pre-construction contours and allowed to revert to pre-construction uses and cover type. Any long-term visual impacts resulting from the widening of existing right-of-way and creation of a new easement would be permanent but minor.

The Moore to Chappells Pipeline would be collocated with existing right-of-way for approximately 7.4 miles (table A.4-4). Locating the pipeline within or adjacent to existing rights-of-way would reduce the visual impacts of the new construction as compared to non-collocated pipelines because of a reduced additional permanent right-of-way and similar land use in the adjacent right-of-way.

Construction of the Moore to Chappells Pipeline would be within 50 feet of 42 residential structures (table B.4-2). Impacts would be greatest during construction because of the displaced soil, and the presence of personnel and equipment. After construction, temporary workspaces would be returned to pre-construction conditions according to procedures outlined in the T2C Plan. Impacts would be minimized where the proposed pipeline is collocated with existing maintained rights-of-way.

To minimize visual impacts of construction on residences, Dominion would ensure construction proceeds quickly and in accordance with the T2C Plan and landowner agreements. To mitigate the long-term visual impacts, mature trees and landscaping would be preserved, to the extent practicable and to maintain safe conditions for operation of construction equipment. Immediately after backfilling the trench, lawn areas and landscaping within the construction work area would be restored.

The Moore to Chappells Pipeline is located within 0.25 mile of the Price House and Belfast WMA. Both the Price House and the Belfast WMA are outside of the Project construction areas and are separated from the Project by forested lands; therefore, there would be no visual impact on these properties.

Aboveground Facilities

The existing Moore Compressor Station is located between a railroad to the west and Highway 221 to the east, and 1 residence is located approximately 150 feet from the facility. The Moore Compressor Station is currently surrounded by vegetative screening and would continue to be after construction is complete. The Southern Compressor Station is an existing facility located in an industrial area. The proposed modifications at the Moore and Southern Compressor Stations would not expand the existing facilities, and therefore, would not change the existing viewshed.

The Dorchester Compressor Station would be constructed in a forested area that currently houses a 0.5-acre gas analysis station. The nearest residence is 300 feet away, and there are no recreational uses

in this area. There is one existing, adjacent undeveloped road which would be used to access the facility. Existing forested lands would continue to screen views of the Dorchester Compressor Station after construction. The town border stations would be constructed in Greenwood and Charleston Counties in previously developed areas. The Caldwell Drive M&R Station and the Reedy Creek Take-Off would be constructed at the northern and southern termini of the Dillon Pipeline in agricultural land that is remote from residential areas. Construction of the other M&R stations, pigging facilities, and MLVs would be located along the pipeline rights-of-way. Siting these features in close proximity to existing facilities would minimize the land area required for Project construction and operation and would therefore reduce environmental impacts.

Upon completion of construction, Dominion would stabilize all of the aboveground facility sites with gravel within a fenced enclosure for security. Lighting and signage would be designed to minimize impacts on adjacent residences.

We conclude that the Project's collocation with existing rights-of-way, siting of aboveground facilities, distance from any designated scenic or sensitive visual areas, and implementation of site-specific mitigation and visual screening methods, as needed, would minimize the impact on visual resources, and that impacts on visual resources would not be significant.

5. Socioeconomics

The potential socioeconomic effects of construction and operation of the Project include the increased opportunities for employment, increased demand for housing and public services, transportation impacts, and an increase in government revenue associated with sales, payroll, and property taxes within the Project area.

5.1 Population and Employment

Table B.5-1 provides a summary of selected demographic and socioeconomic conditions by county for the Project area. Population estimates within the Project area range from approximately 31,000 in Dillon County to more than 381,000 in Charleston County (U.S. Census Bureau Quick Facts 2016). The civilian labor force within the counties crossed by the Project includes more than 575,000 individuals whose major employment sectors are health, education, and social services. Unemployment rates in the counties crossed by the Project range from 8.9 to 14.4 percent (U.S. Census Bureau 2016b).

Dominion anticipates construction of its Project to begin in February 2017 and last for approximately 10 months. Peak construction workforce would be 400 workers, of which approximately 75 percent (300 workers) would be non-local. Non-local workers would utilize readily available temporary housing such as hotels, motels, apartments, and campgrounds during construction of the Project. Worker housing would be within commuting distance of the Project. The influx of non-local workers would result in a temporary minor population increase within the Project area.

Construction of the Project would result in the temporary hiring of approximately 100 local workers. Additional jobs would also be created because of secondary activities associated with the construction of the Project. These jobs would represent a temporary minor increase in employment within the Project area. During operation, the Project would create one full-time job to operate the Dorchester Compressor Station.

EO 12898 on Environmental Justice recognizes the importance of using the NEPA process to identify and address, as appropriate, disproportionately high adverse human health and environmental effects of federal programs, policies, or activities on minority populations and low-income groups. The provisions of the EO 12898 apply equally to Native American programs. Consistent with EO 12898, the

Council on Environmental Quality (CEQ) has called on federal agencies to actively scrutinize the following issues with respect to environmental justice:

- the racial and economic composition of affected communities;
- health-related issues that may amplify Project effects to minority or low-income individuals; and
- public participation strategies, including community or tribal participation in the NEPA process (CEQ 1997).

TABLE B.5-1
Existing Economic Conditions in the Transco to Charleston Project Area

State/ County	Estimated Population in 2014	Population Density (persons per square mile) a/	Per Capita Income	Rental Vacancy Rate (%)	Civilian Labor Force	Unemploy-ment Rate (%)	Major Industry
South Carolina	4,832,482	160.8	$36,677	11.7	2,274,142	10.6	Educational, health, and social services
Spartanburg	293,542	363.3	$36,583	9.5	139,296	10.3	Educational, health, and social services
Laurens	66,533	93.2	$30,131	5.0	30,587	11.7	Educational, health, and social services
Newberry	37,783	60.0	$33,686	7.8	17,962	10.5	Educational, health, and social services
Greenwood	69,520	152.9	$32,913	11.2	32,621	13.5	Educational, health, and social services
Dillon	31,127	76.9	$24,674	6.3	12,851	14.4	Educational, health, and social services
Dorchester	148,469	259.0	$33,199	7.6	71,717	9.6	Educational, health, and social services
Aiken	164,753	153.8	$37,265	7.1	76,368	10.3	Educational, health, and social services
Charleston	381,015	415.9	$47,843	11.5	194,695	8.9	Educational, health, and social services

a Estimated 2014 population density is based on 2010 land area calculations.

Sources: U.S. Bureau of the Census: State and County QuickFacts 2016; U.S. Department of Commerce, Bureau of Economic Analysis 2016; U.S. Census Bureau 2016b,c.

Non-local workers would utilize readily available temporary housing such as hotels, motels, apartments, and campgrounds during construction of the Project. Worker housing would be within commuting distance of the Project. The influx of non-local workers would result in a temporary minor population increase within the Project area.

Construction of the Project would result in the temporary hiring of approximately 100 local workers. Additional jobs would also be created because of secondary activities associated with the construction of the Project. These jobs would represent a temporary minor increase in employment within the Project area. During operation, the Project would create one full-time job to operate the Dorchester Compressor Station.

Table B.5-2 summarizes the minority and low-income populations throughout the Project area compared to the state averages.

The USEPA provides guidance on determining whether there is a minority or low-income community to be addressed in a NEPA analysis. According to this guidance, minority population issues must be addressed when they comprise over 50 percent of the affected area or when the minority population percentage of the affected area is meaningfully greater (i.e., 25 percent or greater) than the minority percentage in the larger area of the general population. Low-income areas are defined as locations in which the percentage of the population below poverty status exceeds 50 percent, or is meaningfully greater (i.e., 25 percent or greater) than the general population (respective county average poverty level) (USEPA 1998). Within the Project area, minority populations must exceed 40 percent to be considered meaningfully greater than the State of South Carolina average. In order to meet the same criteria, the low-income population within a Census Block Group must exceed 20 percent. Low-income populations are those that fall within the annual statistical poverty thresholds from the U.S. Department of Commerce, Bureau of the Census Population Reports, Series P-60 on Income and Poverty. The U.S. Census Bureau defines a poverty area as a census tract or other area where at least 20 percent of residents are below the poverty level (U.S. Census Bureau 2013).

As shown in table B.5-2, the Project would cross or affect three counties (Laurens, Greenwood, and Dillon Counties) with a low-income population (living below the poverty level) comprising more than 20 percent of the population and 1 county (Dillon County) with minority populations greater than the general USEPA guideline of 50 percent (USEPA 2015).

At the census block level, the Project would cross or affect four Census Block Groups with minority populations greater than the general USEPA guideline of 50 percent (USEPA 2015b). Three Census Block Groups (450599207001 and 450599206001 in Laurens County, and 450190031073 in Charleston County) have Hispanic or Latino populations that are meaningfully greater than their respective county averages. The Project would affect seven Census Block Groups with a low-income population (living below the poverty level) comprising more than 50 percent of the population, and 8 Census Block Groups that have low-income populations that are meaningfully greater than their respective county averages. Eighty-three percent of the Census Block Groups in the Project counties meet one or both of the criteria to be considered low-income populations.

TABLE B.5-2
Demographics and Low-income Populations in the Transco to Charleston Project Area

State/County/ Census Block Group	Percent Below the Poverty Level	Percent White Non-Hispanic	Percent African American	Percent Hispanic	Percent Asian	Percent Native American
South Carolina	18	67	28	4	1	0
Spartanburg	18	73	21	6	2	0
450830234022	25	90	7	2	3	0
450830238023	6	100	0	0	0	0
450830235002	21	92	3	1	0	0
450830237001	49	82	16	0	0	0
450830237002	49	93	8	0	1	1
Laurens	21	71	25	4	0	0
450599205011	27	70	29	0	0	0
450599206001	46	87	4	6	0	0
450599207001	58	46	55	6	1	1
450599207005	45	28	73	3	0	0
450599208003	53	72	28	3	1	0
450599210022	59	67	33	0	0	0
Newberry	17	62	30	7	1	0
450719507001	45	76	18	0	0	0
Greenwood	23	64	31	6	1	0
450479707011	40	82	17	3	0	0
Dillon	32	48	47	3	0	3
450339706001	54	68	20	0	0	4
450339703001	55	42	57	0	0	0
Dorchester	12	68	26	5	2	1
450350103002	54	78	17	0	0	1
Aiken	19	70	25	5	1	0
450030212014	8	91	3	0	6	0
Charleston	18	66	29	5	1	0
450190031073	54	31	51	17	0	0

Sources: American Community Survey Demographic and Housing Estimates: 2009-2013; USEPA 2015b.

The Project was sited to avoid environmental impacts on the extent practicable, and was not sited based on socioeconomic conditions of local populations. Dominion would employ the same impact minimization and mitigation measures throughout the Project area regardless of the presence or absence of minority or low-income populations. These standards include noise mitigation measures and fugitive dust controls to avoid negatively impacting local communities. Dominion would ensure that trucks and construction equipment are transported in a manner that causes the least disruption to affected communities within the Project area. Overall there is no evidence that the Project would cause a disproportionate share of adverse environmental or socioeconomic impacts on any racial, ethnic, or socioeconomic group.

5.2 Housing

Rental housing vacancy rates within counties crossed by the Project range from as low as 5 percent in Laurens County, to as high as 11.5 percent in Charleston County. There are approximately 16,000 rental units, 546 hotels, and 1615 camping or recreational vehicle sites within the counties crossed by the Project (U.S. Census Bureau 2016c, d; Good Sam Camping 2015; HotelMotels 2015).

At the peak of construction, the Project would require approximately 300 non-local workers, most of whom are not expected to be accompanied by families. The temporary housing available within the Project area would be capable of meeting the temporary and moderate increased demand for housing resulting from construction of the Project. The Project could have a short-term positive impact on the rental industry in the Project area through higher occupancy rates.

One permanent employee would be hired to operate the Dorchester Compressor Station and would have a negligible, long-term effect on housing demand.

5.3 Public Services

Construction of the Project would temporarily increase demand for medical, police, emergency medical services, and fire protection services in the event of a fire, traffic related, or other emergency event. Dominion employees would comply with all hazard and safety requirements to minimize the potential for accidental injuries or fire emergencies. Local emergency response and management personnel would receive emergency response training and be provided Project facility information and instructions. This information and training would be maintained on an ongoing basis thereafter. Necessary information and instructions regarding Project facilities would be provided to local law enforcement and emergency medical services in the event of an accident or emergency.

Based on the number of existing police, fire stations, and emergency medical services in the area, we conclude that it is unlikely that the Project would represent an increased burden on the public services in the area.

5.4 Transportation

The movement of equipment, materials, and personnel to construction work areas would result in modest, incremental, short-term impacts on the transportation network. Construction of the other M&R stations, pigging facilities, and MLVs would be located along the pipeline rights-of-way. Dominion has stated it would establish parking areas for construction workers within the Project workspaces and utilize, to the extent practicable, major highway to minimize potential effects to traffic. Appropriate traffic control measures such as flagmen, additional transportation escorts, electronic message boards, and signage would be utilized to ensure safety of local traffic. Prior to construction, Dominion would consult with relevant agencies in each county crossed by the Project to obtain necessary road crossing and related permits. A total of 32 state, 19 county, and 8 private or unknown roads would be crossed by the Project. Dominion would utilize conventional bore or HDD crossing methods to cross all state and/or county roads. Some private roads would be crossed via the open-cut method following negotiations with any potentially affected parties. When utilizing the open-cut method, Dominion would ensure access through the use of detours and/or plating across roads. Dominion would maintain emergency access routes at all times during construction. As a result of these measures, we do not expect construction of the Project to have significant impacts on traffic.

5.5 Economy and Tax Revenues

Construction and operation of the Project would have a beneficial impact on county and state tax revenues. A portion of the Project construction payroll would be spent locally to purchase goods, housing, food, and entertainment during construction. A portion of the materials for construction of the Project (e.g., fuel, fencing material, timber mats, concrete, sand and gravel, portable generators, hand tools), would be purchased from vendors within the counties crossed by the Project. The estimated construction payroll for the Project is approximately 57 million dollars. The bulk of most payroll earnings are expected to be spent locally on the aforementioned goods and services. Both the majority of construction-related expenditures and payroll earning would be subject to sales taxes, and therefore, would result in increased sales tax revenue for the local counties and state. This increase in tax revenue would represent a minor, short-term increase in government and local revenue.

Upon completion of the Project, the Project facilities and staff would be subject to applicable state, county, and city property and income taxes. Final tax would be determined based on the final assessed value and local and state abatement programs.

5.6 Tourism

Construction of the Project could result in minor, short-term impacts on tourism where the proposed facilities cross or would be located near recreational or special interest attractions. Impacts related to tourism could result from construction activities resulting in lower vacancy rates in the housing stock (campgrounds, hotels, motels, and for-rent properties) due to the influx of non-local workers. Due to availability of temporary housing within the Project area (section B.5.2) and the lack of recreational or special-interest attractions in the Project area, we expect Project-related increases in occupancy to be negligible, and short-term.

5.7 Property Values

We received one comment regarding the potential effect of the Project on property values. 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 the 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 fit 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.

Dominion would acquire easements for both the temporary (construction) and permanent rights-of-way and compensate landowners for the limited use during construction, and any construction related damages, per the terms of the individual landowner easement agreements.

6. Cultural Resources

Section 106 of the National Historic Preservation Act (NHPA) of 1966, as amended, requires the FERC to take into account the effects of its undertakings on properties listed in or eligible for listing in

the National Register of Historic Places (NRHP) and to afford the Advisory Council on Historic Preservation (ACHP) an opportunity to comment on the undertaking. Dominion, as a non-federal party, is assisting the FERC in meeting its obligations by providing necessary information, analyses and recommendations as authorized by 36 CFR 800.2(a)(3).

6.1 Cultural Resources Investigations

In 2015 and 2016, Dominion conducted cultural resources investigations which included a background literature review and field surveys. On August 22, 2016 Dominion filed route adjustments, modifications, deletions and additions to access roads, additional temporary work spaces and HDD locations for the project. Any necessary survey reports and consultation with the State Historic Preservation Office (SHPO) for these areas have not been filed with the Commission. The Area of Potential Effects (APE) for direct effects for the Project included a 200-foot-wide pipeline corridor where it was collocated with an existing pipeline, a 300-foot-wide pipeline corridor where there was no collocation, and the entire footprint of access roads, contractor yards, and aboveground facilities. The APE for indirect or visual effects included the area within line-of-site of the direct effects APE. The background literature review found that one archaeological site, 38DR0199, had been previously documented within the Project's direct APE; and 32 additional archaeological sites were previously recorded within 1 mile of the Project's direct APE. Additionally, the background literature review found that the Bethea Rural Historic District, considered eligible for the NRHP, had been previously identified within the Project's direct APE.

The boundaries of one previously recorded archaeological resource, 38DR0199, lay within the footprint of the Dorchester Compressor Station parcel. No evidence of the site was encountered during the current investigation. Additionally, the SHPO has concurred with a recommendation from a previous survey that the site is ineligible for inclusion in the NRHP. No further work was recommended at the site prior to construction of the compressor station.

The Dominion survey identified one newly recorded archaeological site (38DR0450) which was recommended eligible for inclusion in the NRHP based upon the results of the survey. Based upon the current design of the compressor station, the site would be avoided, although the installation and maintenance of protective fencing has been recommended to further protect the site.

Eight newly recorded sites were identified within the Dillon Pipeline portion of the Project area (table B.6-1). One of these resources, 38DN187 was located within the Bethea Rural Historic District, and subsequently recommended for further testing to determine its NRHP eligibility. Although the remaining seven sites were recommended ineligible for the NRHP, the SHPO recommended further work at site 38DN193 to determine eligibility for the NRHP. The SHPO also indicated that there was insufficient information provided for site 38DN188 to support the recommendation of ineligible for the NRHP.

TABLE B.6-1
Archaeological Sites Identified Within the Dillon Pipeline Portion of the Project Area

Site #	P/H	Recommended NRHP Eligibility	Proposed Treatment	Current Status
38DN187	Prehistoric/Historic	Potentially Eligible	Avoidance or Phase 2 NRHP Testing	Avoided

TABLE B.6-1
Archaeological Sites Identified Within the Dillon Pipeline Portion of the Project Area

Site #	P/H	Recommended NRHP Eligibility	Proposed Treatment	Current Status
38DN188	Prehistoric	Not Eligible	None	SHPO requests further information to assess eligibility
38DN189	Historic	Not Eligible	None	No further measures
38DN190	Historic	Not Eligible	None	No further measures
38DN191	Historic	Not Eligible	None	No further measures
38DN192	Historic	Not Eligible	None	No further measures
38DN193	Prehistoric/Historic	Not Eligible	None	SHPO recommends further work to determine eligibility
38DN194	Historic	Not Eligible	None	No further measures
Bethea Rural Historic District	Historic	Determined Eligible	Avoid Adverse Impacts	Consult with SHPO to identify appropriate measure

During survey of the Moore to Chappells Pipeline portion of the Project area, 19 newly recorded sites and 6 isolated finds were identified. Isolated finds are, by nature, ineligible for the NRHP. The 19 newly recorded archaeological sites identified within the Moore to Chappells Pipeline corridor are identified in table B.6-2. Standing architectural structures survey was also conducted for all portions of the Project APE where landowner permission had been granted. No architectural resources were found to be within the Project APE.

TABLE B.6-2
Archaeological Sites Identified Within the Moore to Chappells Pipeline Portion of the Project Area

Site #	P/H	Recommended NRHP Eligibility	Proposed Treatment	Current Status
38SP430	Historic	Not Eligible	None	No Further Measures
Isolated Find	Prehistoric	Not Eligible	None	No Further Measures
38SP423	Prehistoric	Not Eligible	None	No Further Measures
Isolated Find	Prehistoric	Not Eligible	None	No Further Measures
38SP425	Historic	Not Eligible	None	No Further Measures
Isolated Find	Prehistoric	Not Eligible	None	No Further Measures
38LU740	Historic/ Prehistoric	Not Eligible	None	No Further Measures
38LU741	Prehistoric	Not Eligible	None	No Further Measures
38LU747	Historic	Not Eligible	None	No Further Measures
Isolated Find	Prehistoric	Not Eligible	None	No Further Measures
38LU743	Historic/ Prehistoric	Not Eligible	None	No Further Measures

TABLE B.6-2
Archaeological Sites Identified Within the Moore to Chappells Pipeline Portion of the Project Area

Site #	P/H	Recommended NRHP Eligibility	Proposed Treatment	Current Status
38LU744	Historic	Not Eligible	None	No Further Measures
38LU746	Historic/ Prehistoric	Not Eligible	None	No Further Measures
Isolated Find	Prehistoric	Not Eligible	None	No Further Measures
TBD **a/**	Historic/ Prehistoric	Not Eligible	None	No Further Measures
38LU745	Prehistoric	Potentially Eligible	Avoidance or Phase 2 NRHP Testing	Avoided
38LU742	Historic/ Prehistoric	Not Eligible	None	No Further Measures
38NE1101	Historic/ Prehistoric	Not Eligible	None	No Further Measures
38NE1094	Historic	Not Eligible	None	No Further Measures
Isolated Find	Historic	Not Eligible	None	No Further Measures
38NE1095	Historic	Not Eligible	None	No Further Measures
38NE1096	Historic/Prehistoric	Not Eligible	None	No Further Measures
38NE1100	Historic	Not Eligible	None	No Further Measures
38NE1097	Historic	Not Eligible	None	No Further Measures
38GN838	Prehistoric	Potentially Eligible	Avoidance or Phase 2 NRHP Testing	Avoided

a Permanent State Site Number is in the process of being obtained.

On March 8, 2016, draft Cultural Resources Reports were submitted to the South Carolina State Historic Preservation Office (SHPO) (Jorgenson and Sittig 2016a, 2016b). The reports recommended three sites as potentially eligible for the NRHP, and one for further testing to determine eligibility. In a letter dated April 12, 2016, the SHPO requested revision of the draft report. In June 2016, revised Cultural Resources Reports were submitted to the SHPO, addressing revisions requested by the SHPO, and documenting the results of cultural resources investigations carried out for all portions of the Project APE where landowner permission had not been granted as of January, 2016, but was granted as of April, 2016 (Jorgenson and Sittig 2016c,d). The Project APE included the Moore Compressor Station, an existing facility which had been previously surveyed in 2013. Since the previous survey resulted in negative findings, no further investigation was required. Additionally, 96 access roads were surveyed as part of the Project APE. Five archaeological sites were encountered along Access Roads 5, 10, and 96. While laydown yards are depicted on figures in the Revised Cultural Resources Reports, no discussion of survey or documentation of previous disturbance was included. Dominion recommended avoidance or testing for two sites, while site 38DR0450 was recommended as eligible for the NRHP. Site 38DR0450, located within the Dorchester Compressor Station parcel, would not be affected by the Project. In a letter dated July 20, 2016 the SHPO provided comments to the *Revised Phase I Archaeological Survey Charleston Project Dillon Pipeline and Moore to Chappells Pipeline Report* and the *Revised Phase I and*

Phase II Archaeological Survey and Testing for Dorchester Compressor Station Transco to Charleston Project Report, and requested that the comments be addressed in a revised draft reports once survey is 100% complete. The SHPO indicated that they would provide comments on the National Register eligibility and Section 106 effect determinations once the reports were complete.

6.2 Native American Consultation

On June 9, 2015, and April 4, 2016, the FERC sent NOIs describing the details of the Project and requesting comments regarding potential concerns related to the Project to five federally recognized tribes, including the Eastern Band of Cherokee Indians, the Catawba Indian Nation, the Cherokee Nation, the Muscogee Creek Nation, and the United Keetoowah Band of Cherokee Indians. On June 10, 2015 Dominion sent letters introducing the Project to the same tribes. Additionally, consultation letters were sent to the same five tribes by the FERC on December 9, 2015. The Catawba Indian Nation stated that they had no immediate concerns with regard to traditional cultural properties, sacred sites, or Native American archaeological sites within the boundaries of the Project areas. The United Keetoowah Band of Cherokee Indians indicated that prehistoric, ethnographic, historic, and traditional sites of value to their tribe surround the Project area, and recommended that a full cultural resources inventory, including systematic fieldwork, be completed prior to Project implementation. We have received no other responses to date.

6.3 Unanticipated Discoveries Plan

Dominion developed an Unanticipated Discovery Plan that would be implemented if previously unidentified cultural resources, such as archeological sites, historic features, or human remains are encountered during Project construction. We find the plan to be acceptable.

6.4 Impacts and Mitigation

Survey of all project areas and consultation with the SHPO and any interested Indian Tribes are not complete. For any NRHP-eligible resources that could not be avoided and would be affected by the Project, consultation among Dominion, the FERC, the SHPO and any interested Indian Tribes would be required to develop appropriate mitigation measures.

To ensure that required cultural resource surveys and consultations are completed for all Project components and that FERC's responsibilities under the NHPA and its implementing regulations are met, **we recommend that:**

Dominion should <u>not</u> begin implementation of any treatment plans/measures (including archaeological data recovery); construction of facilities; or use staging, storage, or temporary work areas and new or to-be-improved access roads <u>until</u>:

a. Dominion files with the Secretary all survey reports, evaluation reports, avoidance plans and treatment plans, and the SHPO's comments on the reports and plans;

b. the ACHP is afforded an opportunity to comment if historic properties would be adversely affected; and

c. FERC staff reviews and the Director of the OEP approves all reports and plans and notifies Dominion in writing that construction may proceed.

All material filed with the Commission 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."

7. Air Quality and Noise

7.1 Air Quality

Air quality would be affected by construction and operation of the Project. Although air emissions would be generated by construction activities, these emissions would be temporary and spread over a large area. The proposed aboveground facilities include 1 new compressor station, modifications to 2 existing compressor stations, 3 M&R stations, 13 MLVs, 2 pig launchers/receivers, 2 OPP systems, and 3 interconnects. The majority of new emissions from the Project would result from operation of new and relocated compressors. The modifications would result in emissions during construction at the sites and operations due to the addition of new piping, valves, and atmospheric tanks. Emissions from the Southern Compressor Station are expected to decrease, and therefore, are not analyzed in this document.

Existing Air Quality

South Carolina generally has a humid subtropical climate with characteristics of such climates being less predominant in the Piedmont Region and increasing towards the Coastal Region. As recommended by the SCDHEC, data from the National Weather Service surface meteorological stations located at the Greenville-Spartanburg International Airport (Station ID 03870) and the Charleston International Airport (Station ID 13880) were used to describe meteorological conditions in the vicinity of the Moore Compressor Station (located in the Piedmont Region) and the Dorchester Compressor Station (located near the Coastal Region) respectively. Since there would likely be a net decrease in emissions at the Southern Compressor Station, no adverse impact on the environment is expected as a result of the modifications at the Southern Compressor Station.

Ambient air quality is protected by federal and state regulations. The USEPA established National Ambient Air Quality Standards (NAAQS) to protect human health and welfare.[17] 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 seven "criteria pollutants": 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 (Pb), and include levels for short-term (acute) and long-term (chronic) exposures. However, O_3 is not a pollutant emitted into the air. It is formed from a chemical reaction between NO_X and volatile organic compounds (VOC) in the presence of sunlight. Consequently, emissions of NO_X and VOCs are regulated by the USEPA as "precursors" to the formation of O_3.

For the Project areas, the SCDHEC has adopted the NAAQS, as promulgated by the USEPA. SCDHEC also regulates emissions of air toxic compounds by imposing maximum allowable ambient concentrations for certain chemicals.

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

The USEPA now defines air pollution to include the mix of six long-lived and directly emitted greenhouse gases (GHGs), finding that the presence of GHGs in the atmosphere may endanger public health and welfare through climate change. The following gases are considered GHGs: carbon dioxide (CO_2), methane (CH_4), nitrous oxide (N_2O), hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride. As with any fossil-fuel fired project or activity, the Project would contribute GHG emissions. The principle GHGs that would be emitted by the Project are CO_2, CH_4, and N_2O. No fluorinated gases would be emitted by the Project. GHG emissions are quantified and regulated in units of CO_2 equivalents (CO_2e). The CO_2e takes into account the global warming potential (GWP) of each GHG. The GWP is a ratio relative to CO_2 of a particular GHG's ability to absorb solar radiation as well as its residence time within the atmosphere. Thus, CO_2 has a GWP of 1, CH_4 has a GWP of 25, and N_2O has a GWP of 298 (40 CFR 98, Subpart A, Table A-1)[18]. In accordance with USEPA's definition of air pollution to include GHGs, we have summarized GHG emissions for construction and operation, as discussed throughout this section. Impacts from GHG emissions (i.e., climate change) are discussed in more detail within this section.

Air quality control regions (AQCRs) are areas established by the USEPA and local agencies for air quality planning purposes, in which State Implementation Plans describe how the NAAQS would be achieved and maintained. The AQCRs are intra- and interstate regions such as large metropolitan areas where improvement of the air quality in one portion of the AQCR requires emission reductions throughout the AQCR. Each AQCR, or smaller portion within an AQCR (such as a county or multiple counties), is designated, based on compliance with the NAAQS, as attainment, unclassifiable, maintenance, or nonattainment, on a pollutant-by-pollutant basis. Areas in compliance or below the NAAQS are designated as attainment, while areas not in compliance or above the NAAQS are designated as nonattainment. Areas previously designated as nonattainment that have since demonstrated compliance with the NAAQS are designated as maintenance for that pollutant. Maintenance areas may be subject to more stringent regulatory requirements to ensure continued attainment of the NAAQS. Areas that lack sufficient data to determine attainment status are designated unclassifiable and treated as attainment areas. The Project's areas are designated as attainment or unclassifiable for all pollutants.

The majority of operational emissions from the Project would result from the compressor stations. The USEPA, along with state and local agencies, collects data on ambient air quality at monitoring stations across the United States. To characterize existing ambient air quality conditions for the Project, air quality data at the monitoring stations that were most representative (i.e., in closest proximity) of each proposed new (Dorchester) or uprated (Moore) compressor station are presented in tables B.7-1 and B.7-2 with the Project air quality impact for comparison with NAAQS contained in table B.7-7. Dominion would not add compression at the Southern Compressor Station.

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

TABLE B.7-1
Ambient Air Quality Data – Moore Compressor Station

Pollutant	Monitor	Averaging Period	Monitored Concentration j/ k/	Units	Data Period
CO	Yorkville, Paulding County, GA	8-hour a/	618	$\mu g/m^3$	2009-2013
		1-hour a/	745	$\mu g/m^3$	2009-2013
Lead	Cartersville, Bartow County, GA	Rolling 3- month b/	0.0185	$\mu g/m^3$	2011-2013
NO_2	Yorkville, Paulding County, GA	Annual c/	5	$\mu g/m^3$	2009-2013
		1-hour d/	32.4	$\mu g/m^3$	2011-2013
Ozone	Chesterfield, Chesterfield County, SC	8-hour e/	0.062	ppm	2011-2013
PM_{10}	Chesterfield, Chesterfield County, SC	24-hour f/	31	$\mu g/m^3$	2011-2013
$PM_{2.5}$	Chesterfield, Chesterfield County, SC	Annual g/	8.1	$\mu g/m^3$	2012-2014
		24-hour h/	17	$\mu g/m^3$	2012-2014
SO_2	Decatur, DeKalb County, GA	3-hour a/	23.8	$\mu g/m^3$	2011-2013
		1-hour i/	30.3	$\mu g/m^3$	2011-2013

a Three-year average of the high-second high values.

b Three-year maximum three-month rolling average.

c Three-year annual average

d Three-year average of the 98th percentile of the daily maximum 1-hour averages.

e Three-year average of 4th-highest daily maximum 8-hour average ozone concentrations.

f Fourth highest 24-hour average over 3-year period.

g Three-year average annual mean $PM_{2.5}$ concentrations.

h Three-year average of the annual 98th percentile 24-hour concentrations.

I Three-year average of 99th percentile daily maximum 1-hour averages.

j Data from SC monitoring stations from SCDHEC, revised September 11, 2015. https://www.scdhec.gov/Environment/AirQuality/ComplianceandReporting/AirDispersionModeling/ModelingData/.

k Data from GA monitoring stations from Georgia Environmental Protection Division, revised October 3, 2014. http://epd.georgia.gov/air/documents/ssppmodeling-georgia-background-data

TABLE B.7-2
Ambient Air Quality Data – Dorchester Compressor Station

Pollutant	Monitor	Averaging Period	Monitored Concentration j/ k/	Units	Data Period
CO	Parlane, Columbia, SC	8-hour a/	916	$\mu g/m^3$	2011-2013
		1-hour a/	1450.3	$\mu g/m^3$	2011-2013
Lead	Jenkins Avenue Fire Station, North Charleston, SC	Rolling 3- month b/	0.006	$\mu g/m^3$	2009-2011
NO_2	Jenkins Avenue Fire Station, North Charleston, SC	Annual c/	12.4	$\mu g/m^3$	2011-2013
		1-hour d/	72.1	$\mu g/m^3$	2011-2013
Ozone	Bushy Park, Berkley County	8-hour e/	0.061	ppm	2011-2013
PM_{10}	Jenkins Avenue Fire Station, North Charleston, SC	24-hour f/	49	$\mu g/m^3$	2011-2013
$PM_{2.5}$	Charleston FAA Beacon, Charleston County, SC	Annual g/	8.4	$\mu g/m^3$	2012-2014
		24-hour h/	18	$\mu g/m^3$	2012-2014
SO_2	Jenkins Avenue Fire Station, North Charleston, SC	3-hour a/	35.8	$\mu g/m^3$	2011-2013
		1-hour i/	41.9	$\mu g/m^3$	2011-2013

a Three-year average of the high-second high values.

b Three-year maximum three-month rolling average.

c Three-year annual average.

d Three-year average of the 98th percentile of the daily maximum 1-hour averages.

e Three-year average of 4th-highest daily maximum 8-hour average ozone concentrations.

f Fourth highest 24-hour average over 3-year period.

g Three-year average annual mean $PM_{2.5}$ concentrations.

h Three-year average of the annual 98th percentile 24-hour concentrations.

i Three-year average of 99th percentile daily maximum 1-hour averages.

j Data from SC monitoring stations from SCDHEC, revised September 11, 2015. https://www.scdhec.gov/Environment/AirQuality/ComplianceandReporting/AirDispersionModeling/ModelingData/.

k Data from GA monitoring stations from Georgia Environmental Protection Division, revised October 3, 2014. http://epd.georgia.gov/air/documents/ssppmodeling-georgia-background-data

Air Quality Regulatory Requirements

Air quality in the United States is regulated by federal statutes in the Clean Air Act (CAA) and its amendments. The provisions of the CAA that are applicable to the Project are discussed below.

Air Permitting

New Source Review (NSR) is a pre-construction permitting program designed to protect air quality when air pollutant emissions are increased either through the modification of existing sources or through the construction of a new source of air pollution. In attainment areas with good air quality, NSR ensures that the new emissions do not degrade the air quality, which is achieved through the implementation of the Prevention of Significant Deterioration (PSD) permitting program or state minor permit programs. In areas with impaired air quality, Nonattainment NSR ensures that the new emissions

do not inhibit progress toward cleaner air. In addition, NSR ensures that any large, new, or modified industrial source uses the best available air pollution control technology. Air permitting of stationary sources has been delegated to each state. Based on the operating emissions presented in tables B.7-3 and B.7-4, potential emissions are not considered a major source and an NSR permit would not be required for any of Dominion's new or uprated compressor stations.

Title V is an operating air permit program run by each state for each facility that is considered a "major source". The Dorchester and Moore Compressor Stations are subject to Title V Permitting based on their potential emissions. Dominion would need to apply for a Title V permit and modifications to an existing Title V permit, respectively, within 12 months of commencing operation.

TABLE B.7-3
Potential Emissions from the Moore Compressor Station (tpy)

Emissions Source (number)	NO_X	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	Single HAP/ Total HAPs	CO_2e
Existing Emission Sources	80.2	2.4	130.2	0.1	0.9	0.9	0.12/0.17	15,642
Project Emission Increase	138.7	11.0	85.4	0.03	0.9	0.9	0.36/0.66	17,866
Compressor turbines (4)	165.4	4.2	268.6	0.10	1.6	1.6	0.19/0.27	30,062
Emergency Generators (1)	0.1	0.5	0.3	<0.1	<0.1	<0.1	<0.1/<0.1	71
Tank Fugitives (4)	--	0.1	--	--	--	--	--/--	--
Catalytic heaters, comfort heaters	0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1/<0.1	88.6
Pneumatic Devices	--	1.5	--	--	--	--	<0.1/<0.1	563
Wet Seal Degassing	--	0.7	--	--	--	--	<0.1/<0.1	256.3
Equipment Blowdowns	--	1.5	--	--	--	--	--	595.0
Equipment Leaks	--	4.9	--	--	--	--	0.2/0.2	1,871.2
Total Emissions after Project	*165.5*	*13.4*	*268.9*	*0.1*	*1.8*	*1.8*	*0.36/0.66*	*33,508*

TABLE B.7-4
Potential Emissions from the Dorchester Compressor Station (tpy)

Emissions Source (number)	NO_X	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	Single HAP/ Total HAPs	CO_2e
Compressor Turbines (3)	109.5	5.1	178.2	0.6	1.2	1.2	0.1/0.17	6,535
Emergency Generators (1)	0.1	0.5	0.3	<0.1	<0.1	<0.1	<0.1/<0.1	71.0
Tank Fugitives (3)	--	0.1	--	--	--	--	--/--	--
Parts Washer	--	0.1	--	--	--	--	--	--
Catalytic Heaters / Comfort Heater	0.1	<0.1	0.1	<0.1	<0.1	<0.1	<0.1/<0.1	85.5
Pneumatic Devices	--	1.0	--	--	--	--	<0.1/<0.1	396
Wet Seal Degassing	--	0.5	--	--	--	--	<0.1/<0.1	192.2
Equipment Blowdowns	--	1.3	--	--	--	--	0.1	501.2
Equipment Leaks	--	4.9	--	--	--	--	0.2/0.2	1,871.2
Total	*109.8*	*13.5*	*178.6*	*0.6*	*1.1*	*1.1*	*0.32/0.53*	*22,724*

TABLE B.7-5
Fugitive Gas Emissions from Pipeline and Minor Aboveground Facilities (tpy)

Emissions Source a/ g/	Methane	CO_2e
Station Blowdown and Venting b/	320	8,000
Pipeline Blowdown and Venting c/	53	1,325
Station Pneumatic Device Venting d/	99	2,475
Station Fugitives e/	660	16,500
Pipeline Fugitives f/	0.46	11.5
Total	*1,133*	*28,312*

a Emissions based on Interstate Natural Gas Association of America's (INGAA) Greenhouse Gas Emission. Estimation Guidelines for Natural Gas Transmission and Storage: Volume 1 – GHG Emission Estimation Methodologies and Procedures dated 28 September 2005 (INGAA Guidelines).

b Emission factors for station blowdowns from INGAA's Greenhouse Gas Emission Estimation Guidelines for Natural Gas Transmission and Storage–- Volume I GHG Emission Estimation Methodologies and Procedures, table 3-6, emission factor for M&R stations. The emission factor is applied to all stations (except compressor stations) associated with the Project, which is conservative given that higher emissions would be expected from M&R stations than, for example, mainline valve stations.

c Emission factors for pipeline blowdowns from INGAA's Greenhouse Gas Emission Estimation Guidelines for Natural Gas Transmission and Storage–- Volume I GHG Emission Estimation Methodologies and Procedures, table 3-6, emission factor for transmission pipeline.

d Emission factor for pneumatic device venting from INGAA's Greenhouse Gas Emission Estimation Guidelines for Natural Gas Transmission and Storage – Volume I GHG Emission Estimation Methodologies and Procedures, table 3-4. The calculation assumes that each station has one isolation valve operator (810.5 lbs/device-yr), one isolation valve (796 lbs/device-yr), and one control loop (7,584 lbs/device-yr); thus, the total emission factor is 9,191 lb/station-yr. The emission factor is applied to all stations (except compressor stations) associated with the Project. This calculation approach may overestimate emissions from pneumatic devices because it assumes that a valve operator, isolation valve, and control loop are present at each facility and some stations may have fewer pneumatic devices.

e Emission factors for station fugitive emissions (leaks) from INGAA's Greenhouse Gas Emission Estimation Guidelines for Natural Gas Transmission and Storage–- Volume I GHG Emission Estimation Methodologies and Procedures, table 4-4, emission factor for M&R stations (transmission interconnects). The emission factor is applied to all stations (except compressor stations) associated with the Project, which is conservative given that higher emissions would be expected from M&R stations than, for example, mainline valve stations.

f Estimation Methodologies and Procedures table 4-4, emission factor for protected steel transmission pipeline.

g INGAA emission factors from INGA''s Greenhouse Gas Emission Estimation Guidelines for Natural Gas Transmission and Storage–- Volume I GHG Emission.

Mandatory Greenhouse Gas Reporting Rule

The EPA's Mandatory Reporting of Greenhouse Gases Rule requires reporting from applicable sources of GHG emissions if they emit greater than or equal to 25,000 metric tons of GHG (as CO_2e) in 1 year. The Mandatory Reporting Rule does not require emission control devices and is strictly a reporting requirement for stationary sources based on actual emissions. Although the rule does not apply to construction emissions, we have provided GHG construction emission estimates, as CO_2e, for accounting and disclosure purposes in table B.7-6. Based on the emission estimates presented, actual GHG emissions from operation of the Moore Compressor Station has the potential to exceed the 25,000 metric tons per year (tpy) reporting threshold. The Dorchester Compressor Station potential is less than 25,000 metric tpy. Recent additions to the Mandatory Reporting Rule effective for calendar year 2016 require reporting of GHG emissions generated during operation of natural gas pipeline transmission systems, which would include blowdown emissions, equipment leaks, and vent emissions at compressor stations, as well as blowdown emissions between compressor stations (40 CFR 98 Subpart W). Operational GHG emission estimates for the Project are presented, as CO_2e, in tables B.7-3 through B.7-5. Therefore, if the actual emissions during operations from any of the compressor stations are equal to or greater than 25,000 metric tpy, Dominion would be required to comply with all applicable requirements of the rule.

TABLE B.7-6
Estimated Construction Emissions (tons)

Location	NO_X	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
Moore to Chappells Pipeline							
Mobile Source	24.09	3.23	21.04	0.03	1.71	1.64	4,300
Fugitive Dust	0	0	0	0	37.92	5.92	0
Total	24.09	3.23	21.04	0.03	39.63	7.57	4,300
Dillon Pipeline							
Mobile Source	13.76	1.73	6.65	0.01	1.06	1.02	2,481
Fugitive Dust	0	0	0	0.001	2.69	0.44	0
Total	13.76	1.73	6.65	0.01	3.76	1.47	2,481
Moore Compressor Station							
Mobile Source	5.62	0.73	3.12	0.01	0.35	0.33	1,637
Fugitive Dust	0	0	0	0	1.15	0.22	0
Total	5.62	0.73	3.12	0.01	1.51	0.55	1,637
Dorchester Compressor Station							
Mobile Source	3.44	0.47	2.41	0.01	0.24	0.22	789
Fugitive Dust	0	0	0	0	1.28	0.24	0
Total	3.44	0.47	2.41	0.01	1.52	0.46	789
Southern Compressor Station							
Mobile Source	3.70	0.46	2.13	0.01	0.26	0.24	846
Fugitive Dust	0	0	0	0	0.33	0.08	0
Total	3.70	0.46	2.13	0.01	0.58	0.32	846
Charleston Town Border Station							
Mobile Source	0.59	0.12	0.87	0.00	0.04	0.03	183
Fugitive Dust	0	0	0	0	0.88	0.16	0

TABLE B.7-6
Estimated Construction Emissions (tons)

Location	NO_X	VOC	CO	SO_2	PM_{10}	$PM_{2.5}$	CO_2e
Total	0.59	0.11	0.88	0.001	0.092	0.019	183
Connections							
Mobile Source	0.59	0.12	0.87	0.001	0.04	0.03	183
Fugitive Dust	0	0	0	0	0.47	0.1	0
Total	0.59	0.11	0.88	0.001	0.51	0.13	183

National Emission Standards for Hazardous Air Pollutants

The 1990 CAA Amendments established a list of 189 hazardous air pollutants (HAPs) (since 1990, USEPA has modified the list through rulemaking to include 187 hazardous air pollutants), resulting in the promulgation of National Emission Standards for Hazardous Air Pollutants (NESHAPs). The NESHAPs regulate HAP emissions from stationary sources by setting emission limits, monitoring, testing, record keeping, and notification requirements. Subpart ZZZZ (National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines) would apply to the emergency electrical power generators at each compressor station. Dominion would be subject to all applicable Subpart ZZZZ monitoring, recordkeeping, and reporting requirements and would comply with NESHAPs Subpart ZZZZ by complying with New Source Performance Standards (NSPS) Subpart JJJJ requirements.

New Source Performance Standards

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

NSPS Subpart JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines) sets emission standards for NO_X, CO, and VOCs. Subpart JJJJ would apply to the engine in the emergency electrical power generators at each of the Project compressor stations. Dominion would comply with all applicable requirements of subparts JJJJ.

The combustion turbines proposed for installation at the Moore Compressor Station were originally constructed in the 1960s, well before the Subpart KKKK applicability date. Since these would be refurbished prior to installation the applicant has assumed that the combustion turbines to be installed at the station as a part of this Project would be modified or reconstructed prior to installation, which would make them subject to Subpart KKKK. The compressors for the Dorchester Compressor Station are not being modified and were constructed before all applicability dates in Part 60 for turbines.

NSPS Subpart OOOOa was promulgated to reduce emissions of GHGs and VOCs from oil and natural gas production and transmission and would apply to the Dorchester and Moore Compressor Stations. Dominion would be required to implement specific measures to reduce GHG/VOC emissions from centrifugal and reciprocating compressors, pneumatic controllers, and large storage tanks. In addition, compliance would require measures for finding and repairing leaks.

General Conformity

The General Conformity Rule was developed to ensure that federal actions in nonattainment and maintenance areas do not impede states' attainment of the NAAQS. The lead federal agency must conduct a conformity determination if a federal action's construction and operational activities are likely to result in generating direct and indirect emissions that would exceed the General Conformity Applicability threshold levels of the pollutant(s) for which an air basin is designated nonattainment or maintenance. There are no nonattainment or maintenance areas for the Project; therefore, the emissions from this Project are exempt and deemed to be in conformance with the General Conformity Rule.

State Regulations

Dominion would be required to obtain a construction permit from the SCDHEC to authorize construction and operation of both the Moore and Dorchester Compressor Stations. Dominion would also be required to request a modification to the Title V operating permit for both facilities. Since equipment is not being added to or modified at the Southern Compression Station, a permit modification is not required for this station. Dominion would notify SCDHEC that turbines are being removed from the site, likely via an administrative amendment.

Dominion's compressor stations and pipeline would be subject to state regulations including, but not limited to, the following:

- Regulation 61-62.1 –- Definitions and General Requirements
- Regulation 61-62.2 –- Prohibition of Open Burning
- Regulation 61-62.3 –- Air Pollution Episodes
- Regulation 61-62.4 –- Hazardous Air Pollution Conditions
- Regulation 61-62.5 –- Standard No. 2 Ambient Air Quality Standards
- Regulation 61-62.5 –- Standard No. 4 Emissions from Process Industries
- Regulation 61-62.5 –- Standard No. 5.2 Control of Oxides of Nitrogen (Moore Compressor Station only)
- Regulation 61-62.5 –- Standard No. 8 Toxic Air Pollutants
- Regulation 61-62.70 –- Title V Operating Permit Program

Impacts and Mitigation

Construction Emissions

Construction of the Project would result in temporary, localized increases of tailpipe emissions from mobile diesel- and gas-fueled equipment. In addition, temporary increases in fugitive dust emissions would occur due to surface disturbance caused by construction activities, construction vehicle travel on unpaved roads, and open burning. Emissions would be generated from delivery vehicles and vehicles associated with construction workers traveling to and from work sites.

Excess cleared materials may be chipped or hauled for disposal in a suitable landfill. Dominion would follow South Carolina's open-burning regulations, permitting, approval, and notification processes during such activities, including restrictions on burn locations, materials, and time, as well as consideration of local air quality.

Table B.7-6 shows a summary of the applicant's estimated construction emissions for the Project.

Construction emissions would occur over the duration of the construction period (estimated to be 10 months) and would be emitted at different times and locations across the Project area.

For the construction period, tailpipe emissions of NO_X, CO, PM_{10}, $PM_{2.5}$, SO_2, and GHGs from mobile construction equipment were calculated based on emission factors derived from USEPA MOVES2014 Model (USEPA MOVES 2014). VOC emissions are calculated by multiplying the hydrocarbon emission factor from MOVES2014 by 1.053, which is the ratio of VOC to total hydrocarbons according to "Conversion Factors for Hydrocarbon Emission Components" (USEPA 2010). HAP emissions are calculated based on emission factors presented in USEPA AP-42, Section 3.3, Table 3.3-2 for engines ≤ 600 HP and AP-42 Section 3.4, Tables 3.4-3 and 3.4-4 for engines > 600 HP.

The volume of fugitive dust generated by surface disturbance and vehicle travel on unpaved roads 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 PM_{10} and $PM_{2.5}$ emissions from excavation and backfilling were calculated using USEPA's Compilation of Air Pollutant Fugitive PM_{10} and $PM_{2.5}$ from construction equipment based on equipment operating on unpaved roads and were calculated using the USEPA's Compilation of Air Pollutant Emission Factors (AP-42) Section 13.2.2 (USEPA, 2006). The applicant used the assumption that PM_{10} is 47 percent of total PM, and $PM_{2.5}$ is 7.2 percent of PM. A dust control efficiency of 75 percent was assumed based on using water trucks to apply water and dust suppressants.

Dominion would implement its Fugitive Dust Control Plan (Accession number 20160523-5181) for construction activities, which includes mitigation measures for dust abatement, in addition to spraying of water (e.g., limiting dirt/mud track-out), a description of how these measures would be implemented (e.g., identification of speed limits, use of speed limit signage, use of gravel at construction entrances to reduce track-out), and information about accountability or identification of the individual with authority regarding fugitive dust mitigation. The plan adequately identifies techniques necessary to address dust control. Dominion's Fugitive Dust Control Plan mitigation measures include:

- utilize existing public and private roads and pipeline right-of-way for access during construction wherever possible. Use only Project approved roads for access;
- reduce vehicle speeds on unpaved roads; 10 miles per hour speed limits would be set on unpaved roads;
- clean up track-out and/or carry-out areas at paved road access points;
- ensure that all haul truck cargo compartments are constructed and maintained so as to minimize spills and loss of materials. Cover haul truck loads or maintain at least 6 inches of freeboard space in each cargo compartment; cover haul truck loads of sand, gravel, solid trash, or other loose material;
- apply water to affected unpaved roads, unpaved haul/access roads, and staging areas (when in use);

- when appropriate, apply a water/magnesium chloride mixture as needed as a dust suppressant. The use of magnesium chloride would be restricted in sensitive vegetative areas, where only water or alternative dust suppressants would be considered;
- apply water to active construction areas as needed. Areas should be pre-watered and soils maintained in a stabilized condition where support equipment and vehicles would operate. Water disturbed soils would form a crust, reducing the potential for dust creation;
- control water spray so that over-spraying and pooling would be avoided to the extent possible;
- where roads are paved, no dust mitigation may be necessary; and
- for temporary surfaces during periods of inactivity, restrict vehicular access by means of either fencing or signage, and apply water to comply with the stabilized surface requirements.

Water trucks would be the primary means of dust abatement during all phases of construction. Water spray would be controlled so that over-spraying and pooling would be avoided to the extent possible. Where roads are paved, no dust mitigation may be necessary.

Because pipeline construction is temporary, air emissions associated with the construction of the Project would be intermittent and short-term. Construction emissions for the Project would be minimized by the mitigation measures described within this section. Once construction activities in an area are completed, fugitive dust and construction equipment emissions would be greatly reduced, and the short-term impact on air quality due to construction would return to pre-construction levels. Further, construction emissions would not occur in an area with impaired air quality. Therefore, we conclude that the Project would not result in a significant impact on local or regional air quality.

Operational Emissions

Sources of air emissions during the operation of the Project would principally be from the combustion of gas for compression units at the compressor stations. Minor fugitive emissions of natural gas would occur along the pipeline and at minor aboveground facilities. Tables B.7-3 and B.7-4 provide the potential emissions for the Moore and Dorchester Compressor Stations which include existing station emissions for the modified compressor station, and Table B.7-5 lists the fugitive gas emissions estimated for operation of the pipeline. Since there would likely be a net decrease in emissions at the Southern Compressor Station, no adverse impacts on air quality are expected due to the Southern Compressor Station as a result of this Project. Dominion calculated air pollutant emissions from full-load operation of its proposed compressor station equipment using emissions factors from vendor data, the USEPA's Compilation of Air Pollutant Emission Factors (AP-42) and 40 CFR 98. Fugitive GHG emissions from equipment at the compressor stations were estimated using methods outlined in 40 CFR 98, Subpart W.

As part of the air-permit applications for compressor stations, the USEPA approved American Meteorological Society/Environmental Protection Agency Regulatory Model (AERMOD) air dispersion model software was used to identify impacts associated with each compressor station for CO, SO_2, NO_2, $PM_{2.5}$, and PM_{10}. Table B.7-7 provides the ambient background data from the stations listed in tables B.7-1 and B.7-2, the Project impact predicted by air modeling conducted by the applicant, the combined concentration, and a comparison with the NAAQS for all these pollutants. Based on this modeling analysis provided by the applicant, the Project is not expected to cause or contribute to an exceedance of NAAQS.

TABLE B.7-7
Air-dispersion Modeling Results for the Compressor Stations Operating at Full-load

Pollutant	Averaging Period	Regional Background ($\mu g/m^3$)	Project Impact a/ ($\mu g/m^3$)	Project Impact + Background ($\mu g/m^3$)	NAAQS ($\mu g/m^3$)
Moore Compressor Station					
NO_2	1-hour	32.4	102.8	135.2	188
NO_2	Annual	5	4.6	9.6	100
$PM_{2.5}$	24-hour	17	0.3	17.3	35
$PM_{2.5}$	Annual	8.1	0.1	8.2	12
PM_{10}	24-hour	31	0.6	31.6	150
CO	1-hour	745	323.1	1,068.1	40,000
CO	8-hour	618	175.8	793.8	10,000
SO_2	3-hour	23.8	0.1	23.9	1,300
SO_2	1-hour	30.3	0.1	30.4	195
Dorchester Compressor Station					
NO_2	1-hour	72.1	66.5	138.6	188
NO_2	Annual	12.4	1.8	14.2	100
$PM_{2.5}$	24-hour	18	0.1	18.1	35
$PM_{2.5}$	Annual	8.4	<0.1	8.4	12
PM_{10}	24-hour	49	0.2	49.2	150
CO	1-hour	1,450.3	221.6	1,671.9	40,000
CO	8-hour	916	107.2	1,023.3	10,000
SO_2	3-hour	35.8	0.5	36.3	1,300
SO_2	1-hour	41.9	0.5	42.4	195

a these values represent both existing and new emission sources at Dorchester Compressor Station

Results demonstrate that the Project compressor stations are not expected to cause an exceedance of the NAAQS and the ambient concentrations would continue to remain protective of human health and public welfare for all listed pollutants. Therefore we conclude that emissions resulting from operation of Dominion's proposed new and modified compressor stations would not have significant impacts on local or regional air quality.

7.2 Noise

Impacts on the noise environment can result from both construction and operation of natural gas pipeline facilities. Two measures to relate the time-varying quality of environmental noise to its known effect on people are the 24-hour equivalent sound level (L_{eq}) and the day-night sound level (L_{dn}). The L_{eq} is the level of steady sound with the same total (equivalent) energy as the time-varying sound of interest averaged over a 24-hour period. The L_{dn} is the L_{eq} plus 10 decibels on the A-weighted scale (dBA) added to account for people's greater sensitivity to nighttime sound levels (between the hours of 10 pm and 7 am). The A-weighted scale is used because 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 dBA; 6 dBA is clearly noticeable to the human ear and 10 dBA is perceived as a doubling of noise.

Regulatory Requirements

In 1974, the EPA published its *Information on Levels of Environmental Noise Requisite to Protect Public Health and Welfare with an Adequate Margin of Safety* (USEPA, 1974). This document provides information for state and local governments to use in developing their own ambient noise standards. The EPA determined that an L_{dn} of 55 dBA protects the public from indoor and outdoor activity noise interference. An L_{dn} of 55 dBA is equivalent to a continuous noise level of 48.6 dBA. The Commission's requirements in 18 CFR 380.12(k)(4)(v)(A) specify that noise attributable to the operation of any new or modified compressor station must not exceed an L_{dn} of 55 dBA at the nearest noise-sensitive areas (NSAs). Examples of NSAs include residences, schools and day-care facilities, hospitals, long-term care facilities, places of worship, libraries, parks, and wilderness areas and recreational areas valued specifically for their solitude and tranquility. In addition to noise requirements, FERC requires that operation of the compressor station not result in any perceptible increase in vibration.

South Carolina does not regulate noise at the state level. Dominion identified noise ordinances for several jurisdictions in the Project area. The only jurisdiction that contained a numerical performance noise ordinance was Aiken County. All remaining jurisdictions were found to have "nuisance type" noise ordinances that generally prohibit loud and unnecessary sounds, and placed restrictions on allowable hours for construction activities. Dominion has indicated that construction would occur within the allowable hours of each jurisdiction and that no variances would be sought.

The Aiken County numerical noise ordinance limits operational noise by frequency ranges at both residential and non-residential lot lines. The Aiken County frequency limits sum to dBA levels of 56 dBA and 63 dBA for residential and non-residential lot lines, respectively. The 56 dBA residential limit would further be equivalent to an L_{dn} level of about 62 dBA for a source that operates at the same sound level 24 hours per day, which is less restrictive than FERC's 55 dBA L_{dn} criterion.

Existing Conditions

Existing NSAs were identified in the vicinity of each compressor station and M&R station. Dominion conducted ambient noise surveys at multiple NSAs in the vicinity of each site. Ambient noise level measurements at the existing Moore Compressor Station were conducted during the day with one turbine in operation during initial measurements, and with a second turbine in operation during subsequent measurements. The measured levels were logarithmically added such that the full load operational sound level with both turbines in operation could be determined. Ambient measurements at the Dorchester and Southern Compressor Station sites were conducted during the day and at night. The NSAs near each site, their distance and direction from the site, and the measured ambient sound levels, are summarized in table B.7-8.

TABLE B.7-8
Identified NSA Locations and Measured Ambient Noise Levels

Station	NSA	Distance and Direction	Measured Ambient dBA L_{dn}
Moore Compressor Station	NSA 1	740 feet / WNW	52
	NSA 2	725 feet / N	53
	NSA 3	1,130 feet / NE	50
	NSA 4	720 feet / SE	50
Dorchester Compressor Station	NSA 1	2,740 feet / N	45
	NSA 2	3,485 feet / N	45
	NSA 3	3,670 feet / NW	50
Southern Compressor Station	NSA 1	1,075 feet / SW	54
	NSA 2	1,225 feet / WNW	56
	NSA 3	1,000 feet / NNW	56

Impacts and Mitigation

Construction Noise

Construction activity and associated noise levels would vary depending on the phase of construction in progress at any one time. The highest level of construction noise typically occurs during earth-moving work. Construction noise is highly variable. Construction equipment operates intermittently, and the type of equipment in use at a given location at any point in time changes with the phase of construction. The sound level impacts on NSAs along the pipeline right-of-way due to construction activities would depend on the type of equipment used, the duration of use for each piece of equipment, the number of construction vehicles and machines used simultaneously, and the distance between the sound source and receptor. Dominion has proposed to limit construction activity for conventional pipelines and compressor stations to daytime hours (7 a.m. to 10 p.m.). However, Dominion does not intend to work beyond 7 p.m. If the need arises, Dominion would work with the communities to minimize impacts.

An exception to the typical daytime construction time period would be certain HDD activities, which may continue into nighttime hours and could operate 24 hours per day for several days. Because of the potential nighttime activity and the fact that the equipment used for the HDDs would be stationary for an extended period of time, there is a greater potential for a prolonged noise impact.

Dominion conducted a noise assessment of construction activities for the compressor stations and for HDD activities. Compressor station construction noise levels were found to be less than 55 dBA as an L_{dn} at any NSAs, and we therefore do not anticipate any significant or long-term impacts due to compressor station construction.

Dominion proposes to conduct HDD at 20 sites along the proposed pipeline route. NSAs within 0.5 mile of all HDD sites were identified and potential impacts were assessed. Dominion identified 11 sites where contributable noise from HDD drilling could exceed 55 dBA as an L_{dn}, or, where the existing ambient sound level is already greater than 55 dBA L_{dn}, HDD noise may increase the ambient sound level by more than 10 dBA.

TABLE B.7-9
Project Noise Analyses of Construction Noise on NSAs near HDD Entry Sites (dBA L_{dn})

HDD a/	Milepost	Number of NSAs within ½ Mile	Distance and Direction to Nearest NSAs (feet)	Measured or Estimated Ambient	Unmitigated Calculated HDD Contribution	Anticipated Mitigation b/	Mitigated HDD Contribution c/	Calculated HDD + Ambient	Potential Noise Increase
Moore to Chappells									
HDD-02a	6.7	6	980 NW	47	58	3	55	56	9
HDD-02b			1520 S	47	54	---	54	55	7
HDD-02c			2100 E	49	50	---	50	52	3
HDD-03a	9.5	18	1015 WSW	47	58	3	55	56	9
HDD-03b			2060 SE	47	51	---	51	52	5
HDD-03c			825 WNW	47	60	5	55	56	9
HDD-03d			1970 NE	47	50	---	50	52	5
HDD-04a	10.3	11	2275 NE	47	50	---	50	52	5
HDD-04b			1030 SW	47	57	2	55	56	9
HDD-04c			2565 NW	47	48	---	48	51	3
HDD-04d			1400 W	47	54	---	54	55	8
HDD-04e			2575 NW	47	48	---	48	51	4
HDD-05a	14.9	46	300 W	47	70	15	55	56	9
HDD-05b			700 W	47	61	6	55	56	9
HDD-05c			250 NE	47	72	17	55	56	9
HDD-05d			540 NE	47	64	9	55	56	9
HDD-06a	15.7	113	370 SW	50	68	13	55	56	9
HDD-06b			1165 SSE	58	58	---	58	61	3
HDD-06c			500 N	47	65	10	55	56	9
HDD-06d			450 E	51	66	11	55	56	9
HDD-06e			1850 E	53	54	---	54	56	3
HDD-07a	16.8	3	2025 N	54	50	---	50	55	1
HDD-07b			1970 N	54	50	---	50	56	2
HDD-08a	20.1	1	820 WSW	42	60	5	55	55	13
HDD-08b			2800 SSW	42	47	---	47	48	7
HDD-09a	24.5	10	1240 ENE	59	55	---	55	61	1
HDD-09b			1440 ESE	59	54	---	54	60	1

TABLE B.7-9
Project Noise Analyses of Construction Noise on NSAs near HDD Entry Sites (dBA L_{dn})

HDD a/	Milepost	Number of NSAs within ½ Mile	Distance and Direction to Nearest NSAs (feet)	Measured or Estimated Ambient	Unmitigated Calculated HDD Contribution	Anticipated Mitigation b/	Mitigated HDD Contribution c/	Calculated HDD + Ambient	Potential Noise Increase
HDD-10	25.7	6	2240 NW	56	49	---	49	57	1
HDD-11a	29.8	64	2000 ENE	59	50	---	50	60	1
HDD-11b			1205 ESE	58	56	---	56	60	2
HDD-11c			620 SW	62	63	---	63	66	3
HDD-11d			530 W	53	64	9	55	57	4
HDD-11e			1350 SE	54	55	---	55	58	3
HDD-11f			1500 SSE	49	55	---	55	56	7
HDD-11g			2175 SSW	47	50	---	50	52	5
HDD-11h			1800 SW	50	52	---	52	54	4
HDD-12a	38.7	11	880 SSE	42	60	5	55	55	13
HDD-12b			1550 NE	52	53	---	53	56	4
HDD-13a	39.6	12	2000 NE	42	51	---	51	51	9
HDD-13b			1780 SSE	42	52	---	52	52	10
HDD-13c			850 SSW	42	59	4	55	55	13
HDD-14d	53.0	5	2530 NW	55	48	---	48	56	1
HDD-17a	21.3	18	1500 SW	45	56	1	55	55	10
HDD-17b			2315 NE	50	49	---	49	52	3
HDD-17c			1715 NNW	50	52	---	52	54	4
HDD-17d			1715 SE	42	52	---	52	52	11
HDD-18a	22.4	10	1510 N	53	53	---	53	56	3
HDD-19a	25.6	8	1900 NNE	58	51	---	51	59	1
HDD-19b			1980 NW	56	52	---	52	57	1
HDD-20a	28.2	29	1500 W	43	54	---	54	54	11
HDD-20b			1900 SSE	44	52	---	52	52	8
HDD-24a	4.5	23	890 E	47	59	4	55	56	9
HDD-24b			1060 SE	47	57	2	55	56	9
HDD-24c			1700 NW	47	52	---	52	54	6
HDD-24d			1580 SW	47	54	---	54	55	7

TABLE B.7-9
Project Noise Analyses of Construction Noise on NSAs near HDD Entry Sites (dBA L_{dn})

HDD a/	Milepost	Number of NSAs within ½ Mile	Distance and Direction to Nearest NSAs (feet)	Measured or Estimated Ambient	Unmitigated Calculated HDD Contribution	Anticipated Mitigation b/	Mitigated HDD Contribution c/	Calculated HDD + Ambient	Potential Noise Increase
HDD-24e			1260 SE	47	55	---	55	56	9
HDD-24f			1640 SW	47	54	---	54	55	8
Dillon Pipeline									
HDD-1	0.2	2	3345 NE	41	46	---	46	47	6
HDD-2a	2.2	4	1220 SE	56	56	---	56	59	3
HDD-2b			4650 NE	62	44	---	44	62	0
HDD-2c			950 SE	56	58	---	58	60	4
HDD-2d			1200 SW	56	56	---	56	59	3

a Letters used to distinguish different NSAs in proximity of same HDD location.

b Minimum reduction required to meet FERC limits.

c Calculated HDD contribution after implementation of noise control measures to reduce attributable noise to 55 dBA as an Ldn, or, where the existing ambient sound level is already greater than 55 dBA Ldn, no more than a 10 dBA increase.

Dominion has demonstrated that noise mitigation can be implemented to achieve an L_{dn} of 55 dBA at HDD sites. Dominion has identified options available and **we recommend that**:

> **Prior to construction, Dominion should file with the Secretary, for the review and written approval by the Director of OEP, a HDD noise mitigation plan to reduce the projected noise level attributable to the proposed drilling operations at nearby NSAs for HDD 02, 03, 04, 05, 06, 08, 11, 12, 13, 17, and 24. During drilling operations, Dominion should implement the approved plan, monitor noise levels, include the noise level results in its bi-weekly construction status reports, and make all reasonable efforts to restrict the noise attributable to the drilling operations to no more than an L_{dn} of 55 dBA at the NSAs.**

Based on the above analyses, proposed mitigation measures, and our recommendation, we conclude that construction of the Project would not result in significant noise impacts on NSAs.

Operational Noise

The compressor stations would contain combustion turbines, compressors, cooling fans, and other noise generating sources as listed in table B.7-10. Operational noise sources and impacts on nearby NSAs are discussed below.

TABLE B.7-10
Summary of Proposed Noise-Generating Equipment at Each New and Modified Station

Compressor/Meter Stations	New/Modifications	Proposed Major Noise-Generating Equipment
Dorchester Compressor Station	New	Three Solar Saturn 10 turbines and compressors, cooling fans.
Moore Compressor Station	Modifications	Two Solar Saturn 10 combustion turbines and compressors, cooling fans.
Southern Compressor Station	Modifications	One Solar Saturn 10 combustion turbine and compressor, cooling fans.
Caldwell Metering and Regulating Station	New	Valves, meters, piping.
Chappells Tie-in Metering and Regulating Station	New	Valves, meters, piping.
Moore Compressor Station Metering and Regulating Station	New	Valves, meters, piping.

Dominion calculated noise levels that would be attributable to operation of the proposed new and modified compressor stations and M&R stations. Table B.7-11 presents the calculated noise levels for each compressor and meter station operating under full load conditions as well as the existing ambient noise level and predicted future noise level at the nearest NSAs.

The noise analysis for the three compressor stations incorporated specific noise mitigation measures to reduce impacts. Dominion indicated that these measures were included in its noise analyses to achieve the noise level presented. These noise mitigation measures, which were site-specific, included the following:

- Compressor building enclosures.
- Combustion turbine enclosures.
- Silencers for combustion turbine air inlet and exhausts.
- Noise barriers.

No noise mitigation measures are proposed for the M&R stations.

TABLE B.7-11
Project Noise Analyses of Operational Noise on NSAs near Aboveground Facilities (dBA L_{dn})

Station	NSA a/	Distance and Direction to NSA (feet)	Existing Measured Ambient L_{dn}	Estimated Project Contribution L_{dn}	Calculated Compressor Project + Ambient L_{dn}	Potential Noise Increase
Moore Compressor Station	NSA 1 White Lillie Farm Rd	740 NW	52	51	55	3
	NSA 2 White Lillie Farm Rd	725 N	53	51	55	2
	NSA 3 US-221	1130 NE	50	47	52	2
	NSA 4 US 221	720 SE	50	51	54	4
Dorchester Compressor Station	NSA 1 Polly Rd	2740 N	45	41	46	1
	NSA 2 Polly Rd	3485 N	45	39	46	1
	NSA 3 Enoch Lane	3670 NW	50	38	50	0
Southern Compressor Station	NSA 1 Dwyer Lane	1075 SW	54	46	55	1
	NSA 2 Augusta Rd	1225 WNW	56	44	56	0
	NSA 3 Augusta Rd	1000 NNW	56	46	56	0
Moore M&R Station	NSA 1 White Lillie Farm Rd	750 NNW	52	39	52	0
Chappells M&R Station	NSA 1 Territories Blvd	400 WNW	60	45	60	0

a No NSAs were identified within one-half mile of the Caldwell M&R station.

As shown in the table, the calculated noise attributable to each compressor station and M&R station is below our 55 dBA L_{dn} criterion. At the existing Southern Compressor Station site (one standby unit being converted to baseload operation), and the proposed Chappells M&R Station, where existing ambient L_{dn} levels are slightly above 55 dBA, no increases over the existing ambient levels are projected. Increases in noise at the remaining sites are shown to be low, with the largest increase being 4 dBA or less. Dominion also evaluated the calculated noise level for the Southern Compressor Station (existing plus modifications) against the Aiken County frequency based noise ordinance and concluded that Project operations would be in compliance with the ordinance.

Dominion also evaluated the combined effect from the Moore M&R station and the Moore Compressor Station due to their proximity to each other. Dominion concluded that noise generated by the M&R station would be less than 1 dBa increase at the NSAs, negligible even when added to the expected noise from the Moore Compressor Station.

Dominion conducted an analysis of expected blowdown noise levels at the nearest NSA to the Moore Compressor Station (appendix 9D of Dominion's Application, June 2016). The blowdown vents would be equipped with silencers to reduce noise levels. Dominion's analysis indicated that blowdowns would occur occasionally and last approximately 10 minutes each time. Dominion indicated that noise levels of up to 63 dBA would occur at the nearest NSA to the Moore Compressor Station during blowdowns. Similar noise levels would be expected at the Dorchester and Southern Compressor Stations.

During the period of commissioning and testing, a unit blowdown could potentially occur two to five times per week, typically only during daytime hours. After the commissioning period, during normal operations, unit blowdowns would occur much less frequently and last for approximately 10 minutes per event.

Based on the noise analysis above, noise levels attributable to operation of the Moore, Dorchester, and Southern Compressor Stations would be less than 55 dBA L_{dn} at all of the NSAs.

To ensure that the noise from the compressor stations does not exceed an L_{dn} of 55 dBA at the nearest NSAs, **we recommend that:**

Dominion should file with the Secretary a noise survey for the Moore and Dorchester Compressor Stations no later than 60 days after placing each station into service. If a full power load condition noise survey is not possible, Dominion should file an interim survey at the maximum possible power load within 60 days of placing the station into service and file the full power load survey within 6 months. If the noise attributable to operation of all equipment at the station under interim or full power load conditions exceeds an L_{dn} of 55 dBA at any nearby NSA, Dominion should:

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

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

c. confirm compliance with this requirement by filing a second full power load noise survey with the Secretary for review and written approval by the Director of OEP no later than 60 days after it installs the additional noise controls.

Based on the noise analyses above and our recommendations, we conclude that construction and operation of the Project would not have a significant impact on the noise environment in the Project area.

8. 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. The natural gas in Dominion's Moore to Chappells and Dillon Pipelines would contain a chemical odorant that produces the familiar "natural gas smell".

Methane has an auto-ignition temperature of 1,000 degrees Fahrenheit and is flammable at concentrations between 5.0 percent and 15.0 percent in air. An unconfined mixture of methane and air is not explosive, however it may ignite and burn if there is an ignition source. 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.

8.1 Safety Standards

The USDOT is mandated to prescribe minimum safety standards to protect against risks posed by pipeline facilities under Title 49, U.S.C. Chapter 601. The USDOT's Pipeline and Hazardous Materials Safety Administration (PHMSA) administers the national regulatory program to ensure the safe transportation of natural gas and other hazardous materials by pipeline. It develops safety regulations and other approaches to risk management that ensure safety in the design, construction, testing, operation, maintenance, and emergency response of pipeline facilities. Many of the regulations are written as performance standards which set the level of safety to be attained and allow the pipeline operator to use various technologies to achieve safety. PHMSA's safety mission is to ensure 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.

Title 49, U.S.C. Chapter 601 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 USDOT's agent to inspect interstate facilities within its boundaries; however, the USDOT is responsible for enforcement actions. For the Project, the State of South Carolina has delegated authority to inspect interstate pipeline facilities.

The USDOT 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 (Memorandum) dated January 15, 1993, between the USDOT and the FERC, the USDOT has the exclusive authority to promulgate federal safety standards used in the transportation of natural gas. Section 157.14(a)(9)(vi) of the FERC's regulations require that an applicant certify that it would design, install, inspect, test, construct, operate, replace, and maintain the facility for which a Certificate is requested in accordance with federal safety standards and plans for maintenance and inspection. Alternatively, an applicant must certify that it has been granted a waiver of the requirements of the safety standards by the USDOT in accordance with section 3(e) of the Natural Gas Pipeline Safety Act. The FERC accepts this certification and does not impose additional safety standards. If the Commission becomes aware of an existing or potential safety problem, there is a provision in the

Memorandum to promptly alert USDOT. The Memorandum also provides for referring complaints and inquiries made by state and local governments and the general public involving safety matters related to pipelines under the Commission's jurisdiction.

The FERC also participates as a member of the USDOT's Technical Pipeline Safety Standards Committee which determines if proposed safety regulations are reasonable, feasible, and practicable.

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

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

Class 1	Location with 10 or fewer buildings intended for human occupancy.
Class 2	Location with more than 10 but less than 46 buildings intended for human occupancy.
Class 3	Location with 46 or more buildings intended for human occupancy or where the pipeline lies within 100 yards of any building, or small well-defined outside area occupied by 20 or more people on at least 5 days a week for 10 weeks in any 12-month period.
Class 4	Location where buildings with four or more stories aboveground are prevalent.

Class locations representing more populated areas require higher safety factors in pipeline design, testing, and operation. For instance, 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.

Class locations also specify the maximum distance to a sectionalizing block valve (e.g., 10.0 miles in Class 1, 7.5 miles in Class 2, 4.0 miles in Class 3, and 2.5 miles in Class 4). Pipe wall thickness and pipeline design pressures; hydrostatic test pressures; MAOP; inspection and testing of welds; and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas. Preliminary class locations for the Transco to Charleston Project have been developed based on the relationship of the pipeline centerline to other nearby structures and manmade features. Dominion would construct the Project using Class 3 pipe.

If a subsequent increase in population density adjacent to the right-of-way results in a change in class location for the pipeline, Dominion would reduce the MAOP or replace the segment with pipe of sufficient grade and wall thickness, if required to comply with the USDOT requirements for the new class location.

The USDOT Pipeline Safety Regulations require operators to develop and follow a written integrity management program that contain all the elements described in 49 CFR 192.911 and address the

risks on each transmission pipeline segment. The rule establishes an integrity management program which applies to all high consequence areas (HCA).

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

- 20 or more buildings intended for human occupancy; or
- an identified site.

Once a pipeline operator has determined the HCAs along its pipeline, it must apply the elements of its integrity management program to those segments of the pipeline within HCAs. The USDOT regulations specify the requirements for the integrity management plan at section 192.911. Of the 59.7 miles of proposed pipeline route, Dominion has identified approximately 1.3 miles that would be classified as an HCA. The pipeline integrity management rule for HCAs requires inspection of the pipeline HCAs every 7 years.

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

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

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

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[19] The potential impact radius is calculated as the product of 0.69 and the square root of: the MAOP of the pipeline in psig multiplied by the square of the pipeline diameter in inches.

- emergency system shutdown and safe restoration of service;
- making personnel, equipment, tools, and materials available at the scene of an emergency; and
- protecting people first and then property, and making them safe from actual or potential hazards.

The USDOT requires that each operator establish and maintain liaison with appropriate fire, police, and public officials to learn the resources and responsibilities of each organization that may respond to a natural gas pipeline emergency, and to coordinate mutual assistance. The operator must also establish a continuing education program to enable customers, the public, government officials, and those engaged in excavation activities to recognize a gas pipeline emergency and report it to appropriate public officials. Dominion would provide the appropriate training to local emergency service personnel before the pipeline is placed in service.

8.2 Pipeline Accident Data

The USDOT requires all operators of natural gas transmission pipelines to notify the USDOT of any significant incident and to submit a report within 30 days. Significant incidents are defined as any leaks that:

- caused a death or personal injury requiring hospitalization; or
- involved property damage of more than $50,000 (1984 dollars)20.

During the 20 year period from 1995 through 2014, a total of 1,265 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 B.8-1 provides a distribution of the causal factors as well as the number of each incident by cause.

The dominant causes of pipeline incidents are corrosion and pipeline material, weld or equipment failure constituting 49.6 percent of all significant incidents. The pipelines included in the data set in table B.8-1 vary widely in terms of age, diameter, and level of corrosion control. Each variable influences the incident frequency that may be expected for a specific segment of pipeline.

[20] $50,000 in 1984 dollars is approximately $112,955 as of May, 2015 (CPI, Bureau of Labor Statistics, 2015).

TABLE B.8-1
Natural Gas Transmission Pipeline Significant Incidents by Cause a/ 1995-2014

Cause	No. of Incidents	Percentage
Corrosion	291	23.0
Excavation **b/**	207	16.4
Pipeline material, weld or equipment failure	337	26.6
Natural force damage	147	11.6
Outside force **c/**	79	6.2
Incorrect operation	40	3.2
All other causes **d/**	164	13.0
TOTAL:	1,265	-

a All data gathered from PHMSA Significant incident files, January 14, 2016. http://www.phmsa.dot.gov/pipeline/library/data-stats/pipelineincidenttrends

b Includes third party damage

c Fire, explosion, vehicle damage, previous damage, intentional damage

d Miscellaneous causes or unknown causes

The frequency of significant incidents is strongly dependent on pipeline age. Older pipelines have a higher frequency of corrosion incidents and material failure, since corrosion and pipeline stress/strain is a time-dependent process.

The use of both an external protective coating and a cathodic protection system[21], required on all pipelines installed after July 1971, significantly reduces the corrosion rate compared to unprotected or partially protected pipe.

Outside force, excavation, and natural forces are the cause in 34.5 percent of significant pipeline incidents. These result from the encroachment of mechanical equipment such as bulldozers and backhoes; earth movements due to soil settlement, washouts, or geologic hazards; weather effects such as winds, storms, and thermal strains; and willful damage. Table B.8-2 provides a breakdown of outside force incidents by cause.

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 pipelines contain a disproportionate number of smaller-diameter pipelines; which have a greater rate of outside forces incidents. Small diameter pipelines are more easily crushed or broken by mechanical equipment or earth movement.

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 (e.g., oil pipelines

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

and cable television) to provide pre-construction information to contractors or other maintenance workers on the underground location of pipes, cables, and culverts.

TABLE B.8-2
Outside Forces Incidents by Cause 1995-2014

Cause	No. of Incidents	Percent of all Incidents
Third party excavation damage	172	13.6
Operator excavation damage	24	1.9
Unspecified excavation damage/previous damage	11	0.9
Heavy rain/floods	72	5.7
Earth movement	34	2.7
Lightning/temperature/high winds	26	2.1
Natural force (other)	15	1.2
Vehicle (not engaged with excavation)	47	3.7
Fire/explosion	8	0.6
Previous mechanical damage	6	0.5
Fishing or maritime activity	7	0.5
Intentional damage	1	0.1
Electrical arcing from other equipment/facility	1	0.1
Unspecified/other outside force	7	0.6
TOTAL:	433	-

8.3 Impact on Public Safety

The service incidents data summarized in table B.8-2 include pipeline failures of all magnitudes with widely varying consequences.

Table B.8-3 presents the average annual injuries and fatalities that occurred on natural gas transmission lines for the 5 year period between 2010 and 2014. The majority of fatalities from pipelines are due to local distribution pipelines not regulated by FERC. These are natural gas pipelines that distribute natural gas to homes and businesses after transportation through interstate natural gas transmission pipelines. In general, these distribution lines are smaller diameter pipes and/or plastic pipes which are more susceptible to damage. Local distribution systems typically do not have large rights-of-way and pipeline markers common to the FERC regulated natural gas transmission pipelines. Therefore, incident statistics inclusive of distribution pipelines are inappropriate to use when considering natural gas transmission projects.

TABLE B.8-3
Injuries and Fatalities - Natural Gas Transmission Pipelines

Year	Injuries	Fatalities
2010[1]	61	10
2011	1	0
2012	7	0
2013	2	0
2014	1	1

TABLE B.8-3
Injuries and Fatalities - Natural Gas Transmission Pipelines

Year	Injuries	Fatalities

a All of the fatalities in 2010 were due to the Pacific Gas and Electric pipeline rupture and fire in San Bruno, California on September 9, 2010.

The nationwide totals of accidental fatalities from various anthropogenic and natural hazards are listed in table B.8-4 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. The data nonetheless indicate a low risk of death due to incidents involving natural gas transmission pipelines compared to the other categories. Furthermore, the fatality rate is much lower than the fatalities from natural hazards such as lightning, tornados, or floods.

The available data show that natural gas transmission pipelines continue to be a safe, reliable means of energy transportation. From 1995 to 2014, there were an average of 63 significant incidents, 9 injuries, and 2 fatalities per year. The number of significant incidents over the more than 303,000 miles of natural gas transmission lines indicates the risk is low for an incident at any given location. The operation of the Project would represent a slight increase in risk to the nearby public.

TABLE B.8-4
Nationwide Accidental Deaths a/

Type of Accident	Annual No. of Deaths
All accidents	117,809
Motor Vehicle	45,343
Poisoning	23,618
Falls	19,656
Injury at work	5,113
Drowning	3,582
Fire, smoke inhalation, burns	3,197
Floods **b/**	89
Tractor Turnover **c/**	62
Lightning **b/**	54
Natural gas distribution lines **d/**	14
Natural gas transmission pipelines **d/**	2

a All data, unless otherwise noted, reflects 2005 statistics from U.S. Census Bureau, Statistical Abstract of the United States: 2010 (129th Edition) Washington, DC, 2009; http://www.census.gov/statab.

b NOAA National Weather Service, Office of Climate, Water and Weather Services, 30 year average (1985-2014) http://www.weather.gov/om/hazstats.shtml.

c Bureau of Labor Statistics, 2007 Census of Occupational Injuries.

d PHMSA significant incident files, January 14, 2016. http://www.phmsa.dot.gov/pipeline/library/data-stats/pipelineincidenttrends, 20 year average.

9. Cumulative Impacts

9.1 Cumulative Impact Assessment

In accordance with NEPA, we identified other actions located in the vicinity of the Project facilities and evaluated the potential for a cumulative effect on the environment. As defined by CEQ, a cumulative effect is the impact on the environment which results from the incremental impact of the action when added to other past, present, and reasonably foreseeable future actions regardless of what agency or person undertakes such other actions. CEQ guidance states that an adequate cumulative effects analysis may be conducted by focusing on the current aggregate effects of past actions without delving into the historical details of individual past actions. In this analysis, we consider the impacts of past projects within the geographic scope of potential impact as part of the affected environment (environmental baseline) which was described and evaluated in the preceding environmental analysis. However, present effects of past actions that are relevant and useful are also considered.

Consistent with CEQ guidance and to determine cumulative impacts, we expanded the geographic boundaries of our review into geographic scope of potential impact as described below. Actions located outside the geographic scope of potential impact are generally not evaluated because their potential to contribute to a cumulative impact diminishes with increasing distance from the Project.

Based on the impacts of the Project as identified and described in this EA and consistent with CEQ guidance, table B.9.1 presents resource-specific geographic scopes of potential impact are appropriate to assess cumulative impacts.

TABLE B.9-1
Geographic Scope of Potential Impact for the Project

Resource	Geographic Scope
Geology and Soils	Limits of Project disturbance
Water Resources, Wetlands, and Fisheries	Watershed boundary (HUC-12)
Vegetation	Watershed boundary (HUC-12)
Wildlife	Watershed boundary (HUC-12)
Land Use	1 mile of Project disturbance
Visual Resources	Aboveground facilities: Distance that the tallest feature would be visible from neighboring communities Pipeline: 0.25 mile and existing visual access points (e.g., road crossings)
Socioeconomics	County
Cultural Resources	Limits of Project disturbance
Air Quality	Construction: 0.5 mile from pipeline Operations: 50 km from the Moore CS and the Dorchester CS
Noise	Construction: 0.25 mile from pipeline / 0.5 mile from HDD Operations: 0.25 mile from pipeline

- Impacts on geology, soils, and cultural resources would be largely contained within or adjacent to Project workspaces. Impacts on water resources (primarily increased turbidity), wetlands, vegetation, and wildlife could extend outside of the workspaces, but would also be contained to a relatively small area. Therefore, for these resources we

evaluated other projects/actions within the HUC-12 watersheds crossed by the Project.

- Impacts on land use would be limited to areas within 1 mile of the Project. Impacts on visual resources would extend to the distance that the tallest feature is visible for aboveground facilities, and to 0.25 mile and existing visual access points for the pipeline.

- Impacts on socioeconomic conditions could include entire counties, as demographic statistics are generally assessed on a county basis.

- Temporary impacts on air quality, including fugitive dust, would be largely limited to areas within 0.5 mile of active construction. Long-term impacts on air quality would be largely contained within approximately a 50-km radius of the Moore Compressor Station and the Dorchester Compressor Station. We evaluated other projects/actions that overlap in time and location with construction activities and those with potentially significant long-term stationary emission sources within these geographic areas.

- Long term impacts on NSAs were evaluated by identifying other stationary source projects with the potential to result in significant noise that would affect the same NSAs within 0.5 mile of the Project compressor stations. None were identified; therefore, we do not consider long-term cumulative noise impacts further in this analysis. However, we did consider areas where the temporary noise from construction of the Project would overlap with noise from other construction projects.

The purpose of this cumulative impacts analysis is to identify and describe cumulative impacts that would potentially result from implementation of the Project. This cumulative impact analysis generally follows the methodology set forth in relevant guidance (CEQ 1997; EPA 1999). Under these guidelines, inclusion of other projects within the analysis is based on identifying commonalities of impacts from other projects with impacts that would result from the Project. The cumulative impacts analysis includes actions meeting the following three criteria:

- Impact a resource area potentially impacted by the proposed Project.

- Cause this impact within all or part of the proposed Project area.

- Cause this impact within all, or part, of the time span for the potential impact from the Project.

The actions considered in the cumulative impact analysis may vary from the Project in nature, magnitude, and duration. We include these actions based on the likelihood of Project completion and only projects that have been recently completed (1 year prior to construction of the Project), current (ongoing impacts), or reasonably foreseeable (planned or approved but not yet constructed) future actions. Projects considered were infrastructure, community development, FERC jurisdictional and non-jurisdictional linear pipeline projects, and other industrial facilities within Spartanburg, Laurens, Newberry, Dillon, and Greenwood Counties.

Dominion contacted state and local municipalities, including planning, engineering, and transportation departments to identify recently completed, present, and future major construction projects proximate to the Project. Four projects were identified with potential to contribute to cumulative impacts. These are described in table B.9-2.

TABLE B.9-2
Projects Considered for Cumulative Effects Analysis for the Transco to Charleston Project

Company/Facility	Description	Location Relative to Project	Potential Contribution to Cumulative Impacts
Wyman-Gordon Manufacturing Plant Dillon County, SC	Operation of a new 50,000-square-foot metal manufacturing and finishing facility. Materials manufactured at the Wyman-Gordon Plant would be supplied to the aerospace and electrical power generation industries. The plant is currently under construction.	The Dillon Pipeline would terminate approximately 0.5 mile northwest of the Wyman-Gordon Manufacturing Plant.	Water Resources; Vegetation and Wildlife; Socioeconomics; and Air Quality and Noise
Transco Moore Purchase Station Spartanburg County, SC	Addition of 8-inch-diameter MLV and pig launcher at existing Moore Purchase Station. These improvements are currently under construction.	The Moore to Chappells Pipeline would include an interconnection to the Moore Purchase Station.	Water Resources; Vegetation and Wildlife; Socioeconomics; and Air Quality and Noise
Kobelco Production Facility Spartanburg County, SC	Construction of a new production plant that would manufacture heavy (construction) equipment. The facility would be approximately 156,000 square feet and would include a stand-alone office on an 85-acre lot. The facility is currently under construction.	The Moore to Chappells Pipeline would be constructed approximately 1 mile southwest of the Kobelco Facility.	Water Resources; Vegetation and Wildlife; Socioeconomics; and Air Quality and Noise
Toray Carbon Fiber Manufacturing Plant Spartanburg County, SC	Construction of a new facility to manufacture carbon fiber composite materials. The facility would be constructed on approximately 400 acres. The facility is currently under construction.	The Moore to Chappells Pipeline would be constructed approximately 1 mile southwest of the Toray facility.	Water Resources; Vegetation and Wildlife; Socioeconomics; and Air Quality and Noise

9.2 Potential Cumulative Impacts of the Proposed Action

As described in section B of this EA, constructing and operating the Project would temporarily and permanently impact the environment. The Project would impact geology; soils; surface waters and wetlands; vegetation, wildlife, and fisheries; cultural resources; and land use, recreation, and visual resources. However, nearly all of the Project-related impacts on geology, soils, and cultural resources would be contained within or adjacent to the areas directly affected by construction, and proposed

construction measures would result in only minor impacts on these resources. Therefore, we conclude that the Project is not likely to result in cumulative impacts on these resources and they are not discussed further. For example, erosion control measures included in Dominion's construction and restoration plans would keep disturbed soils within work areas. Based on our review, there is potential for the Project to interact cumulatively at some level for water, vegetation, wildlife resources, land use, visual resources, and climate change, as well as with socioeconomic conditions and air quality and noise, as discussed below.

Water Resources and Wetlands

Cumulative impacts on groundwater resources would be limited to potential spills as Project construction and operation would not require withdrawal of groundwater. With implementation of the SPHMM Plan, impacts would only be expected in the immediate area. The only overlapping/immediately adjacent project is the Moore Purchase Station, which would have its own SPHMM Plan. Therefore, the Project is not anticipated to cumulatively contribute to impacts on groundwater resources.

Construction and operation of the Project facilities would result in short-term impacts on waterbodies and could result in an incremental cumulative impact when combined with the projects described above. Impacts on waterbodies would be mostly limited to the construction phase of the Project. Turbidity plumes in waterbodies would persist for a short duration and it is unlikely that turbidity caused by other projects within the geographic scope would overlap both the spatial and temporal extents of the caused by the Project. Long-term impacts on waterbodies are not anticipated. Construction of the projects listed in table B.9-2 would have similar impacts on those described for the Project. Because the anticipated impacts of this Project are limited to the duration of construction and localized to the waterbody crossings, they do not overlap in time or space with the projects listed in table B.9-2, the Project is not expected to contribute cumulatively to impacts on waterbodies.

The most significant use of surface water for the Project would be hydrostatic testing of the pipeline. Although construction for some of the projects mentioned in table B.9-2 is planned at the same time as the Project, the projects do not involve hydrostatic testing. Additionally, as Dominion would not add chemicals to the hydrostatic test water and would discharge water back to the environment, no cumulative consumptive loss or impact on water quality is expected from the Project.

The projects mentioned in table B.9-2 are in the same watersheds that would be crossed by the Project. Cumulative impacts on water quality could result from sedimentation from erosion of disturbed soils adjacent to the waterbodies during simultaneous construction of these projects. As described in section B.2, Dominion would minimize sedimentation effects from the construction and operation of the Project through implementation of the T2C Procedures. Dominion would stabilize disturbed areas, restore the contours and elevations of waterbodies to pre-construction conditions, and revegetate disturbed riparian areas to prevent erosion of exposed soils and migration of sediments. Dominion would avoid impacts on wetlands in the Project area by using the HDD method. Therefore, the Project would not contribute to cumulative impacts on wetlands in the Project area. We conclude that the Project would not significantly contribute to cumulative impacts with other past, present, and reasonably foreseeable projects on water resources.

Fisheries, Vegetation, and Wildlife

Within each watershed affected by the Project, there are several projects that have affected or are anticipated to impact vegetation through clearing of forested areas to create development sites. The acreage of clearing associated with each project is not available; however, forested areas are abundant in the surrounding counties, and the cleared acreage is a small fraction of the overall forested area.

The surrounding forested areas are interspersed with agricultural areas and crossed by existing roads, utility rights-of-way, and other non-forested areas, so a degree of forest fragmentation has already occurred. Although the Project would contribute to further forest fragmentation, forested lands in the Project area already exhibit edge effects and the Project would not be expected to significantly contribute cumulatively to impacts on this resource.

Disturbance during construction is expected to cause short-term displacement of wildlife from in and near the construction workspace and mortality of wildlife that cannot avoid construction disturbance. Following construction and restoration, displaced wildlife are expected to return to the areas. The change in habitat (from forest to maintained right-of-way) is expected to cause minor, permanent changes in the distribution of wildlife as species adapted to open areas recolonize the previously forested areas.

Forested wildlife habitat is abundant in the area, and the small fraction of habitat disturbance represented by this Project and the other projects in table B.9-2 is not anticipated to cumulatively contribute.

The other vegetative types considered (agricultural, forested wetland, and non-forested wetland) would not experience a change in vegetation or wildlife habitat value, so they would not contribute to cumulative impacts on these resources.

Although construction of the Project facilities would result in short-term impacts on waterbodies and could result in an incremental cumulative impact on fisheries when combined with the other projects in table B.9-2, impacts on waterbodies and fisheries would be mostly limited to the construction phase of the Project. Because the anticipated impacts on waterbodies and fisheries are limited to the duration of construction and localized to the waterbody crossings, and they do not overlap in time or space with the projects listed in table B.9-2, cumulative impacts are not expected.

Based on the small proportion of forest vegetation and forested wildlife habitat affected by this Project and the other projects in table B.9-2 and the short-term, localized impacts on waterbodies and fisheries, we conclude that this Project would not cumulatively contribute to significant impacts on vegetation, wildlife, and fisheries.

Land Use and Visual Resources

Much of the Project's construction workspace would be allowed to return to pre-construction land use (e.g., agricultural areas would be returned to agricultural use), and the primary long-term land-use impact of the Project would be the conversion of forested areas (including unmanaged forest and pine plantation) to maintained right-of-way.

In general, local land-use planning and zoning is intended to manage cumulative impacts on land use. Because the Moore Purchase Station, Wyman-Gordon Manufacturing Plant, and Kobelco Production Facility are consistent with existing zoning designations of industrial/commercial, they were not considered to contribute to cumulative land use impacts.

The Toray Carbon Fiber Manufacturing Plant would require rezoning of approximately 400 acres of agricultural and forest land (pine plantation) to industrial/commercial use. It is sited primarily within an expanding industrial/commercial corridor, which is consistent with land-use planning philosophy. The Project's land use impacts in combination with those of the Toray facility within 1 mile would contribute to a cumulative impact on land use; however, we conclude this would not be a significant cumulative impact.

The short-term visual impacts of the Project are associated with construction workspace and equipment. Project construction is not anticipated to overlap in time and space with construction of the other projects in table B.9-2, but if construction schedules do coincide, the sequential nature of pipeline construction ensures that no particular area would remain under construction for an extended period, and the Project's contribution to short-term visual impacts is considered negligible.

Long-term visual impacts would be associated with pipeline rights-of-way and aboveground facilities. Based on Dominion's viewshed analysis, the Moore to Chappells Pipeline, the Moore Compressor Station, the Southern Compressor Station, and several of the other aboveground facilities (e.g., MLVs) have viewsheds that include at least one of the other projects in table B.9-2. The Moore Compressor Station and the Southern Compressor Station do not represent a significant change in visual character, and therefore, do not contribute to cumulative visual impacts.

Because pipeline rights-of-way in agricultural lands would continue to be in agricultural use, no visual impacts are anticipated. Pipeline rights-of-way in forested areas would have a permanent visual impact, but would be screened by the surrounding forest from the potential visual impacts of the other projects in table B.9-2. Therefore, we conclude that the Project would not have a significant cumulative impact on visual resources.

Although other Project aboveground features would contribute to cumulative visual impacts, many of these features are located at existing developed areas (e.g., railroad crossings) and would not represent a change in visual character or are located within forested areas and would be at least partially screened from casual observation.

We conclude that the long-term contribution of the Project to cumulative visual impacts would be negligible.

Socioeconomics

Concurrent activities from large-scale industrial projects in the area has the potential to create cumulative socioeconomic impacts related to temporary workforce influx and vehicular traffic during Project construction. These impacts would occur in Spartanburg, Laurens, Newberry, Dillon, and Greenwood Counties.

The construction workforce for the Transco to Charleston Project would peak at 300 non-local workers, with the remainder local labor. While total workforce requirements and schedules for the projects listed in table B.9-2 are unknown, the Project's non-local construction workforce in combination with potential non-local worker influx peaks from other projects are likely to be offset in time, reducing the overall maximum number of workers at any one time. Increases in traffic would be related to workforce, and peak traffic would be similarly attenuated by offset construction schedules. If construction schedules do coincide, the sequential nature of pipeline construction ensures that no particular area would remain under construction for an extended period, and the Project's contribution to short-term worker influx and traffic impacts is considered negligible.

It should also be noted that this Project and the other projects (table B.9-2) would include a positive socioeconomic impact because they provide new jobs and support the planned growth anticipated in the area. We conclude that cumulative impacts on socioeconomic resources would not be significant.

Air Quality and Noise

Air Quality

Air quality would be affected by construction and operation of the Project and other present and reasonably foreseeable future projects. Given the temporary nature of project construction, we consider construction-related air quality impacts on be highly localized, confined to the immediate area around the pipeline right-of-way, and occurring only during the estimated 10 months of construction. Two facilities were identified within 0.5 mile of the pipeline centerline: Moore Purchase Station and Wyman- Gordon Industrial Facility; neither are non-point sources of emissions. South Carolina Electric and Gas would use gas provided by the Project as additional fuel gas supply to existing and future gas customers throughout its service area; air emissions would be gas combustion products by end users. Flakeboard Company, Ltd in Bennettsville, SC would use gas from the Project for manufacturing of particle board and other lumber products. Wyman-Gordon, would use gas from the Project for a metals manufacturing and finishing facility located approximately 0.5 mile northwest of the Dillon Pipeline.

The air quality impacts most likely to affect local residents would be fugitive dust from construction of projects within the geographic scope. There are no reasonably foreseeable projects identified within a 0.5 mile of the Project that would be constructed concurrently. If a project unidentified at this time were to occur in the same area and timeframe as the Project, it could temporarily add to the ongoing air quality effects of existing activities. These impacts may be minimized by mitigation measures, such as using properly maintained vehicles, using commercial gasoline and diesel fuel products with specifications to control pollutants, implementing fugitive dust control measures, and using erosion control devices to prevent erosion. However, the contribution of the Project and any other project would be temporary and minimal, as effects would generally be localized and other projects would be required to comply with the CAA and state air quality regulations. Based on this information, we conclude the Project construction would not cumulatively contribute to significant air quality impacts.

Operation of the Project and other projects would also contribute to cumulative air emissions. Ambient air impacts typically are greatest near the source. The Wyman-Gordon Manufacturing Plant is expected to be a new source of operational air emissions, capped at 250 tons per year of PM, PM_{10}, and $PM_{2.5}$ and 25 tons per year for all hazardous pollutants. However, the Wyman-Gordon Manufacturing Plant is more than 145 miles from the Moore Compressor Station and 103 miles from the Dorchester Compressor Station. In addition, the Moore and Dorchester Compressor Stations are each outside the geographic scope for the other. Based on this information, we conclude that Project operation would not contribute to any cumulative air quality impacts.

Noise

The Project and other projects shown in table B.9-2 would all produce noise during construction; however, construction noise would be a temporary disturbance to noise receptors in the vicinity of the projects. Construction noise impacts are highly localized and attenuate quickly as the distance from the noise source increases; therefore, cumulative impacts are unlikely, unless one or more of the other projects are constructed at the same time and location.

Only the Moore Purchase Station is within a distance that could reasonably contribute to a significant cumulative noise impact. However, construction of the Project's proposed interconnect at Moore Purchase Station would not occur until the Moore Purchase Station has been constructed, reducing the likelihood of cumulative impacts on noise in the area from construction equipment. Therefore, we conclude that the Project's construction would result in negligible cumulative noise impacts.

Operation of the Project and other projects would also cumulatively contribute to noise impacts. None of the reasonably foreseeable projects are expected to be new sources of operational noise. Based on this information, we conclude that Project operation would not contribute to any cumulative noise impacts.

Climate Change

Climate change is the change in climate over time and cannot be represented by single annual events or individual anomalies. For example, a single large flood event or particularly hot summer is not an indication of climate change, while a series of floods or warm years that statistically change the average precipitation or temperature over years or decades may indicate climate change.

The U.S. Global Change Research Program's report notes the following observations of environmental impacts that may be attributed to climate change in the Southeast region:

- more frequent days with temperatures above 95 degrees Fahrenheit;
- higher temperatures to reduce livestock and crop productivity;
- increase in very heavy precipitation events;
- decreased freshwater availability; and
- rising sea level.

GHG emissions are a primary cause of climate change (USEPA, 2014b). Of the GHGs emitted, carbon dioxide is the most prevalent, accounting for 82 percent of all U.S. emissions in 2012 (USEPA, 2014c). Methane is the second most prevalent, accounting for 9 percent of the total U.S. emissions (USEPA 2014d). Between 1990 and 2012, natural gas and petroleum systems accounted for 29 percent of methane emissions in the United States. Although the amount of methane being emitted into the atmosphere is significantly less than that of carbon dioxide, the comparative impact of methane on climate change over a 100-year period is more than 20 times greater (USEPA, 2014e). Fugitive methane emissions are common in natural gas systems and can occur during natural gas production, transmission, storage, and distribution (USEPA 2014f).

The minor fugitive emissions of GHGs from the Project would not have any direct impacts on human health or the environment in the area on the local level (e.g., criteria pollutants). The GHG emissions from the construction and operation of the Project are below the USEPA threshold for reporting GHG emissions. Burning natural gas results in less carbon dioxide emissions compared to other fuel sources (e.g., fuel oil or coal).

Currently there is no standard methodology to determine how the Project's relatively small incremental contribution to GHGs would translate into physical effects on the global environment. However, the emissions would increase the atmospheric concentration of GHGs, in combination with past and future emissions from all other sources, and contribute incrementally to climate change. The Project's GHG emissions compared to the GHG emissions for South Carolina are shown in table B.9-3.

TABLE B.9-3
Comparison of the Project's GHG Emissions to State-Wide GHG Emissions

Project Component	State-wide CO_2e (mmt/yr) a/	Project CO_2e (mmt/yr) a/	Percentage of State-wide CO_2e Emissions	Project CO_2e (mmt/yr) a/	Percentage of State-Wide CO_2e Emissions
		Construction		Operations	
Moore	69.2 b/	-	-	0.03	0.04%
Dorchester	69.2 b/	-	-	0.02	0.03%
Construction	69.2	0.01	0.01%	-	-

a mmt/yr (million metric tons per year)

b actual emissions for the year 2013, Energy-Related Carbon Dioxide Emissions at the State Level, 2000-2013, US Energy Information Administration, http://www.eia.gov/environment/emissions/state/analysis/.

Conclusions on Cumulative Impacts

Based on the impacts and mitigation measures described in this EA, we conclude that the impacts from this Project when considered cumulatively with past, present, and reasonably foreseeable projects would not contribute significantly to impacts on the environment.

C. ALTERNATIVES

As required by NEPA and the Commission's implementing regulations, we considered alternatives to the proposed action. Specifically, we considered the no-action alternative, system alternatives, pipeline routing alternatives, and compressor station alternatives. The following evaluation criteria were used to determine whether an alternative would be environmentally preferable:

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

1. No-action Alternative

Under the no-action alternative, Dominion would not construct the Project and none of the impacts of the Project (as described in section B) would occur. The no-action alternative would not meet the objectives of the Project, which are to provide additional natural gas transportation service to fully subscribed customers. At this time, no alternative projects have been planned that could meet the purpose and need of the Project. Assuming there continues to be demand by these customers for service, it is likely that other natural gas pipeline projects would be proposed. Because these other projects would likely have similar or greater impact than the proposed Project, we have dismissed this alternative as a reasonable alternative to meet the Project objectives.

2. System Alternatives

System alternatives would utilize other existing, modified, or proposed facilities to meet the objectives of the Project. A system alternative would make it unnecessary to construct all or part of the Project, although modifications or expansion of existing or proposed pipeline systems could be required.

Two natural gas pipeline systems currently serve the Project area. The Clinton Newberry Natural Gas Authority pipeline system consists of primarily 2-inch-diameter lines in Spartanburg, Greenville, Laurens, and Newberry Counties (Clinton Newberry Natural Gas Authority 2016). These are small-capacity pipelines and could not meet the maximum daily transportation requirement of the Project. A second pipeline system owned and operated by Dominion runs 40 miles southeast from the Moore Compressor Station, then turns and runs 41 miles southwest to Chappells, South Carolina, which results in an 81-mile-long route by this 8-inch-diameter natural gas pipeline. According to Dominion, both the Clinton Newberry Natural Gas Authority Pipeline and Dominion's Pipeline are currently serving customers in South Carolina and would not have the capacity to support the Project's subscribed customers without modification. According to Dominion, the required modifications to its existing, 81-mile pipeline would include approximately 1,400 hp of compression at Dominion's existing Moore Compressor Station; a new 2,800-hp compressor station near the City of Greenwood, South Carolina (Chappells); 3,600 hp of compression near Dorchester, South Carolina; and approximately 80 miles of 12-inch pipeline from the Moore Compressor Station to the interconnect with the new Greenwood Compressor Station. This alternative pipeline would be almost 50 percent longer than the proposed pipeline and, even accounting for the large proportion of collocation, it would be expected to have significantly larger environmental impacts. Neither of these systems was considered a viable option. For these reasons, we have removed the Clinton Newberry Natural Gas Authority and Dominion's system alternatives from further consideration.

3. Alternative Pipeline Routes

3.1 Moore to Chappells Pipeline

We evaluated four alternative routes for the Moore to Chappells Pipeline. Each of these route alternatives originate and terminate at the same locations. Figure C.3-1 provides a map and table C.3-1 provides a comparison of these alternatives with the Project.

One commenter (Mr. Jerry Galloway) questioned other tie-in locations along the Williams supply line other than Moore, South Carolina. Dominion examined pipeline route alternatives originating at three different locations along the Williams supply line (Belton, Moore, and Grover, South Carolina). The Transco-Moore Receipt Point route option was selected because it eliminated the need for construction of a new Williams receipt point; is located within 2 miles of Dominion's existing Moore Compressor Station; and would require fewer and smaller compressors units.

Moore to Chappells Pipeline Alternative 1

Alternative 1, which is approximately 56 miles in length, would run southwest of Moore, South Carolina along the right-of-way of an existing gas pipeline. South of the City of Laurens, South Carolina, Alternative 1 would follow an existing electrical transmission right-of-way toward the southeast, then follow an existing Dominion gas pipeline to Chappells, South Carolina.

Moore to Chappells Pipeline Alternative 2

Alternative 2, which is approximately 55 miles long, would run southeast along existing Dominion gas pipeline, Interstate 26, and secondary roads rights-of-way to Chappells, South Carolina.

Moore to Chappells Pipeline Alternative 3

Alternative 3 would be approximately 54 miles long and would run southwest of Moore, South Carolina, along the right-of-way of an existing gas pipeline then southeast along an electrical transmission right-of-way. South of Clinton, South Carolina, Alternative 3 would traverse forested and agricultural land.

Moore to Chappells Pipeline Alternative 4

Alternative 4, approximately 82 miles long, would be collocated with the existing 8-inch Dominion pipeline, running southeast of Moore, South Carolina for approximately 40 miles to Carlisle, South Carolina. From there, Alternative 4 would travel southwest for approximately 41 miles towards Chappells, South Carolina. Approximately 37 miles of Alternative 4 would traverse Sumter National Forest.

TABLE C.3-1
Major Route Alternatives: Moore to Chappells Pipeline

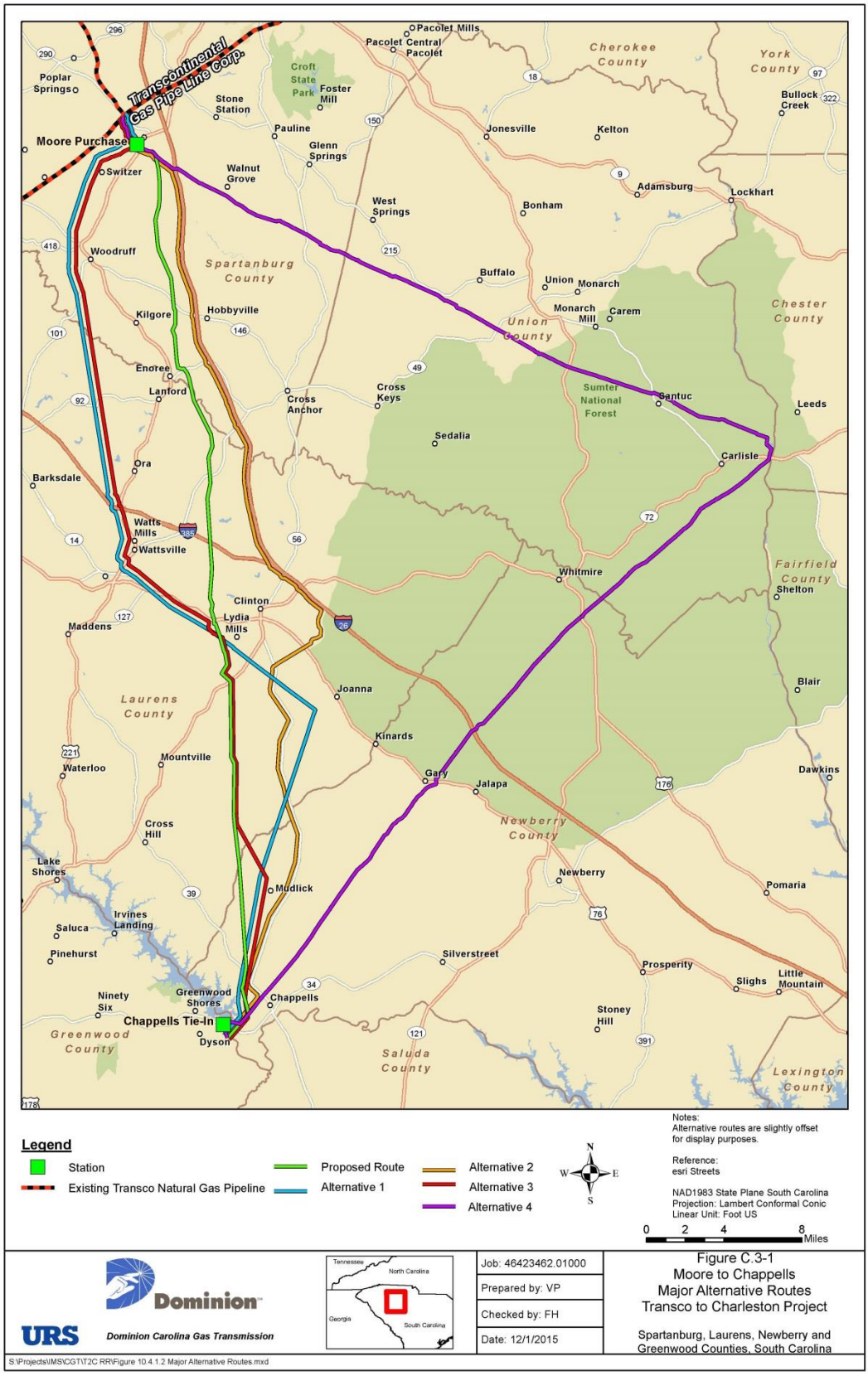
Evaluation Criterion	Units	Proposed Route a/	Alternatives a/			
			1	2	3	4
Length	miles	54.4	56.0	55.0	53.7	81.7
Study Corridor Width b/	feet	400	400	400	400	200 c/
Wetlands Crossed	count	20	53	34	48	54
Intermediate and Major Streams Crossed	count	22	13	17	16	30
State or National Forest Land	acres	0	0	35	0	901
Agricultural Land	acres	635	1129	523	980	548
Forested Land	acres	1610	1275	663	1342	1329
Residential Parcels Intersected	count	181	398	164	333	NA

a For consistency between alternatives, information in this table is based on desktop analysis, and therefore, may not match with information presented in sections A and B of this document. Acres are based on length x corridor width.

b Dominion used 400-foot and 200-foot-wide "study" corridors for these alternatives to determine potential impacts.

c Narrower corridor evaluated because entire length would be directly adjacent to existing pipeline rights-of-way.

The alternatives to the Moore to Chappells Pipeline would result in more impacts on wetlands than the proposed route. In addition, two of the route alternatives would result in impacts on Sumter National Forest, and two alternatives would result in increased impacts on residential areas. Therefore, we conclude that these alternative pipeline routes for the Moore to Chappells Pipeline are not environmentally preferred and were not considered further.


Transcontinental Gas Pipe Line Corp.
Moore Purchase
Chappells Tie-In
Pacolet Mills
Pacolet Central
Pacolet
Cherokee County
York County
Poplar Springs
Croft State Park
Foster Mill
Stone Station
Bullock Creek
Pauline
Jonesville
Kelton
Glenn Springs
Switzer
Walnut Grove
Adamsburg
Lockhart
West Springs
Bonham
Woodruff
Spartanburg County
Buffalo
Union
Monarch
Monarch Mill
Carem
Chester County
Union County
Kilgore
Hobbyville
Enoree
Lanford
Cross Anchor
Cross Keys
Sumter National Forest
Santuc
Leeds
Sedalia
Carlisle
Ora
Barksdale
Watts Mills
Wattsville
Whitmire
Fairfield County
Shelton
Clinton
Lydia Mills
Maddens
Joanna
Blair
Laurens County
Kinards
Waterloo
Mountville
Gary
Jalapa
Dawkins
Cross Hill
Newberry County
Lake Shores
Newberry
Pomaria
Mudlick
Irvines Landing
Saluca
Pinehurst
Silverstreet
Prosperity
Slighs
Little Mountain
Ninety Six
Greenwood Shores
Chappells
Stoney Hill
Greenwood County
Dyson
Saluda County
Lexington County
Legend
Station
Existing Transco Natural Gas Pipeline
Proposed Route
Alternative 1
Alternative 2
Alternative 3
Alternative 4
N
W
E
S
Notes:
Alternative routes are slightly offset for display purposes.
Reference:
esri Streets
NAD1983 State Plane South Carolina
Projection: Lambert Conformal Conic
Linear Unit: Foot US
0 2 4 8 Miles
Dominion
Dominion Carolina Gas Transmission
URS
Tennessee
North Carolina
Georgia
South Carolina
Job: 46423462.01000
Prepared by: VP
Checked by: FH
Date: 12/1/2015
Figure C.3-1
Moore to Chappells
Major Alternative Routes
Transco to Charleston Project
Spartanburg, Laurens, Newberry and Greenwood Counties, South Carolina
S:\Projects\MS\CGT\T2C RR\Figure 10.4.1.2 Major Alternative Routes.mxd

3.2 Dillon Pipeline

Based on a comment from Ms. Patricia Carmichael to locate the Dillon Pipeline closer to I-95 and other existing rights-of-way, Dominion identified two alternative routes, which we evaluated. Each of these route alternatives originate and terminate at the same locations. As shown in figure C.3-2 and table C.3-2, Dillon Pipeline Alternative A would parallel the northwest side of I-95, approximately 2,000 feet from the road shoulder, and would extend from the Caldwell Drive M&R station to the east. Dillon Pipeline Alternative B would partially follow existing rights-of-way along I-95.

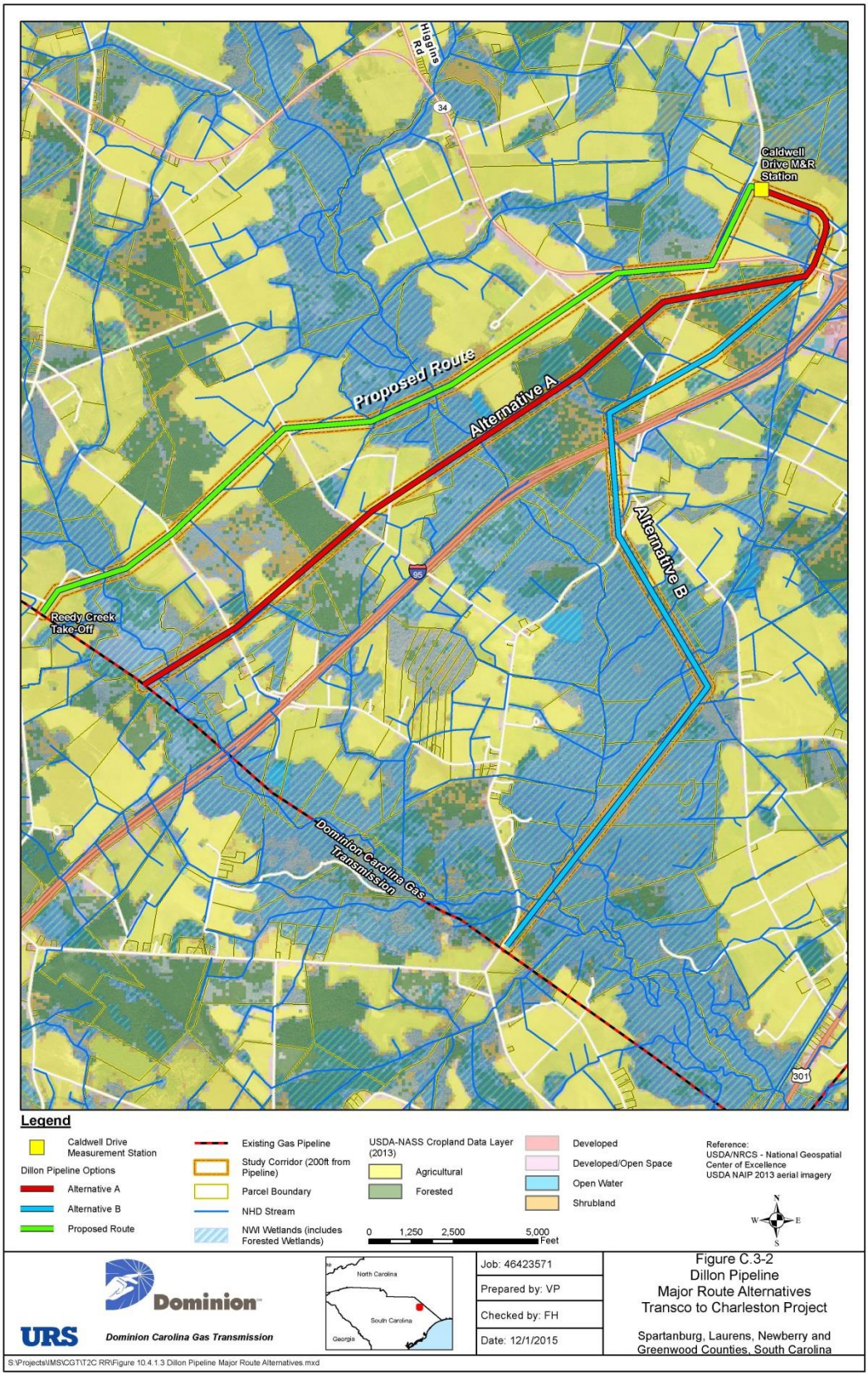
The Dillon Pipeline route alternatives would have similar impacts on those described for the proposed route. We did not identify any areas of concern that would warrant route variations. Therefore, alternative pipeline routes for the Dillon Pipeline are not considered further.

TABLE C.3-2
Major Route Alternatives: Dillon Pipeline

Evaluation Criterion	Units	Proposed Route a/	Alternatives a/	
			A	B
Length	miles	4.9	5.2	5.6
Study Corridor Width b/	feet	400	400	400
Wetlands in Corridor	acres	242	255	275
Stream Crossings	count	13	8	13
State or National Forest Land	acres	0	0	0
Utility Collocation	miles	0	3.4	0
Forested Land	acres	6	82	51
Residential Parcels Intersected	count	2	2	2

a Values based on desktop analysis.

b Dominion used 400-foot and 200-foot-wide "study" corridors for these alternatives to determine potential impacts.


Higgins Rd
34
Caldwell Drive M&R Station
Proposed Route
Alternative A
Alternative B
95
Reedy Creek Take-Off
Dominion Carolina Gas Transmission
301
Legend
Caldwell Drive Measurement Station
Dillon Pipeline Options
Alternative A
Alternative B
Proposed Route
Existing Gas Pipeline
Study Corridor (200ft from Pipeline)
Parcel Boundary
NHD Stream
NWI Wetlands (includes Forested Wetlands)
USDA-NASS Cropland Data Layer (2013)
Agricultural
Forested
Developed
Developed/Open Space
Open Water
Shrubland
0 1,250 2,500 5,000 Feet
Reference:
USDA/NRCS - National Geospatial Center of Excellence
USDA NAIP 2013 aerial imagery
N
W
E
S
Dominion
URS
Dominion Carolina Gas Transmission
North Carolina
South Carolina
Georgia
Job: 46423571
Prepared by: VP
Checked by: FH
Date: 12/1/2015
Figure C.3-2
Dillon Pipeline
Major Route Alternatives
Transco to Charleston Project
Spartanburg, Laurens, Newberry and Greenwood Counties, South Carolina
S:\Projects\IMS\CGT\T2C RR\Figure 10.4.1.3 Dillon Pipeline Major Route Alternatives.mxd

4. Pipeline Route Minor Variations

We evaluated a number of route variations for the Moore to Chappells Pipeline to avoid or minimize impacts on geographically distinct and localized resources, such as wetlands. Route variations were also considered to resolve engineering or constructability issues or address stakeholder concerns, where feasible. Forty-two variations (table C.4-1) were evaluated for the Moore to Chappells Pipeline route, and 23 were implemented.

Eighteen commenters requested that minor route variations be considered to avoid or minimize impacts on their individual properties. Of these, seven commenters requested minor route variations to avoid or minimize impacts on pine plantations; responses to these comments are provided in section B.4, Agricultural Lands. Five commenters asked that minor route variations be considered to limit impacts on an environmentally sensitive property at 1324 Hobbysville Road in Roebuck, South Carolina as discussed in section B.3.3, Wildlife. Project impacts on this property would be minor and limited to a non-forested roadway frontage. Several commenters requested examination of minor route variations to reduce impacts on forested land; responses to these comments are provided in section B.3.2, Vegetation.

Another commenter (Mr. Todd Scott) stated that his property was purchased as a wildlife preserve and suggested an alternative for Dominion to parallel the railroad near his property. As proposed, the Moore to Chappells Pipeline would traverse 0.38 mile of Mr. Scott's property, mostly forested land. Mr. Scott's proposed alternative would traverse 0.2 mile of the Scott property. The alternative pipeline length would be 0.4 mile longer (all forested land) on adjacent properties, affecting 3.2 acres of additional forest land. Mr. Scott's suggested route variation would result in greater environmental impacts on other properties; therefore, we conclude it is not an environmentally preferable alternative.

Two commenters (Mr. Jerry Wood and Mr. Dale Utter) requested that minor route variations be considered to avoid or minimize impacts on their properties. Minor route variation 17 (table C.4-1) shifted the pipeline alignment closer to Mr. Woods property line. Mr. Utter's property would not be affected by the Project.

Johnson II Alternative

Johnson Entities requested analysis of a specific minor route variation, the Johnson Reroute II. The Johnson Reroute II is a combination of two minor route variations (MRV 24 and MRV 25) previously proposed by Johnson Entities (see table C.4-1). MRV 24 would commence at MP 2.0, follow Route 221 for 2.1 miles, and then follow Old Switzer Road for 1.6 miles to the proposed pipeline route. MRV 24 would result in a longer pipeline and would affect more landowners, particularly residential landowners along Old Switzer Road. MRV 25 would commence at MP 2.2, follow an existing southwesterly electric transmission line right-of-way for 2.3 miles, then turn roughly eastward following parcel boundaries for 1.2 miles to the proposed pipeline route. MRV 25 would result in a longer pipeline, would affect natural and cultural resources at the environmentally sensitive parcel at 1324 Hobbysville Road in Roebuck, South Carolina, avoidance of which was requested by five different commenters, and more property owners along Old Switzer Road would be affected.

The Johnson Reroute II would commence at MP 2.2, following an existing southwesterly electric transmission line right-of-way for 2.3 miles to Old Switzer Road, then southeasterly for 0.89 mile along Old Switzer Road before rejoining the proposed Moore to Chappells Pipeline route at MP 5.2R. Johnson Entities stated that the Johnson Reroute II would impact fewer acres of forested land than the proposed Project. However, the Johnson II Reroute would require clearing of at least 7 acres of forested land along the electric transmission line right-of way, assuming that the pipeline centerline were located along the center of the 50-foot-wide cleared portions of the transmission line right-of-way. The Johnson Reroute II

would cross the environmentally sensitive parcel at 1324 Hobbysville Road in Roebuck, South Carolina, as well as additional residential properties along Old Switzer Road. The Johnson II Reroute would also require two additional waterbody crossings than the proposed route.

Incorporation of the Johnson II Reroute would not result in fewer environmental impacts than the proposed route and would affect more residential parcels than the proposed route. Therefore, the Johnson Reroute II is not environmentally preferred and was not considered further.

TABLE C.4-1
Minor Route Adjustments

Adjustment No.	Milepost	Length (miles)	Reason for Adjustment/Action
1 **a**/	2.98	0.0	Avoid industrial development and new railroad. Not implemented
2 **a**/	1.87	0.0	Avoid industrial development and new railroad. Implemented
3 **a**/	1.87	0.0	Avoid industrial development and new railroad. Not implemented
4 **a**/	1.89	0.0	Avoid industrial development and new railroad. Not implemented
5 **a**/	4.44	0.0	Avoid industrial development and new railroad. Not implemented
6 **a**/	2.95	0.0	Avoid industrial development and new railroad. Not implemented
7 **a**/	3.05	0.0	Avoid industrial development and new railroad. Not implemented
8 **a**/	3.21	0.0	Avoid industrial development and new railroad. Not implemented
9 **a**/	3.95	0.0	Avoid industrial development and new railroad. Not implemented
10 **a**/	0.97	1.8	Increase collocation/minimize impacts. Implemented

TABLE C.4-1
Minor Route Adjustments

Adjustment No.	Milepost	Length (miles)	Reason for Adjustment/Action
11 **a**/	0.18	29.3	Shifted proposed route closer to the property line per landowner request. Implemented.
12 **a**/	2.5	1.14	Shifted proposed route closer to the property line per landowner request. Implemented.
13 **a**/	5.7	1.34	Shifted proposed route closer to the property line per landowner request. Implemented.
14 **b**/	1.9	4.72	Landowner request to shift line – increased wetland and waterbody impacts Not implemented
15 **b**/	1.9	7.78	Landowner request to shift line – increased wetland and waterbody impacts Not implemented
16 **b**/	3.1	3.19	Shifted proposed route closer to the property line per landowner request. Implemented.
17 **a**/	12.4	0.32	Shifted proposed route closer to the property line per landowner request. Implemented.
18 **b**/	32.2	0.82	Landowner request to shift line – increased wetland and waterbody impacts Not implemented
19 **b**/	29.7	0.37	Shifted proposed route closer to the property line per landowner request. Implemented.
20 **b**/	33.6	0.95	Shifted proposed route closer to the property line per landowner request. Implemented.
21 **b**/	31.3	0.72	Shifted proposed route closer to the property line per landowner request. Implemented.
22 **b**/	NA	NA	Landowner request to shift line – increased wetland and waterbody impacts Not implemented

TABLE C.4-1
Minor Route Adjustments

Adjustment No.	Milepost	Length (miles)	Reason for Adjustment/Action
23 **b**/	NA	NA	Landowner request to shift line – increased wetland and waterbody impacts Not implemented
24 **b**/	1.9	4.95	Landowner request to shift line – increased wetland, waterbody, and landowner impacts Not implemented
25 **b**/	2.2	4.15	This variation utilized existing transmission line easement. This variation was not adopted because of an on-going investigation of groundwater contamination in the area, increased impacts to natural resources Not implemented
26 **b**/	42.1	1.2	Shifted proposed route to avoid side slopes and terrain issues. Implemented.
27 **b**/	30.5	0.35	Shifted proposed route to avoid residences within the ROW. Implemented.
28 **b**/	36.4	0.94	Shifted proposed route closer to the property line per landowner request. Implemented.
29 **b**/	9.1	0.46	Shifted to avoid tree removal or damage per landowner request. Implemented.
30 **b**/	8.8	0.12	Shifted proposed route closer to the property line per landowner request. Implemented.
31 **b**/	25.2	0.48	Shifted proposed route closer to the property line per landowner request. Implemented.
32 **b**/	19.6	2.1	Landowner request to shift line - increased environmental impacts, topographic issues, and constructability issues. Not Implemented.
33 **b**/	40.7	0.18	Shifted proposed route to avoid silage pit. Implemented.
34 **b**/	52.4	0.33	Shifted proposed route closer to the property line and away from trees per landowner request. Implemented.

TABLE C.4-1
Minor Route Adjustments

Adjustment No.	Milepost	Length (miles)	Reason for Adjustment/Action
35 **b**/	6.6	1.2	Landowner request to shift line - increased environmental impacts and constructability issues. Not Implemented.
36 **b**/	6.8	0.3	Landowner request to shift line - increased environmental impacts, topographic issues, and constructability issues. Not Implemented.
37 **b**/	7.5	0.1	Landowner request to shift line - increased environmental impacts and constructability issues from road and gulley crossing. Not Implemented.
38 **b**/	18.6	0.88	Shifted proposed route for better constructability. Implemented.
39 **b**/	3.7	0.39	Shifted proposed route to avoid gully and for better constructability. Implemented.
40 **b**/	4.8	0.47	Shifted proposed route to avoid gully and for better constructability. Implemented.
41 **b**/	5.8	0.19	Shifted proposed route to avoid gully and for better constructability. Implemented.
42 **b**/	15.6	0.58	Shifted proposed route to avoid residential well. Implemented.

a. Minor route variations evaluated during pre-filing
b. Minor route variations evaluated after application submittal

Because the inclusion of these minor route variations did not result in an appreciable increase in environmental impacts, we agree with Dominion's incorporation of these variations into the currently proposed route.

No environmental issues were identified that would warrant evaluation of minor route variations along the Dillon Pipeline, and we did not receive any comments or concerns from stakeholders regarding Dillon Pipeline minor route variations, nor did we receive any requests from stakeholders for such an evaluation.

5. Alternative Compressor Station Locations

Additional compression facilities proposed for the Project at the Moore and Southern Compressor Stations would be constructed at existing Dominion compressor stations on previously disturbed land.

The Dorchester Compressor Station site was selected because an existing gas composition analysis facility already exists in this location. Dominion would construct the Dorchester Compressor Station within the existing boundaries of this parcel. Our review of the Project found that environmental impacts associated with compressor stations have been minimized, and no alternative sites were evaluated. No environmental issues have been identified at these sites, and we did not receive any comments or concerns from stakeholders regarding compressor station site alternatives, nor did we receive any requests from stakeholders for such an evaluation.

Based on the considerations described above, we conclude that the proposed project is the preferred alternative to meet the Project objectives.

D. CONCLUSIONS AND RECOMMENDATIONS

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

1. Dominion shall follow the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests) and as identified in the EA, unless modified by the Order. Dominion must:

    a. request any modification to these procedures, measures, or conditions in a filing with the Secretary;

    b. justify each modification relative to site-specific conditions;

    c. explain how that modification provides an equal or greater level of environmental protection than the original measure; and

    d. receive approval in writing from the Director of the OEP **before using that modification**.

2. The Director of OEP has delegated authority to take whatever steps are necessary to ensure the protection of all environmental resources during construction and operation of the Project. This authority shall allow:

    a. the modification of conditions of the Order; and

    b. the design and implementation of any additional measures deemed necessary (including stop-work authority) to assure continued compliance with the intent of the environmental conditions as well as the avoidance or mitigation of adverse environmental impact resulting from Project construction and operation.

3. **Prior to any construction**, Dominion shall 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 EI's authority and have been or will be trained on the implementation of the environmental mitigation measures appropriate to their jobs before becoming involved with construction and restoration activities.

4. The authorized facility locations shall be as shown in the EA, as supplemented by filed alignment sheets. **As soon as they are available, and before the start of construction,** Dominion shall file with the Secretary any revised detailed survey alignment maps/sheets at a scale not smaller than 1:6,000 with station positions for all facilities approved by the Order. All requests for modifications of environmental conditions of the Order or site-specific clearances must be written and must reference locations designated on these alignment maps/sheets.

    Dominion's exercise of eminent domain authority granted under the Natural Gas Act Section 7(h) in any condemnation proceedings related to the Order must be consistent with these authorized facilities and locations. Dominion's right of eminent domain granted under the Natural Gas Act Section 7(h) does not authorize it to increase the size of its natural gas pipelines or aboveground

facilities to accommodate future needs or to acquire a right-of-way for a pipeline to transport a commodity other than natural gas.

5. Dominion shall file with the Secretary detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all route alignments or facility relocations, and staging areas, pipe storage yards, new access roads, and other areas that will be used or disturbed and have not been previously identified in filings with the Secretary. Approval for each of these areas must be explicitly requested in writing. For each area, the request must include a description of the existing land use/cover type, documentation of landowner approval, whether any cultural resources or federally listed threatened or endangered species will be affected, and whether any other environmentally sensitive areas are within or abutting the area. All areas shall be clearly identified on the maps/sheets/aerial photographs. Each area must be approved in writing by the Director of OEP **before construction in or near that area.**

   This requirement does not apply to extra workspace allowed by the FERC *Upland Erosion Control, Revegetation, and Maintenance Plan* and/or minor field realignments per landowner needs and requirements which do not affect other landowners or sensitive environmental areas such as wetlands.

   Examples of alterations requiring approval include all route realignments and facility location changes resulting from:

   a. implementation of cultural resources mitigation measures;

   b. implementation of endangered, threatened, or special concern species mitigation measures;

   c. recommendations by state regulatory authorities; and

   d. agreements with individual landowners that affect other landowners or could affect sensitive environmental areas.

6. **Within 60 days of the acceptance of the Certificate and before construction begins,** Dominion shall file an Implementation Plan with the Secretary for review and written approval by the Director of OEP. Dominion must file revisions to the plan as schedules change. The plan shall identify:

   a. how Dominion will implement the construction procedures and mitigation measures described in its application and supplements (including responses to staff data requests), identified in the EA, and required by the Order;

   b. how Dominion 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 Dominion will give to all personnel involved with construction and restoration (initial and refresher training as the Project progresses and personnel change) with the opportunity for OEP staff to participate in the training session(s);

f. the company personnel and specific portion of Dominion's organization having responsibility for compliance;

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

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

i. the completion of all required surveys and reports;

i. the environmental compliance training of onsite personnel;

ii. the start of construction; and

iii. the start and completion of restoration.

7. Dominion shall employ at least one EI per construction spread. The EI shall be:

a. responsible for monitoring and ensuring compliance with all mitigation measures required by the Order and other grants, permits, certificates, or other authorizing documents;

b. responsible for evaluating the construction contractor's implementation of the environmental mitigation measures required in the contract (see condition 6 above) and any other authorizing document;

c. empowered to order correction of acts that violate the environmental conditions of the Order, and any other authorizing document;

d. a full-time position, separate from all other activity inspectors*;*

e. responsible for documenting compliance with the environmental conditions of the Order, as well as any environmental conditions/permit requirements imposed by other federal, state, or local agencies; and

f. responsible for maintaining status reports.

8. Beginning with the filing of its Implementation Plan, Dominion shall file updated status reports with the Secretary on a **bi-weekly** basis until all construction and restoration activities are complete. On request, these status reports will also be provided to other federal and state agencies with permitting responsibilities. Status reports shall include:

a. an update on Dominion's efforts to obtain the necessary federal authorizations;

b. the construction status of the project, work planned for the following reporting period, and any schedule changes for stream crossings or work in other environmentally-sensitive areas;

c. a listing of all problems encountered and each instance of noncompliance observed by the EI during the reporting period (both for the conditions imposed by the Commission and any environmental conditions/permit requirements imposed by other federal, state, or local agencies);

d. a description of the corrective actions implemented in response to all instances of noncompliance, and their cost;

e. the effectiveness of all corrective actions implemented;

f. a description of any landowner/resident complaints which may relate to compliance with the requirements of the Order, and the measures taken to satisfy their concerns; and

g. copies of any correspondence received by Dominion from other federal, state, or local permitting agencies concerning instances of noncompliance, and Dominion's response.

9. **Prior to receiving written authorization from the Director of OEP to commence construction of any Project facilities,** Dominion shall file with the Secretary documentation that it has received all applicable authorizations required under federal law (or evidence of waiver thereof).

10. Dominion must receive written authorization from the Director of OEP **before placing the Project into service.** Such authorization will only be granted following a determination that rehabilitation and restoration of the right-of-way and other areas affected by the Project are proceeding satisfactorily.

11. **Within 30 days of placing the authorized facilities in service,** Dominion 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 Dominion has complied with or will comply with. This statement shall also identify any areas affected by the Project where compliance measures were not properly implemented, if not previously identified in filed status reports, and the reason for noncompliance.

12. **Prior to construction**, Dominion shall contact the Woodruff Roebuck Water District and the City of Clinton to determine notification procedures in regard to construction of the Project within 3 miles of the public water supply intakes, and file documentation of this consultation with the Secretary.

13. **Prior to construction**, Dominion shall file with the Secretary the locations, rates, and volumes of water that would be withdrawn from surface waters for hydrostatic testing activities. This shall include the watershed associated with the source water, and the respective discharge locations.

14. **Prior to construction**, Dominion shall file with the Secretary, for review and written approval by the Director of OEP, its proposed mesh size to minimize entrainment during hydrostatic test water withdrawals, and the proposed pump velocity to minimize impingement of smaller nongame fish, developed in consultation with the SCDNR. Dominion shall include in its filing,

documentation of its consultation with the SCDNR regarding both the proposed mesh size and pump velocity limits**.**

15. **Prior to construction**, Dominion shall revise its T2C Procedures to ensure consistency with the FERC Procedures at section V.B.1 to conduct all in-water work from June 1 through November 30, or file with the Secretary documentation of consultation with the SCDNR and any other applicable agencies in regard to alternative timing restrictions for crossing warmwater fisheries.

16. **Prior to construction**, Dominion shall consult with the NRCS in regard to the proposed access road modification and related disturbance on the WRP conservation easement along the Dillon Pipeline. Dominion shall file copies of this consultation with the Secretary, and any proposed avoidance or mitigation measures, for review and written approval by the Director of OEP.

17. **Prior to construction**, Dominion shall file with the Secretary documentation of consultation with the USFWS regarding project-related impacts on migratory bird species, including any additional conservation measures it will implement.

18. **Prior to construction**, Dominion shall file with the Secretary documentation of consultation with the USFWS and SCDNR for the Newberry burrowing crayfish and for the Broad River spiny crayfish.

19. Dominion shall develop and implement an environmental complaint resolution procedure. The procedure shall provide landowners with clear and simple directions for identifying and resolving their environmental mitigation problems/concerns during construction of the project and restoration of the right-of-way. **Prior to construction**, Dominion shall mail the complaint procedures to each landowner whose property would be crossed by the project.

    a. In its letter to affected landowners, Dominion shall:

        i. provide a local contact that the landowners should call first with their concerns; the letter should indicate how soon a landowner should expect a response;
        ii. instruct the landowners that if they are not satisfied with the response, they should call Dominion's Hotline; the letter should indicate how soon to expect a response; and
        iii. instruct the landowners that if they are still not satisfied with the response from Dominion's Hotline, they should contact the Commission's Landowner Helpline at 877-337-2237 or at LandownerHelp@ferc.gov.

    b. In addition, Dominion shall include in its biweekly status report a copy of a table that contains the following information for each problem/concern:

        i. the identity of the caller and date of the call;
        ii. the location by milepost and identification number from the authorized alignment sheet(s) of the affected property;
        iii. a description of the problem/concern; and
        iv. an explanation of how and when the problem was resolved, will be resolved, or why it has not been resolved.

20. **Prior to construction**, Dominion shall provide evidence of landowner concurrence for the construction work area and fencing located within 10 feet of the residences at MP 0.7, 1.0R, 15.6R, and 15.8R.

21. **Prior to construction**, Dominion shall file with the Secretary documentation of concurrence from the South Carolina Department of Health and Environmental Control's Office of Ocean and Coastal Resource Management that the Project is consistent with the South Carolina Coastal Zone Management Program.

22. Dominion shall **not** begin implementation of any treatment plans/measures (including archaeological data recovery); construction of facilities; or use staging, storage, or temporary work areas and new or to-be-improved access roads **until**:

    a. Dominion files with the Secretary all survey reports, evaluation reports, avoidance plans and treatment plans, and the SHPO's comments on the reports and plans;

    b. the ACHP is afforded an opportunity to comment if historic properties will be adversely affected; and

    c. FERC staff reviews and the Director of the OEP approves all reports and plans and notifies Dominion in writing that construction may proceed.

    All material filed with the Commission 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**."

23. **Prior to construction**, Dominion shall file with the Secretary, for the review and written approval by the Director of OEP, a HDD noise mitigation plan to reduce the projected noise level attributable to the proposed drilling operations at nearby NSAs for HDD 02, 03, 04, 05, 06, 08, 11, 12, 13, 17, and 24. During drilling operations, Dominion shall implement the approved plan, monitor noise levels, include the noise level results in its bi-weekly construction status reports, and make all reasonable efforts to restrict the noise attributable to the drilling operations to no more than an L_{dn} of 55 dBA at the NSAs.

24. Dominion shall file with the Secretary a noise survey for the Moore and Dorchester Compressor Stations **no later than 60 days** after placing each station into service. If a full power load condition noise survey is not possible, Dominion shall file an interim survey at the maximum possible power load **within 60 days** of placing the station into service and file the full power load survey **within 6 months**. If the noise attributable to operation of all equipment at the station under interim or full power load conditions exceeds an L_{dn} of 55 dBA at any nearby NSA, Dominion shall:

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

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

    c. confirm compliance with this requirement by filing a second full power load noise survey with the Secretary for review and written approval by the Director of OEP **no later than 60 days** after it installs the additional noise controls.

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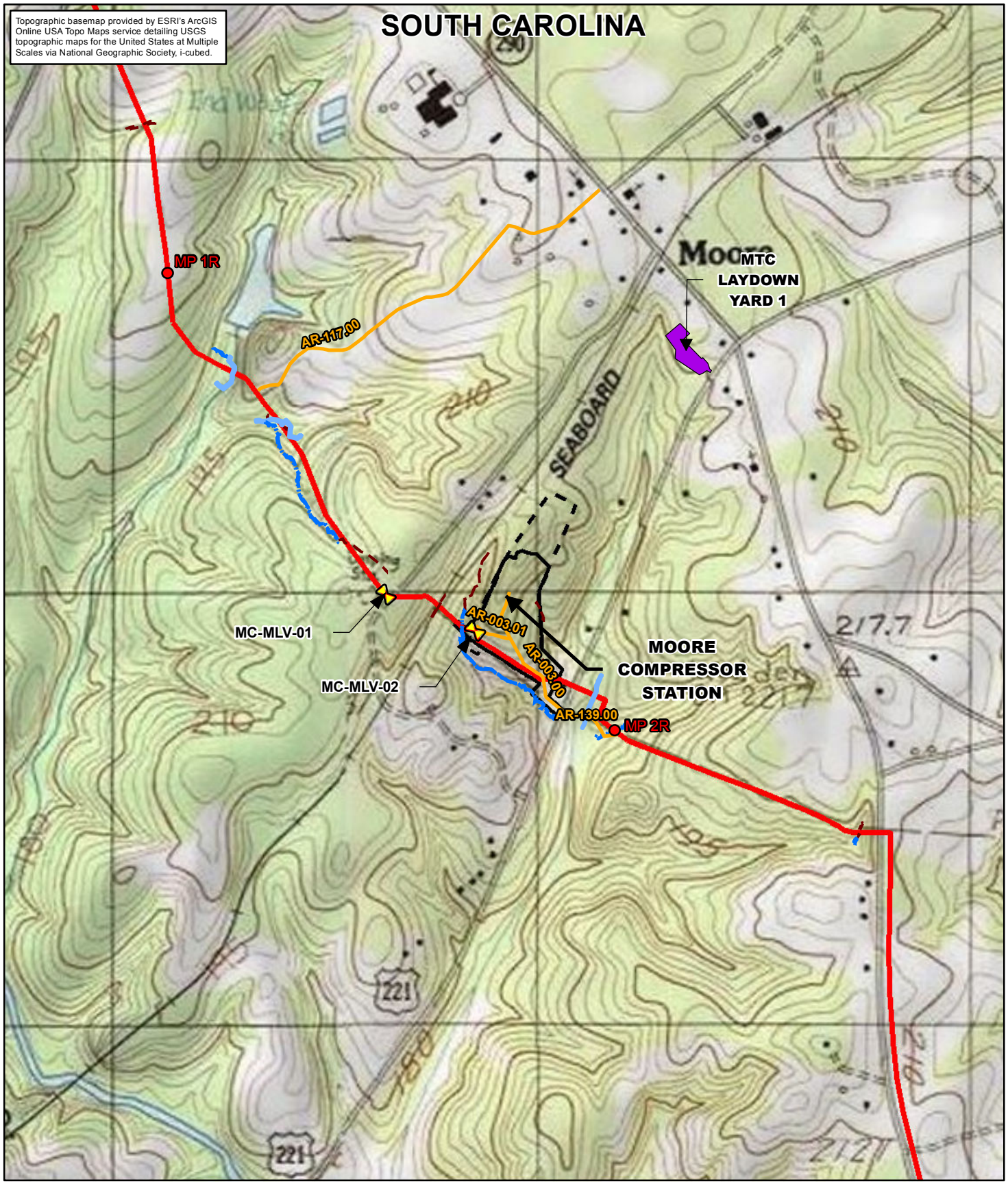
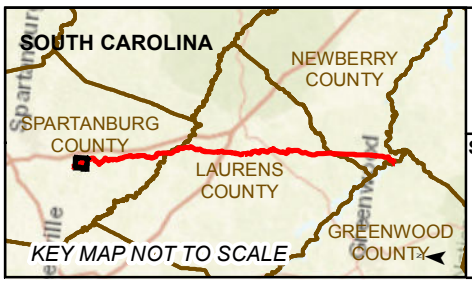
TRC is a third party contractor assisting the Commission staff in reviewing the environmental aspects of the project application and preparing the environmental documents required by NEPA. Third party contractors are selected by Commission staff and funded by project applicants. Per the procedures in 40 CFR 1506.5(c), third party contractors execute a disclosure statement specifying that they have no financial or other conflicting interest in the outcome of the project. The Commission staff has complete control over the scope, content, quality, and schedule of the contractor's work. The Commission staff independently evaluates the results of the third-party contractor's work and the Commission, through its staff, bears ultimate responsibility for full compliance with the requirements of NEPA.

Appendix A

Proposed Facilities Maps





LEGEND:

- MILE POST
- MLV
- HDD ENTRY
- HDD EXIT
- PROPOSED PIPELINE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- LAYDOWN YARD
- SITE PERMANENT IMPACT
- SITE TEMPORARY IMPACT
- COUNTY BOUNDARY
- DITCH
- TI
- TP
- TS
- NAF
- PEM
- PFO
- PSS
- OW

SCALE:

N W E S

1 in = 1,000 ft

0 500 1,000

Dominion™

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APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
MOORE COMPRESSOR STATION
USGS TOPOGRAPHIC QUADRANGLE MAP
MOORE QUADRANGLE

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
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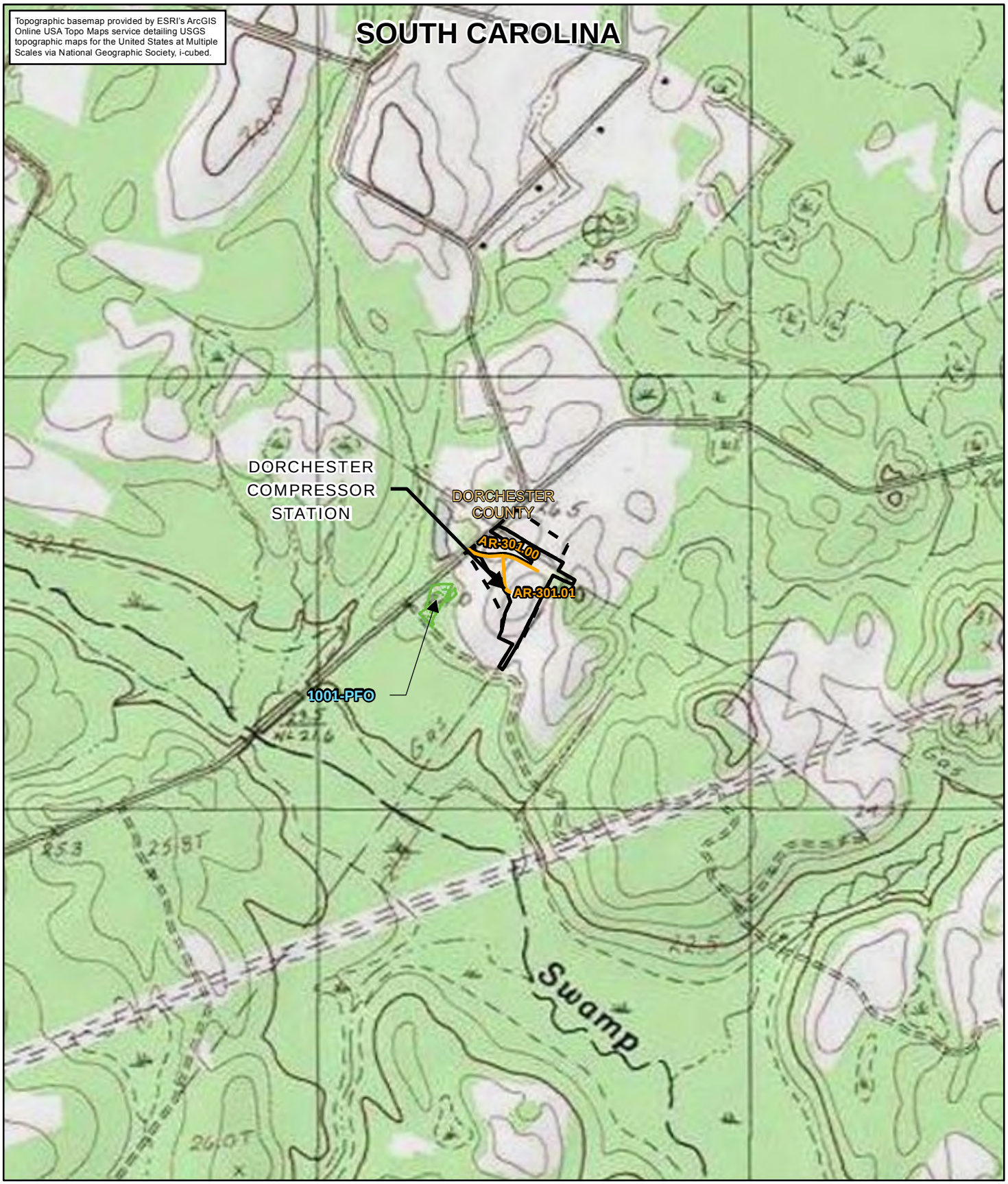

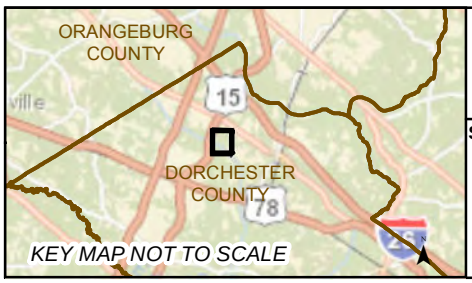

LEGEND:
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- SITE PERMANENT IMPACT
- SITE TEMPORARY IMPACT
- PFO
- COUNTY BOUNDARY

SCALE:

N W E S

1 in = 1,000 ft

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APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
DORCHESTER COMPRESSOR STATION
USGS TOPOGRAPHIC QUADRANGLE MAP
SAINT GEORGE QUADRANGLE

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
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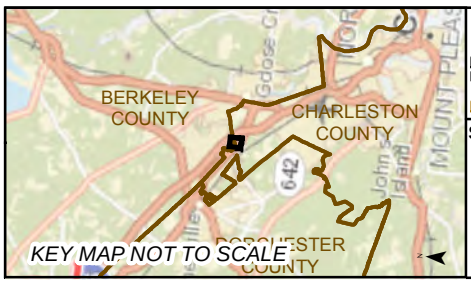
SOUTH CAROLINA



LEGEND:
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- PEM
- COUNTY BOUNDARY

SCALE:

1 in = 500 ft

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APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
CHARLESTON TOWN BORDER STATION
USGS TOPOGRAPHIC QUADRANGLE MAP
LADSON QUADRANGLE

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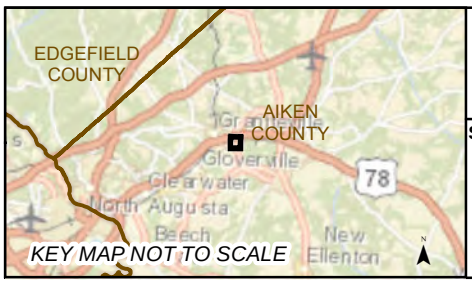

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- PERMANENT ACCESS ROAD
- SITE PERMANENT IMPACT
- SITE TEMPORARY IMPACT
- COUNTY BOUNDARY

SCALE:

N W E S

1 in = 1,000 ft

0 250 500

Dominion

URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
SOUTHERN COMPRESSOR STATION
USGS TOPOGRAPHIC QUADRANGLE MAP
GRANITEVILLE QUADRANGLE

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
TP	AE	BG	1 " = 500 '

DATE:	DRAWING NO.:	SHEET	REV:
3/9/2016	DCG-SC-TOP-001	SHEET 1 OF 1	D

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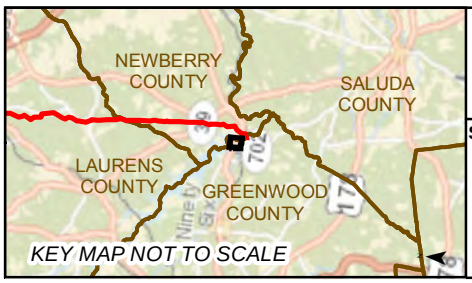
Topographic basemap provided by ESRI's ArcGIS Online USA Topo Maps service detailing USGS topographic maps for the United States at Multiple Scales via National Geographic Society, i-cubed.

SOUTH CAROLINA



LEGEND:

- PERMANENT ACCESS ROAD
- SITE PERMANENT IMPACT
- SITE TEMPORARY IMPACT
- COUNTY BOUNDARY

SCALE:

N W E S

1 in = 500 ft

0 250 500

Dominion

URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
GREENWOOD TOWN BORDER STATION
USGS TOPOGRAPHIC QUADRANGLE MAP
DYSON QUADRANGLE

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
JE	AE	BG	1 " = 500 '

DATE:	DRAWING NO.:		REV:
3/9/2016	DCG-GW-TOP-001	SHEET 1 OF 1	C

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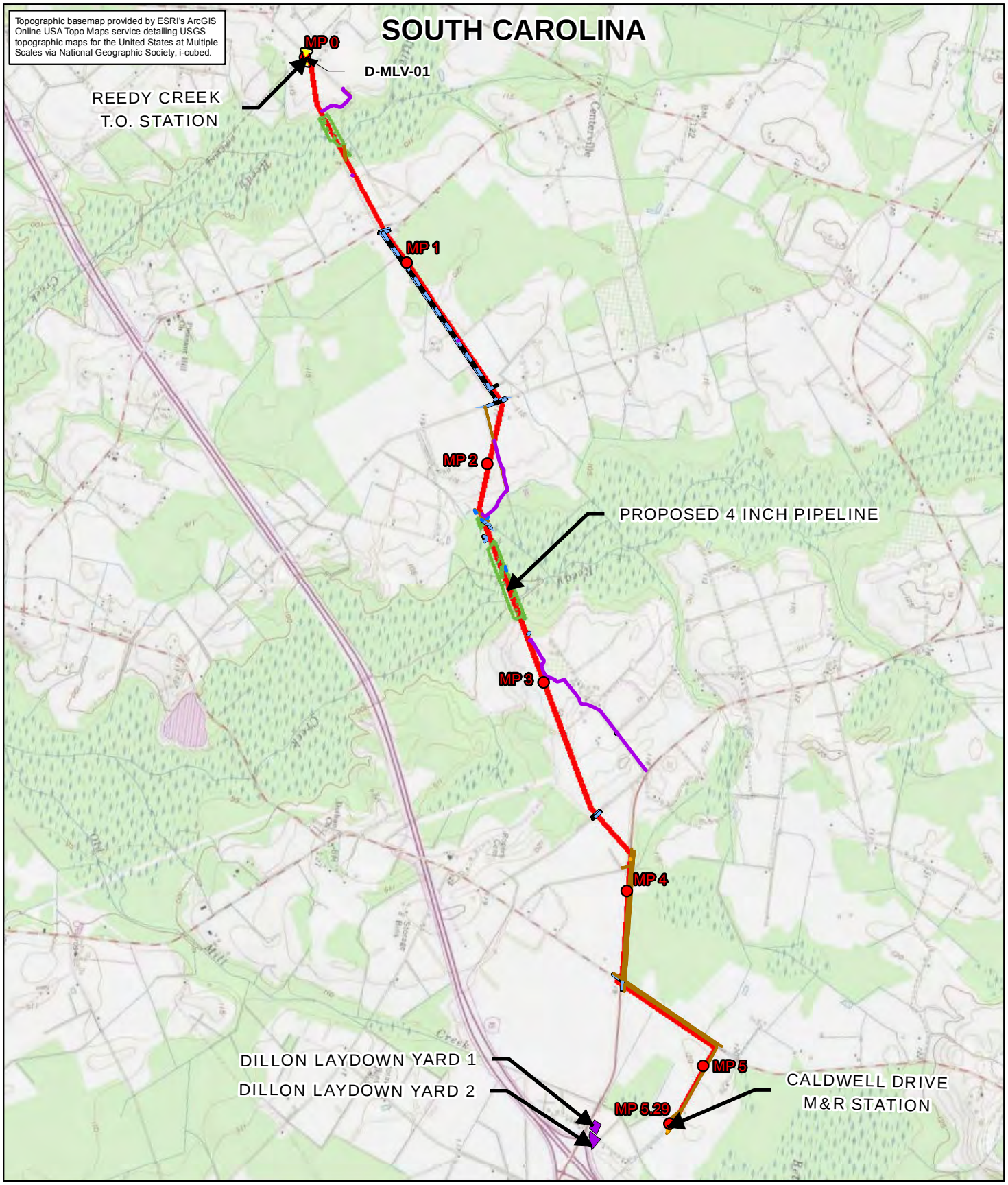

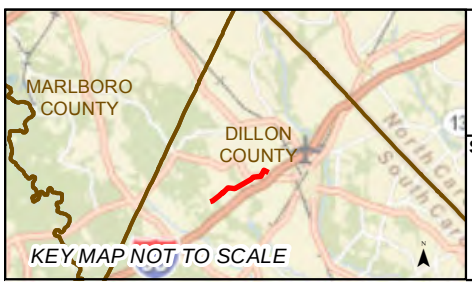

LEGEND:

- MILE POST
- MLV
- HDD ENTRY
- HDD EXIT
- PROPOSED PIPELINE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- LAYDOWN YARD
- SITE PERMANENT IMPACT
- SITE TEMPORARY IMPACT
- COUNTY BOUNDARY
- DITCH

NWI: TI, TP, TS, NAF, PEM, PFO, PSS, OW

SCALE:

1 in = 3,000 ft

0 1,500 3,000

Dominion™

URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
DILLON PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP COVER

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
TP	AE	SB	1 " = 3,000 '

DATE:	DRAWING NO.:	SHEET	REV:
03/09/2016	DCG-DL-TGE-001	SHEET 1 OF 3	D

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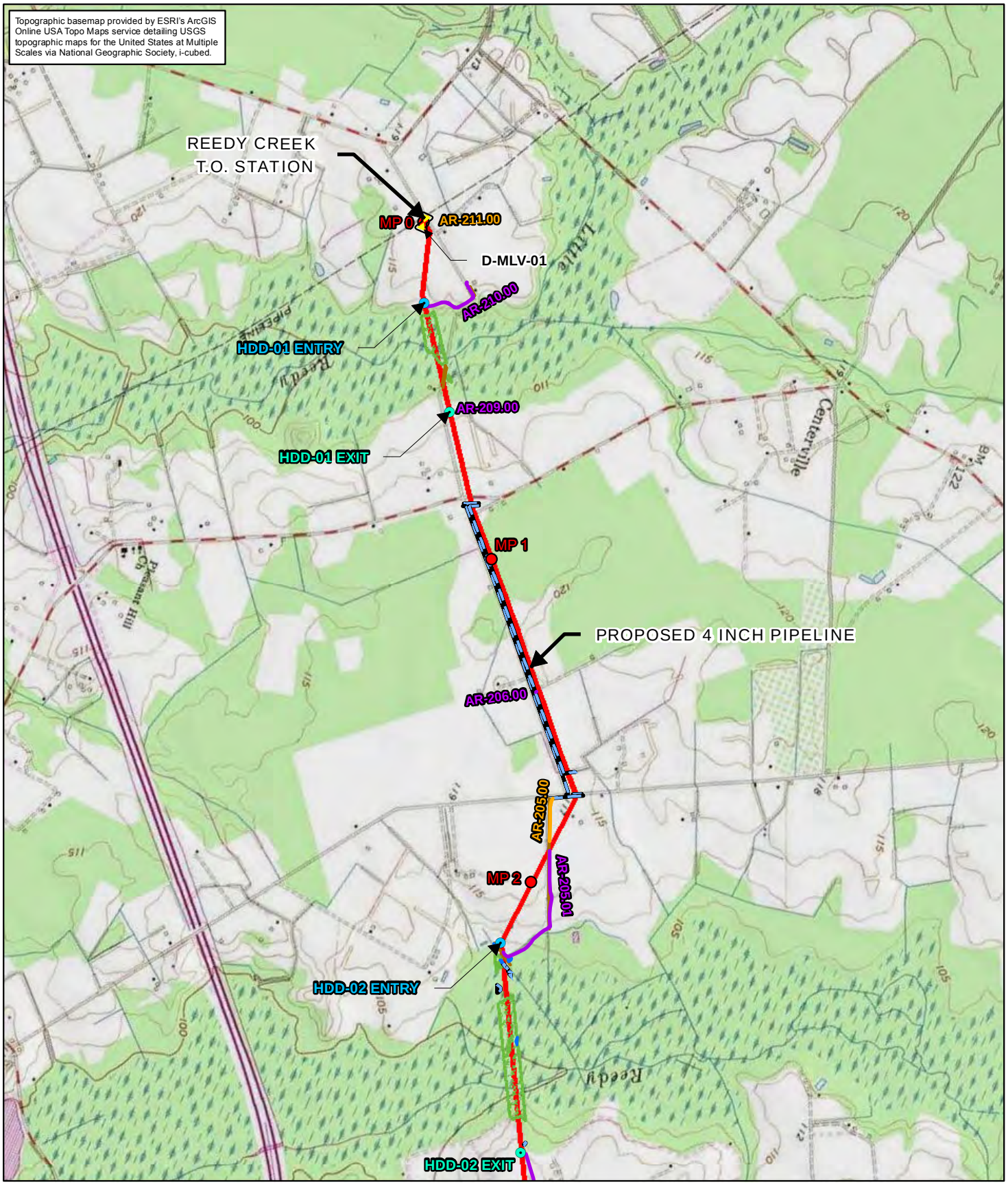

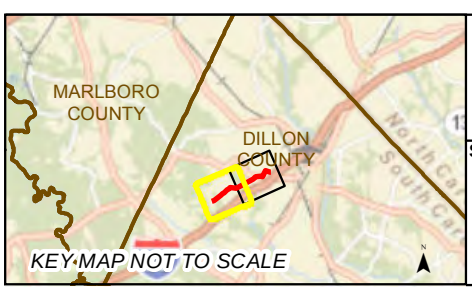

LEGEND:

- MILE POST
- MLV
- HDD ENTRY
- HDD EXIT
- PROPOSED PIPELINE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- LAYDOWN YARD
- SITE PERMANENT IMPACT
- SITE TEMPORARY IMPACT
- COUNTY BOUNDARY
- DITCH

LANDOWNER: TI, TP, TS, NAF, PEM, PFO, PSS, OW

SCALE:

1 in = 2,000 ft

0 1,500 3,000

Dominion™ URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
DILLON PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP
DILLON WEST QUADRANGLE

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
TP	AE	BG	1 " = 2,000 '

DATE:	DRAWING NO.:	SHEET	REV:
03/09/2016	DCG-DL-TOP-001	SHEET 2 OF 3	D

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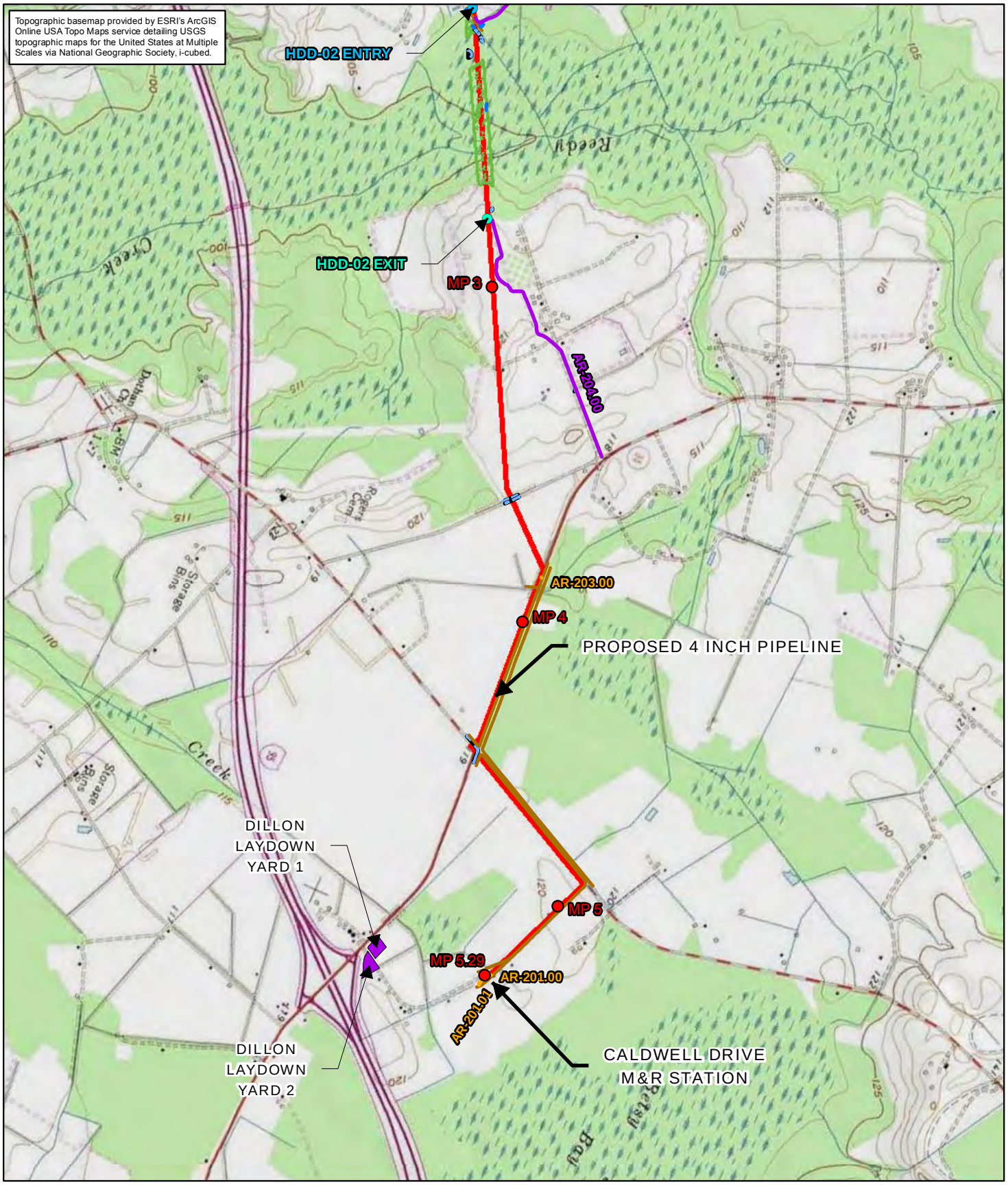

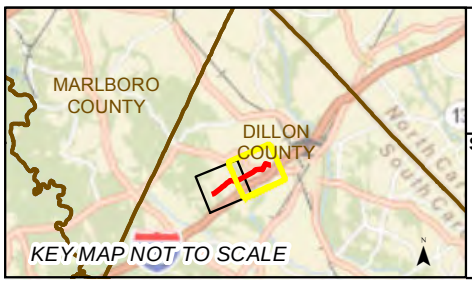

LEGEND:

- MILE POST
- MLV
- HDD ENTRY
- HDD EXIT
- PROPOSED PIPELINE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- LAYDOWN YARD
- SITE PERMANENT IMPACT
- SITE TEMPORARY IMPACT
- COUNTY BOUNDARY
- DITCH

NWI: TI, TP, TS, NAF, PEM, PFO, PSS, OW

SCALE:

1 in = 2,000 ft

0 1,500 3,000

Dominion™ URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
DILLON PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP
DILLON WEST QUADRANGLE

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
TP	AE	BG	1 " = 2,000 '

DATE:	DRAWING NO.:	SHEET	REV:
03/09/2016	DCG-DL-TOP-002	SHEET 3 OF 3	D

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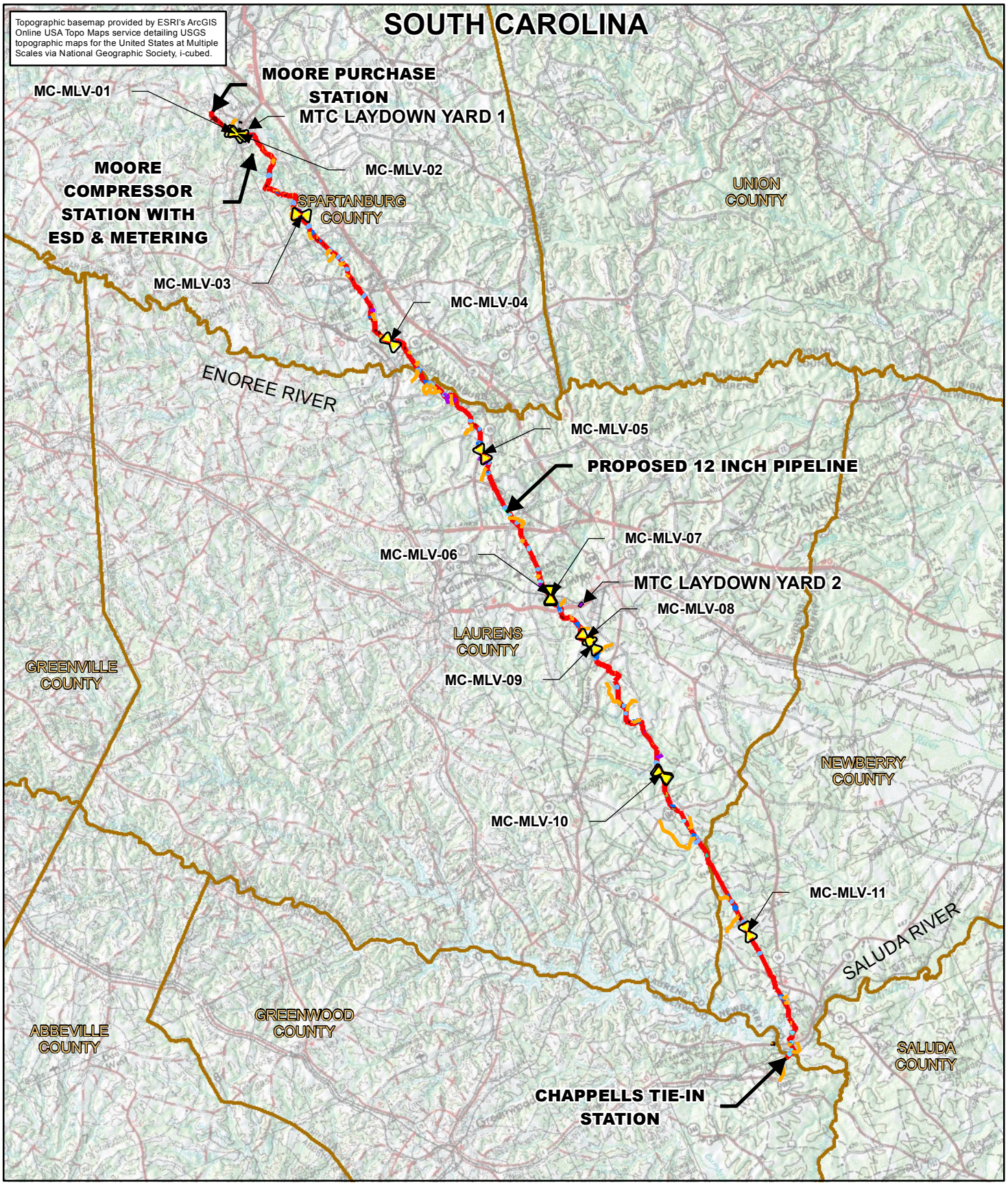

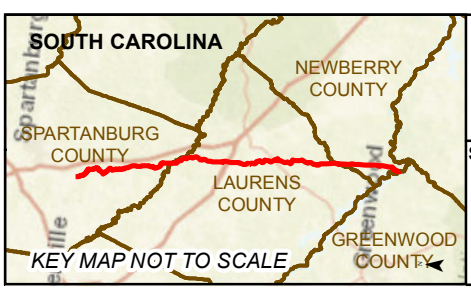

LEGEND:
- MILE POST
- MLV
- HDD ENTRY
- HDD EXIT
- PROPOSED PIPELINE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- LAYDOWN YARD
- SITE PERMANENT IMPACT
- SITE TEMPORARY IMPACT
- COUNTY BOUNDARY
- DITCH
- TI
- TP
- TS
- NAF
- PEM
- PFO
- PSS
- OW

SCALE: N.T.S.
0 10,000 20,000 30,000

Dominion | URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP OVERVIEW
SPARTANBURG, LAURENS, NEWBERRY, & GREENWOOD COUNTIES, SOUTH CAROLINA

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
TP	AE	BG	N.T.S.

DATE:	DRAWING NO.:	SHEET	REV:
08/19/2016	DCG-MTC-TGE-001	1 OF 18	F

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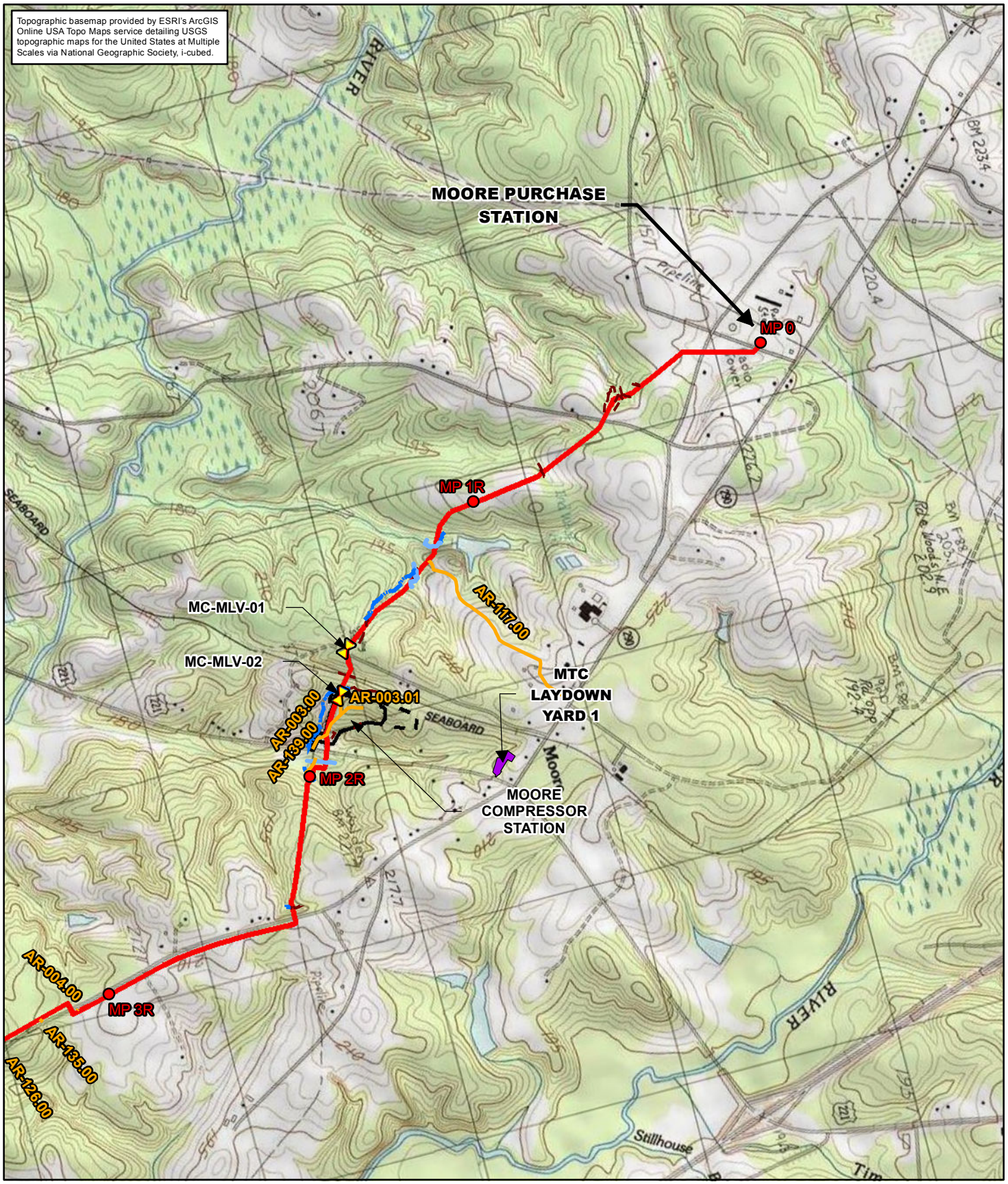

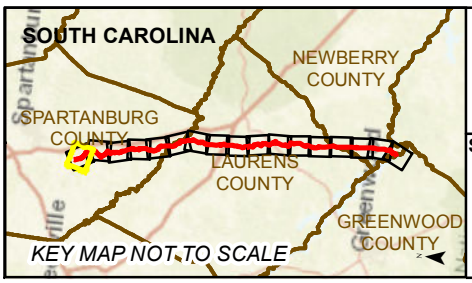

LEGEND:

- MILE POST
- MLV
- HDD ENTRY
- HDD EXIT
- PROPOSED PIPELINE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- LAYDOWN YARD
- SITE PERMANENT IMPACT
- SITE TEMPORARY IMPACT
- COUNTY BOUNDARY
- DITCH
- TI
- TP
- TS
- NAF
- PEM
- PFO
- PSS
- OW

SCALE:

Feet

0 1,000 2,000

Dominion

URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP
REIDVILLE, MOORE QUADRANGLE

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
TP	AE	BG	1 " = 2,000 '

DATE:	DRAWING NO.:	SHEET	REV:
08/19/2016	DCG-MTC-TOP-001	2 OF 18	F

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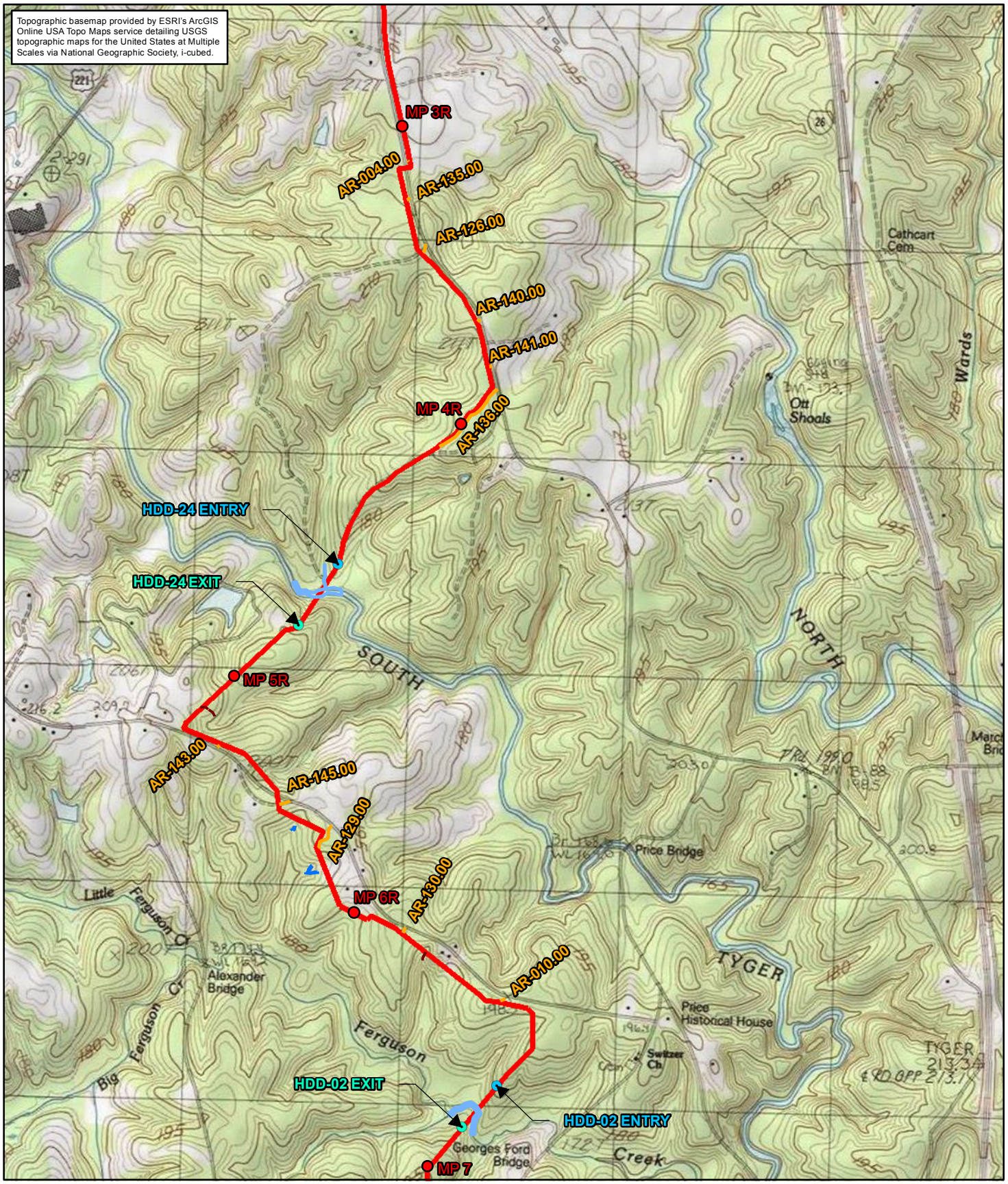

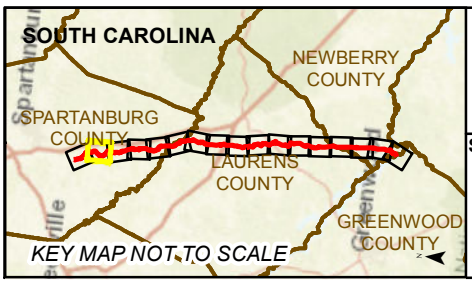

LEGEND:

- MILE POST
- MLV
- HDD ENTRY
- HDD EXIT
- PROPOSED PIPELINE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- LAYDOWN YARD
- SITE PERMANENT IMPACT
- SITE TEMPORARY IMPACT
- COUNTY BOUNDARY
- DITCH
- TI
- TP
- TS
- NAF
- PEM
- PFO
- PSS
- OW

SCALE:

N
W E
S
Feet
0 1,000 2,000

Dominion™

URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP
MOORE QUADRANGLE

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
TP	AE	BG	1 " = 2,000 '

DATE:	DRAWING NO.:	SHEET	REV:
08/19/2016	DCG-MTC-TOP-002	3 OF 18	F

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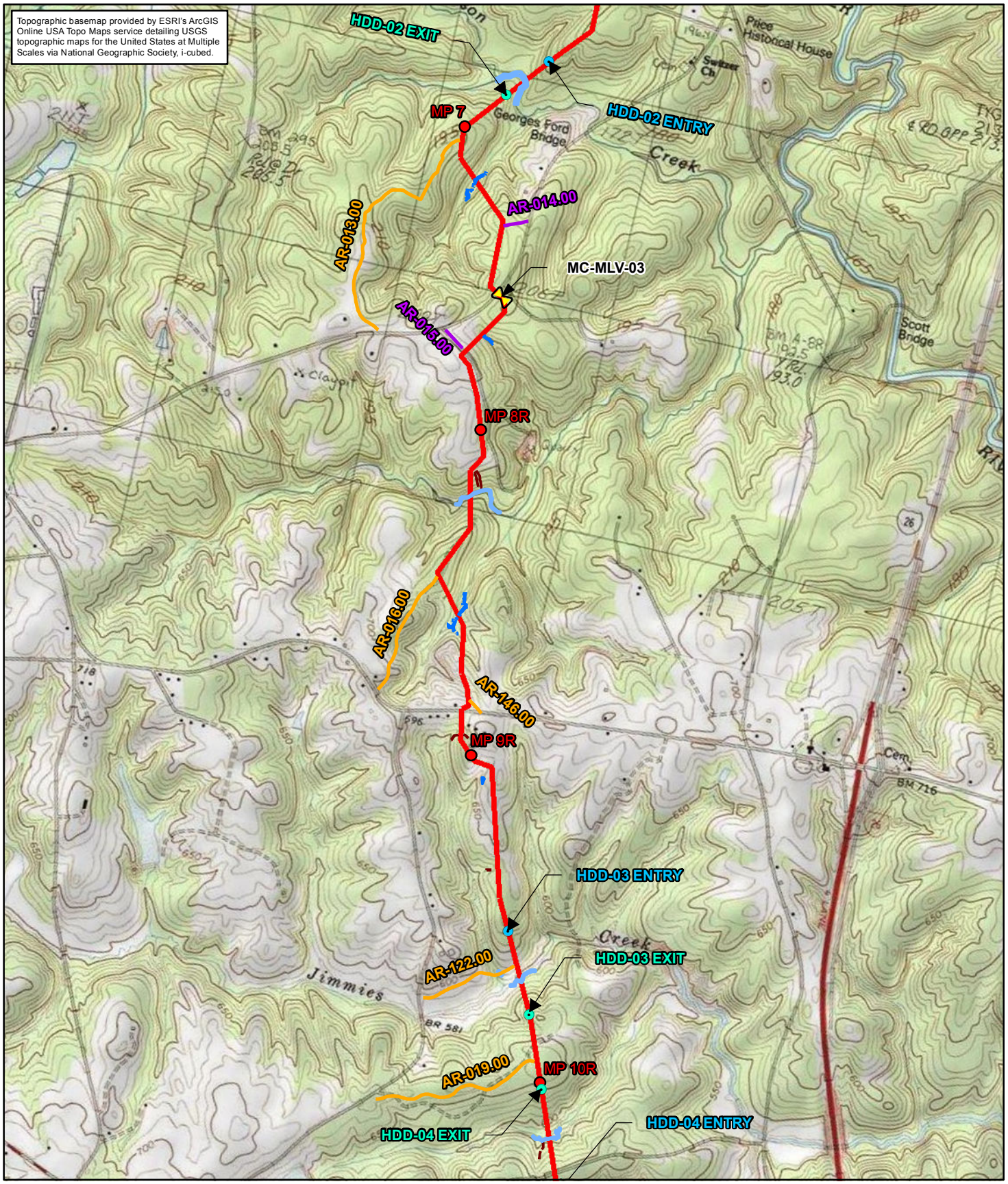

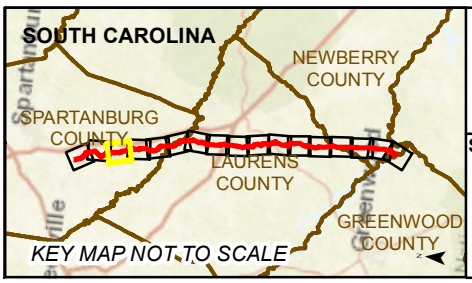

LEGEND:

- MILE POST
- MLV
- HDD ENTRY
- HDD EXIT
- PROPOSED PIPELINE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- LAYDOWN YARD
- SITE PERMANENT IMPACT
- SITE TEMPORARY IMPACT
- COUNTY BOUNDARY
- DITCH
- TI
- TP
- TS
- NAF
- PEM
- PFO
- PSS
- OW

SCALE:

N W E S

Feet

0 1,000 2,000

Dominion™

URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP
MOORE, ENOREE QUADRANGLE

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
TP	AE	BG	1 " = 2,000 '

DATE:	DRAWING NO.:	SHEET	REV:
08/19/2016	DCG-MTC-TOP-003	4 OF 18	F

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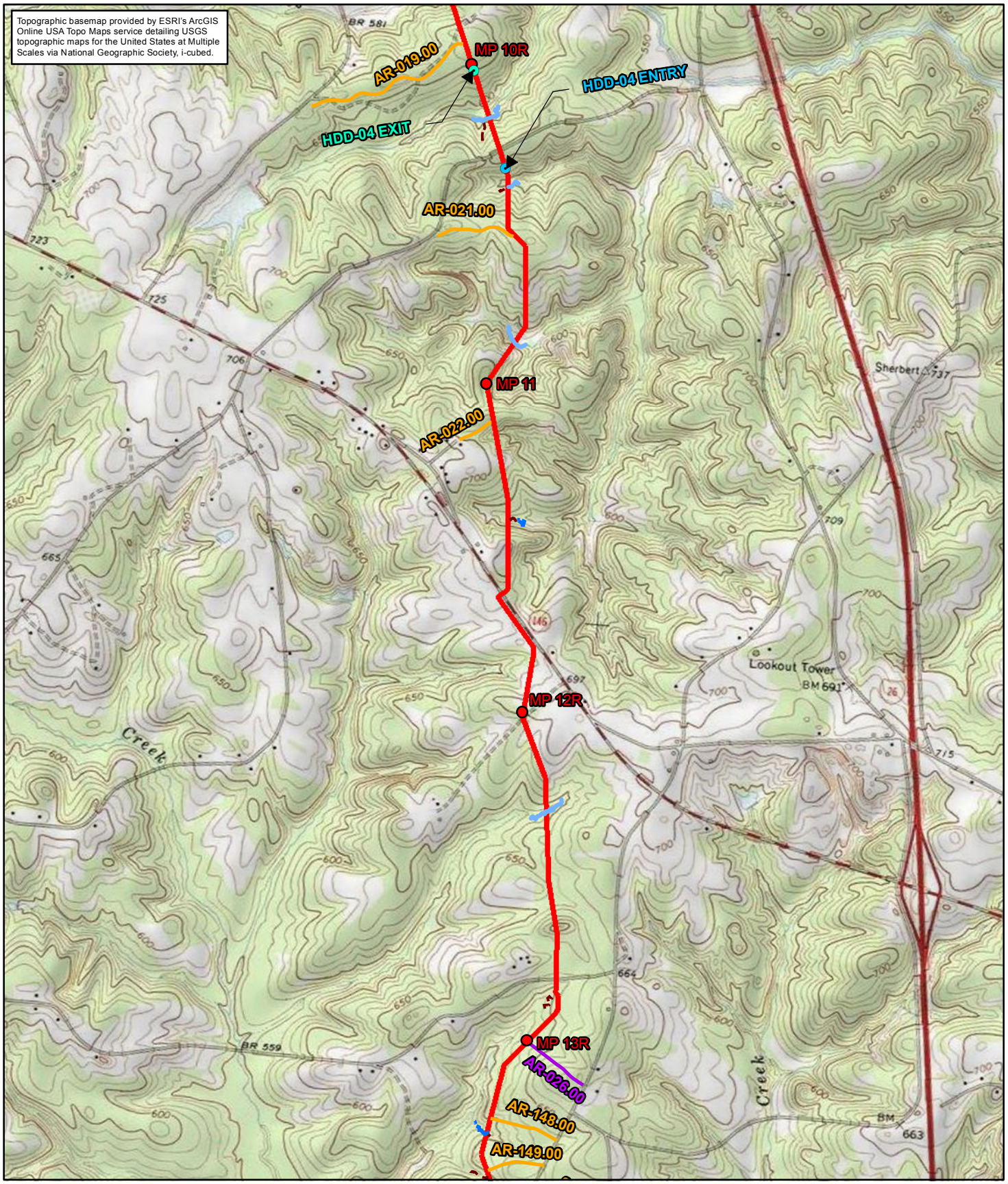

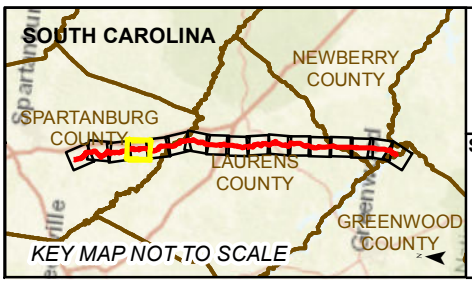

LEGEND:

- MILE POST
- MLV
- HDD ENTRY
- HDD EXIT
- PROPOSED PIPELINE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- LAYDOWN YARD
- SITE PERMANENT IMPACT
- SITE TEMPORARY IMPACT
- COUNTY BOUNDARY
- DITCH
- TI
- TP
- TS
- NAF
- PEM
- PFO
- PSS
- OW

SCALE:

N W E S

Feet

0 1,000 2,000

Dominion™

URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP
ENOREE QUADRANGLE

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
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DATE:	DRAWING NO.:	SHEET	REV:
08/19/2016	DCG-MTC-TOP-004	SHEET 5 OF 18	F

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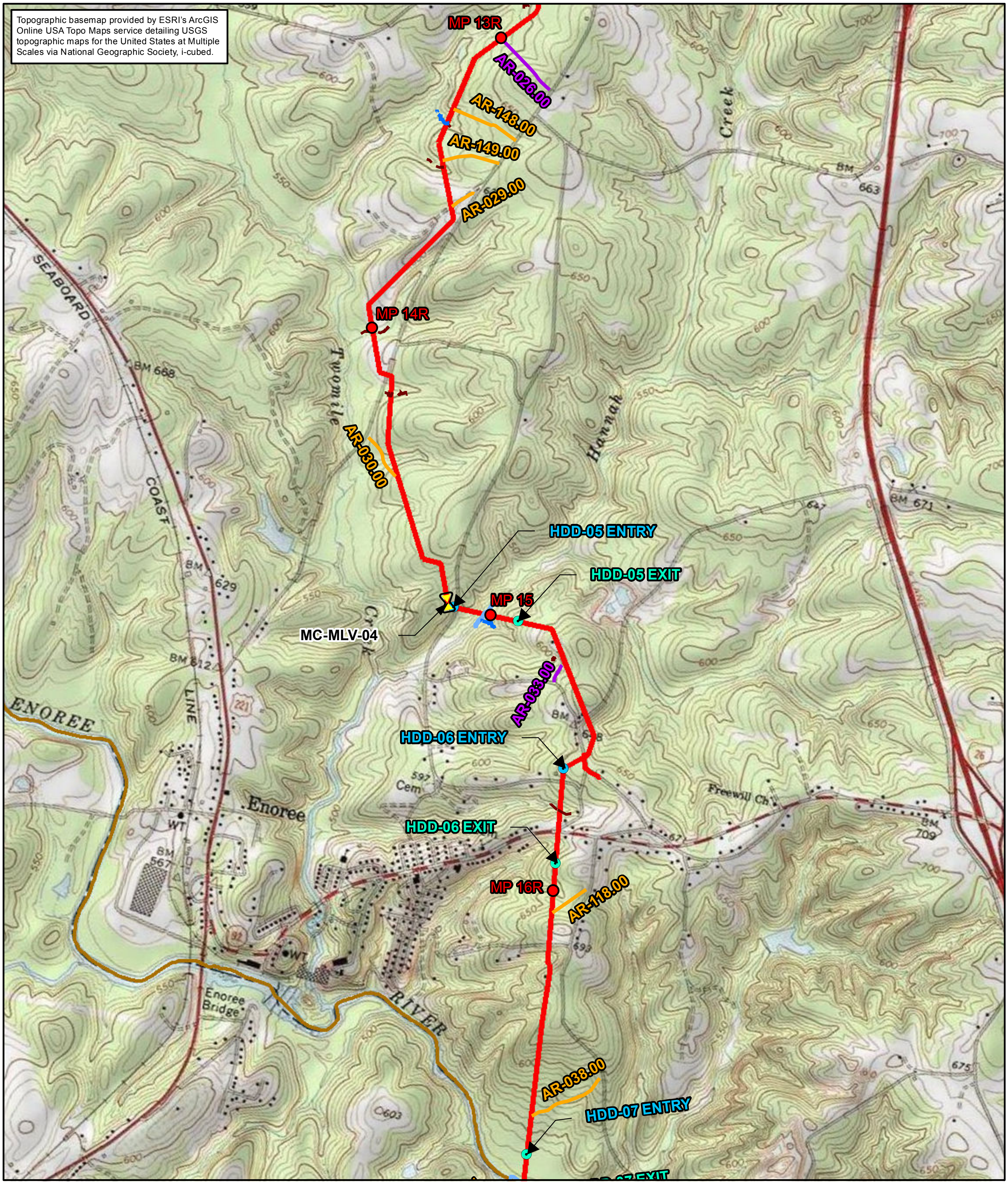

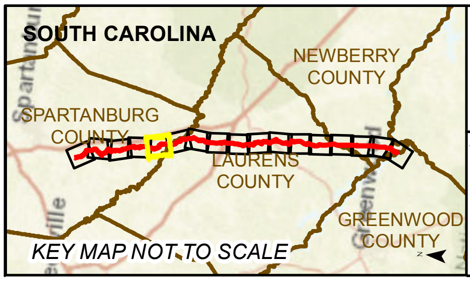

LEGEND:

- MILE POST
- MLV
- HDD ENTRY
- HDD EXIT
- PROPOSED PIPELINE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- LAYDOWN YARD
- SITE PERMANENT IMPACT
- SITE TEMPORARY IMPACT
- COUNTY BOUNDARY
- DITCH
- TI
- TP
- TS
- NAF
- PEM
- PFO
- PSS
- OW

SCALE:

Feet

0 1,000 2,000

Dominion

URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP
ENOREE QUADRANGLE

DRAWN BY: TP	CHECKED BY: AE	APPROVED BY: BG	SCALE: 1 " = 2,000 '
DATE: 08/19/2016	DRAWING NO.: DCG-MTC-TOP-005	SHEET 6 OF 18	REV: F

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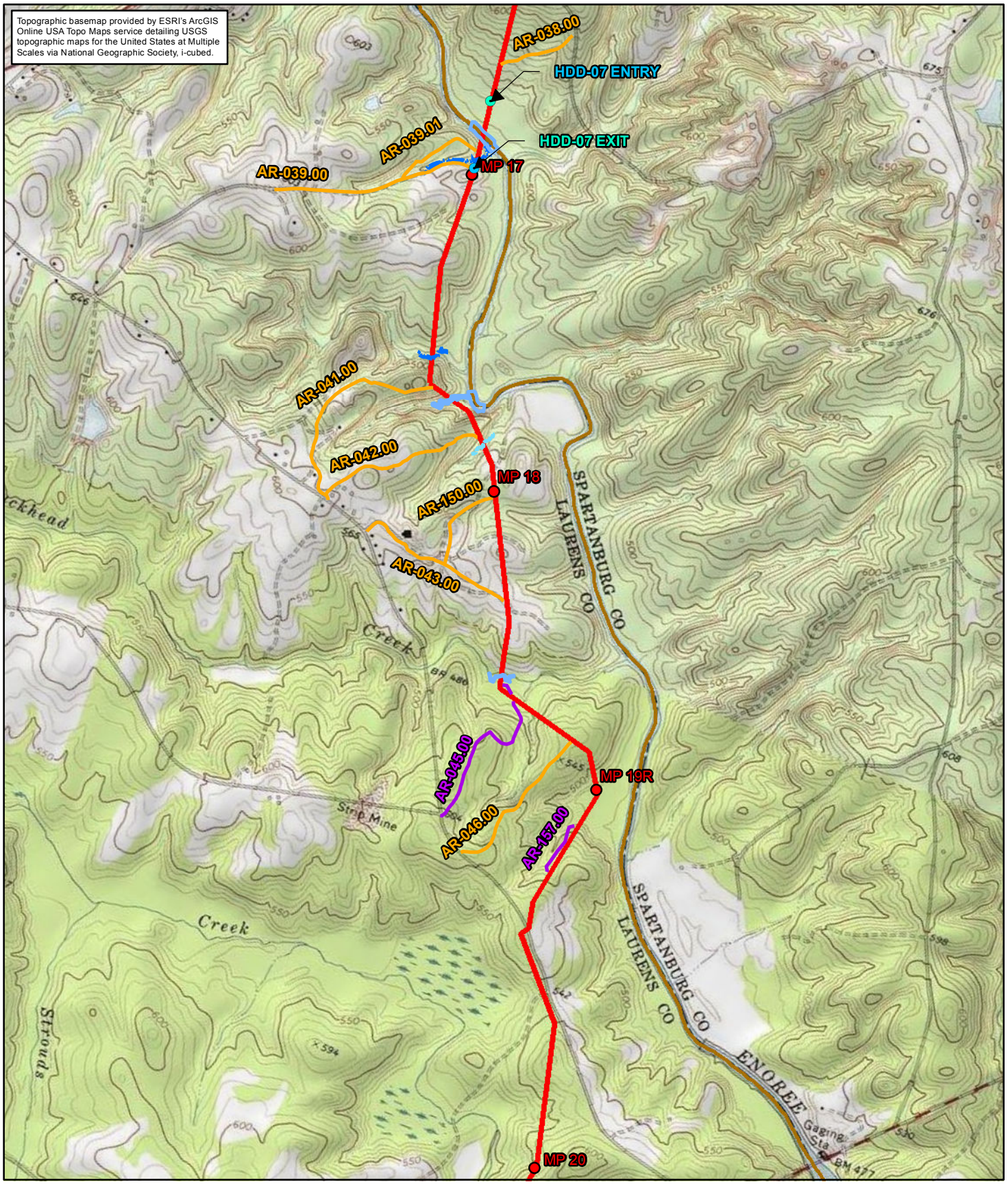

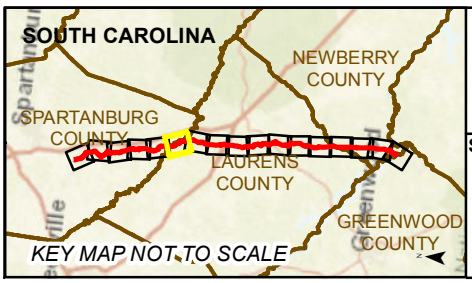

LEGEND:

- MILE POST
- MLV
- HDD ENTRY
- HDD EXIT
- PROPOSED PIPELINE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- LAYDOWN YARD
- SITE PERMANENT IMPACT
- SITE TEMPORARY IMPACT
- COUNTY BOUNDARY
- DITCH
- TI
- TP
- TS
- NAF
- PEM
- PFO
- PSS
- OW

SCALE:

N W E S

Feet

0 1,000 2,000

Dominion™

URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP
ENOREE, ORA QUADRANGLE

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
TP	AE	BG	1 " = 2,000 '

DATE:	DRAWING NO.:	SHEET	REV:
08/19/2016	DCG-MTC-TOP-006	7 OF 18	F

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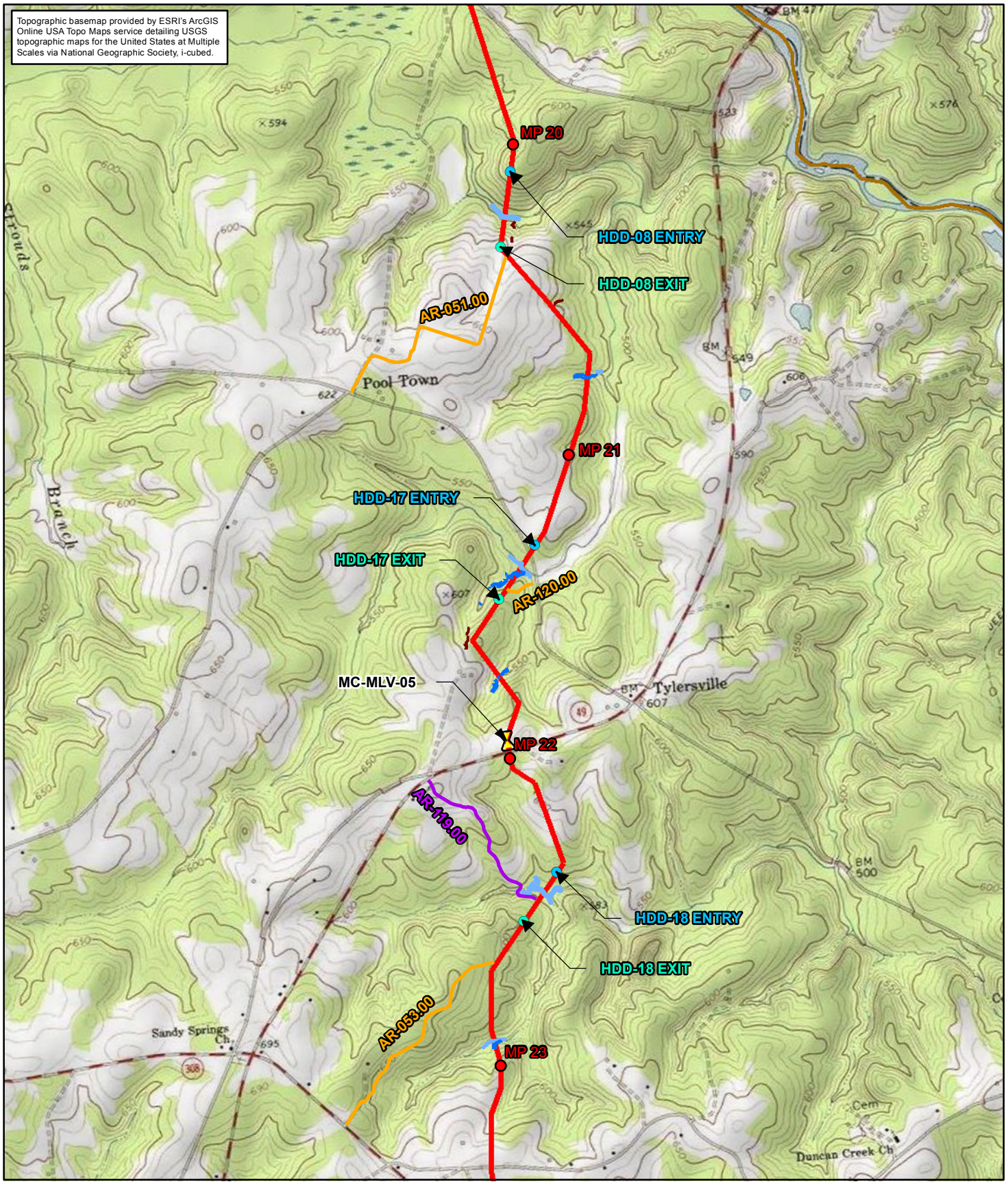
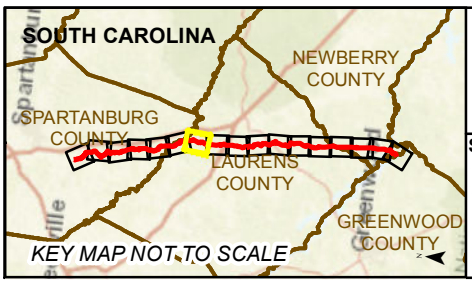




LEGEND:

- MILE POST
- MLV
- HDD ENTRY
- HDD EXIT
- PROPOSED PIPELINE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- LAYDOWN YARD
- SITE PERMANENT IMPACT
- SITE TEMPORARY IMPACT
- COUNTY BOUNDARY
- DITCH
- TI
- TP
- TS
- NAF
- PEM
- PFO
- PSS
- OW

SCALE:

N
W E
S
Feet
0 1,000 2,000

Dominion™

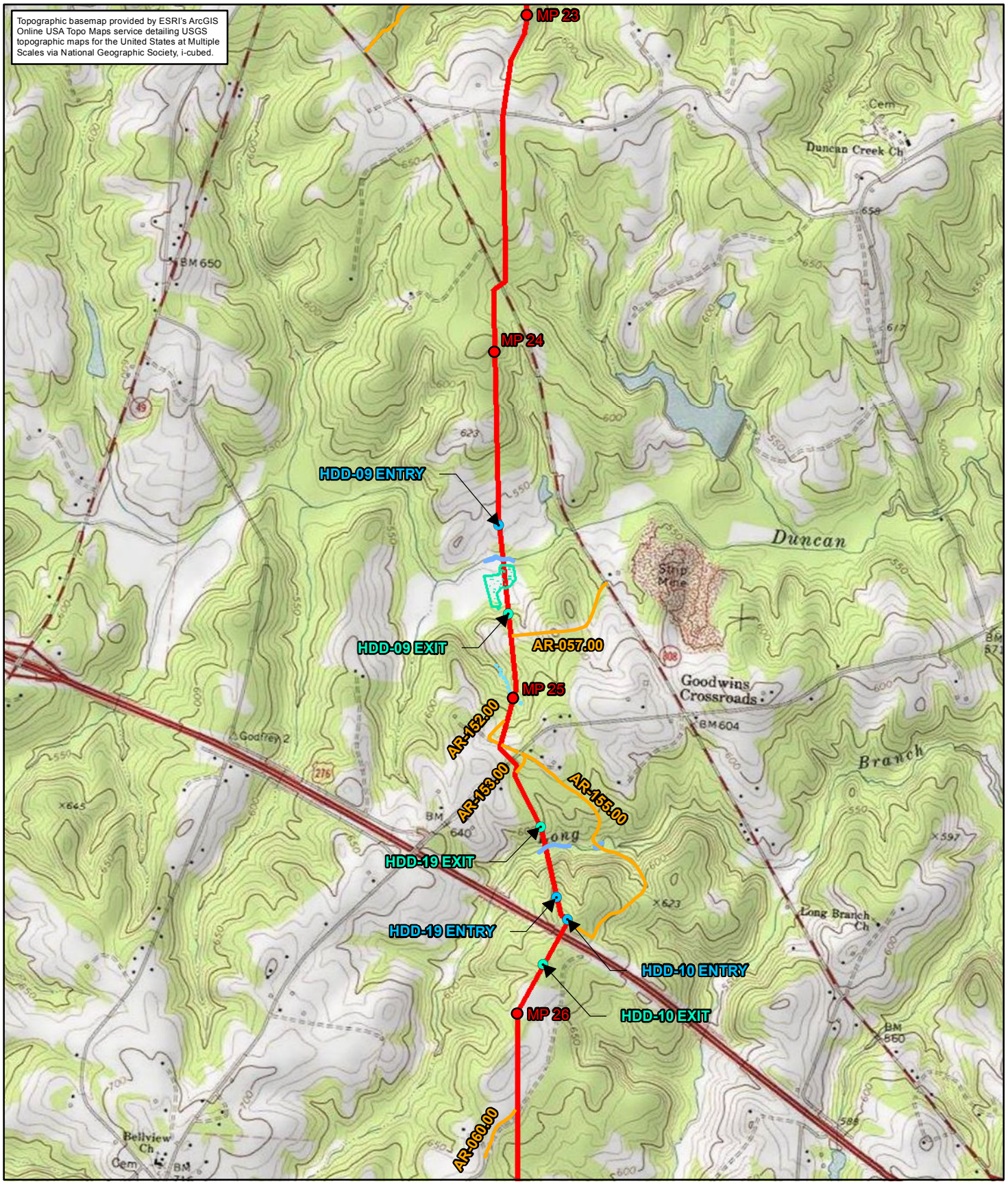
URS

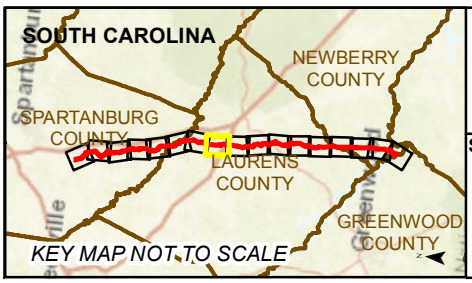
APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP
ORA QUADRANGLE

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
TP	AE	BG	1 " = 2,000 '

DATE:	DRAWING NO.:	SHEET	REV:
08/19/2016	DCG-MTC-TOP-007	8 OF 18	F

Path: O:\PE\Projects\SCANACGT\60420377\Pipeline\Dsn\01_Mapping\06_GIS\02_MXD\SUPPLEMENTAL_2\DCGT-USGS_TOPO_RM_8.5x11_Supplemental.mxd





LEGEND:

- MILE POST
- MLV
- HDD ENTRY
- HDD EXIT
- PROPOSED PIPELINE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- LAYDOWN YARD
- SITE PERMANENT IMPACT
- SITE TEMPORARY IMPACT
- COUNTY BOUNDARY
- DITCH
- TI
- TP
- TS
- NAF
- PEM
- PFO
- PSS
- OW

SCALE:

N / W / E / S

Feet

0 1,000 2,000

Dominion™

URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP
ORA QUADRANGLE

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
TP	AE	BG	1 " = 2,000 '

DATE:	DRAWING NO.:	SHEET	REV:
08/19/2016	DCG-MTC-TOP-008	9 OF 18	F

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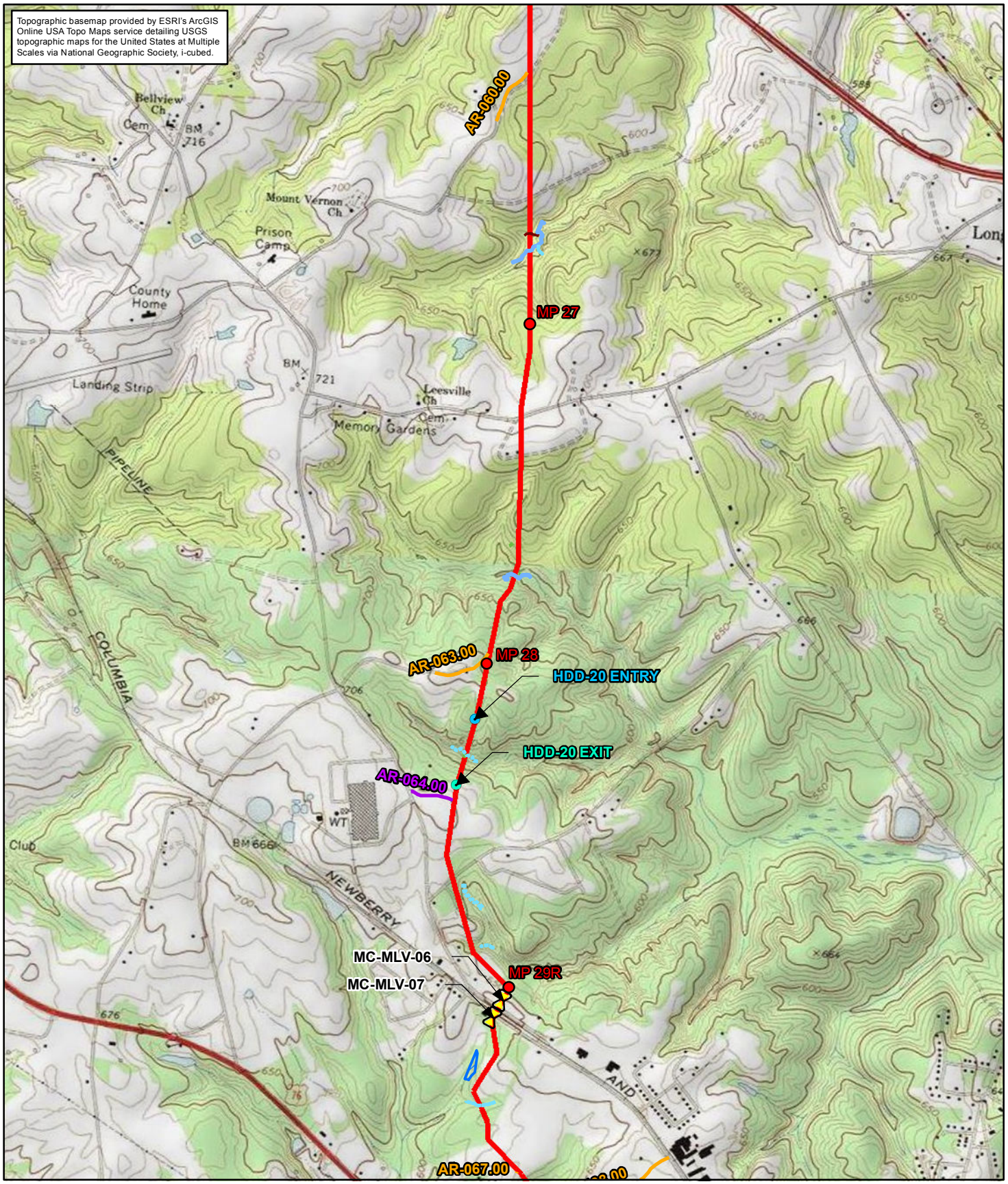

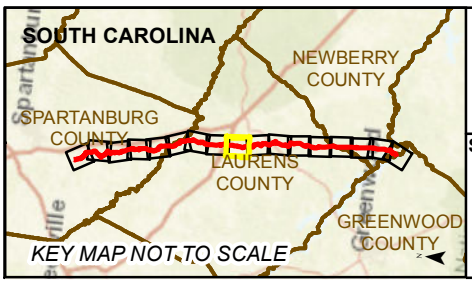

LEGEND:

- MILE POST
- MLV
- HDD ENTRY
- HDD EXIT
- PROPOSED PIPELINE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- LAYDOWN YARD
- SITE PERMANENT IMPACT
- SITE TEMPORARY IMPACT
- COUNTY BOUNDARY
- DITCH
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- NAF
- PEM
- PFO
- PSS
- OW

SCALE:

N / W / E / S

Feet

0 1,000 2,000

Dominion™

URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP
ORA, CLINTON QUADRANGLE

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
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DATE:	DRAWING NO.:	SHEET	REV:
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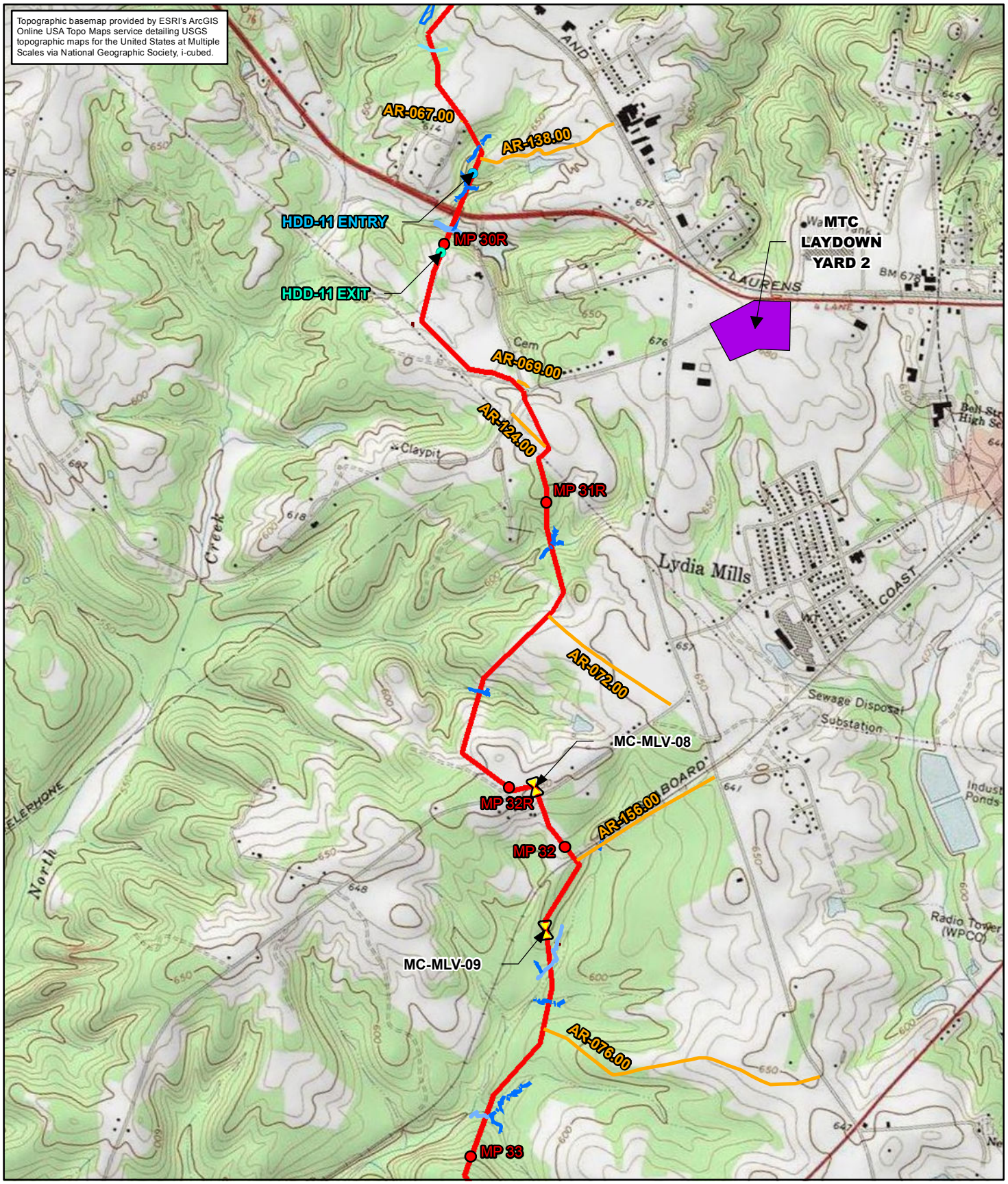

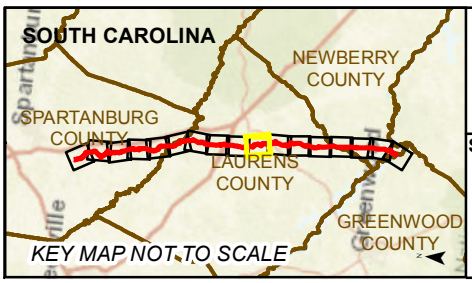

LEGEND:
- MILE POST
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- HDD ENTRY
- HDD EXIT
- PROPOSED PIPELINE
- PERMANENT ACCESS ROAD
- TEMPORARY ACCESS ROAD
- LAYDOWN YARD
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SCALE: N, W, E, S; Feet; 0 1,000 2,000

Dominion™ URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP
CLINTON QUADRANGLE

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
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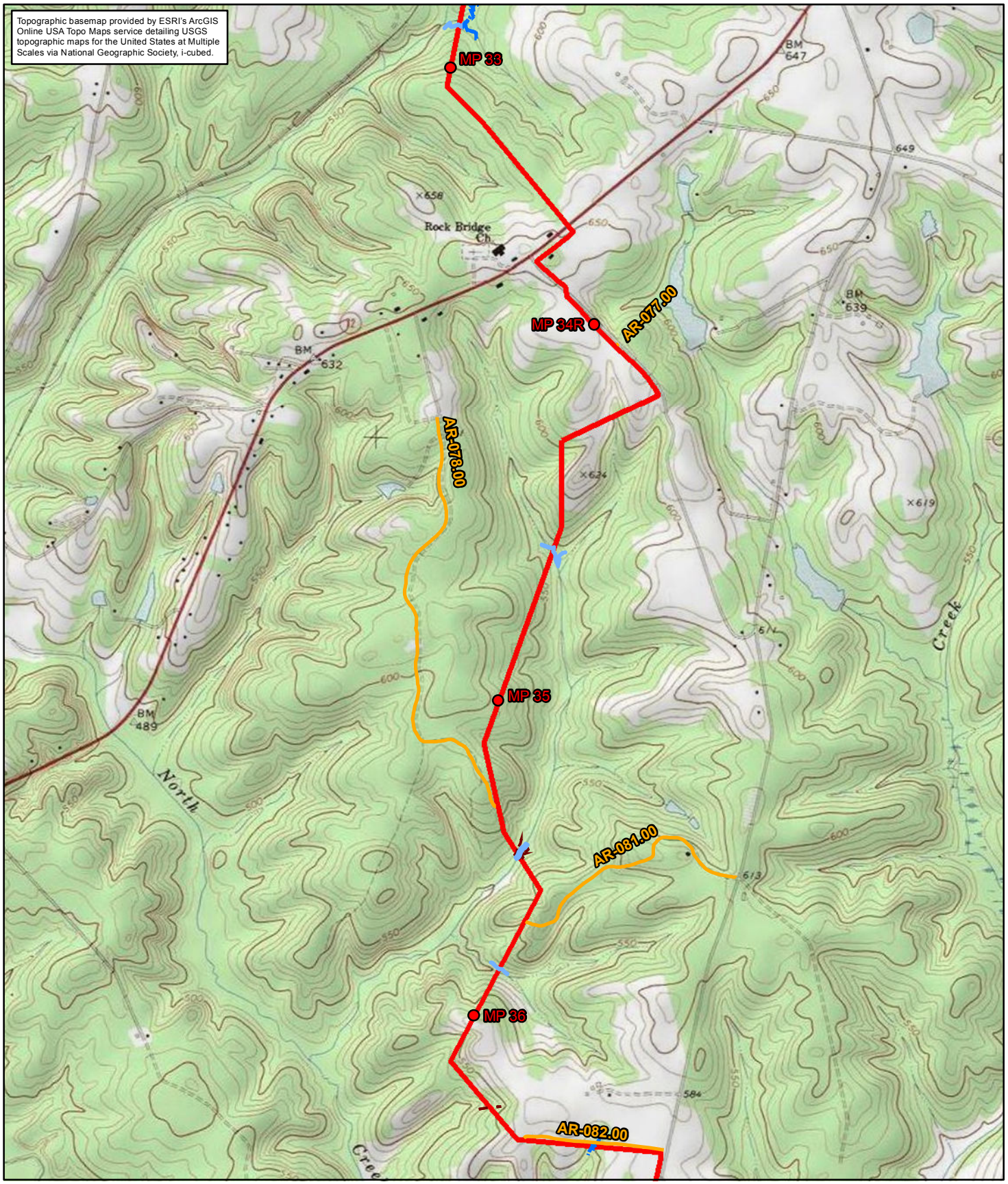

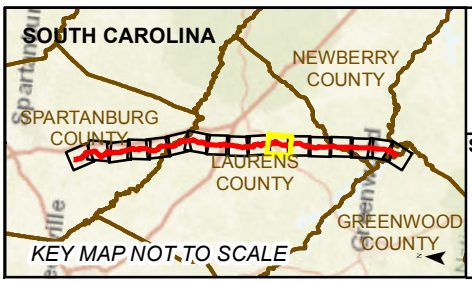

LEGEND:

- MILE POST
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- HDD ENTRY
- HDD EXIT
- PROPOSED PIPELINE
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SCALE:

N W E S

Feet

0 1,000 2,000

Dominion™

URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP
CLINTON QUADRANGLE

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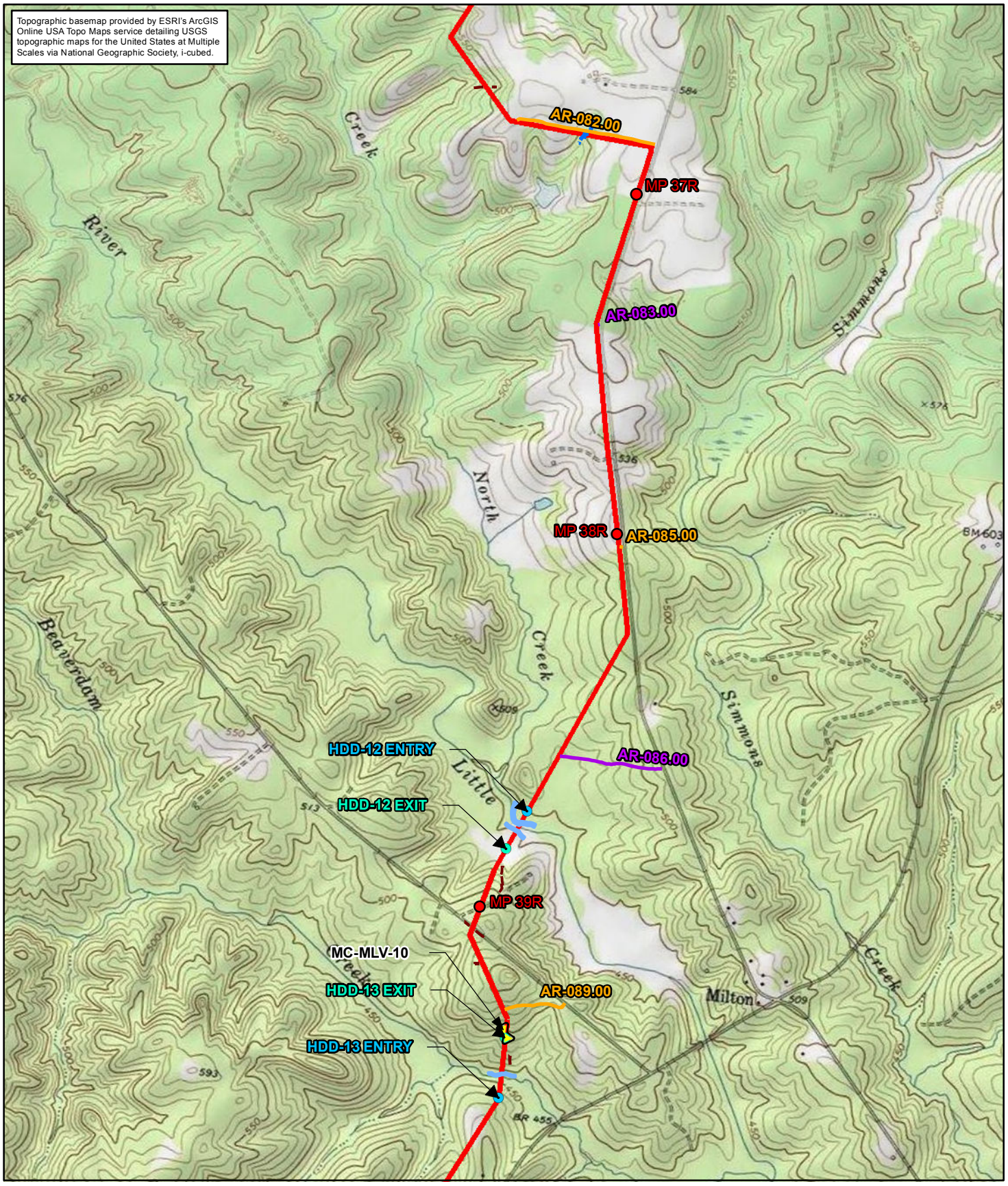

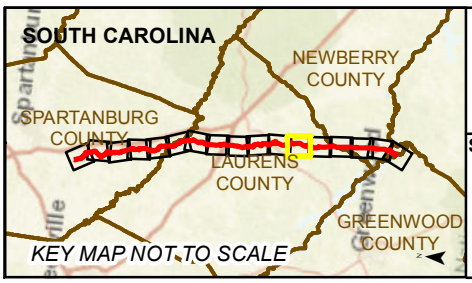

LEGEND:

- MILE POST
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- HDD ENTRY
- HDD EXIT
- PROPOSED PIPELINE
- PERMANENT ACCESS ROAD
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SCALE: N, W, E, S; Feet; 0 1,000 2,000

Dominion™ URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP
CLINTON, CROSS HILL QUADRANGLE

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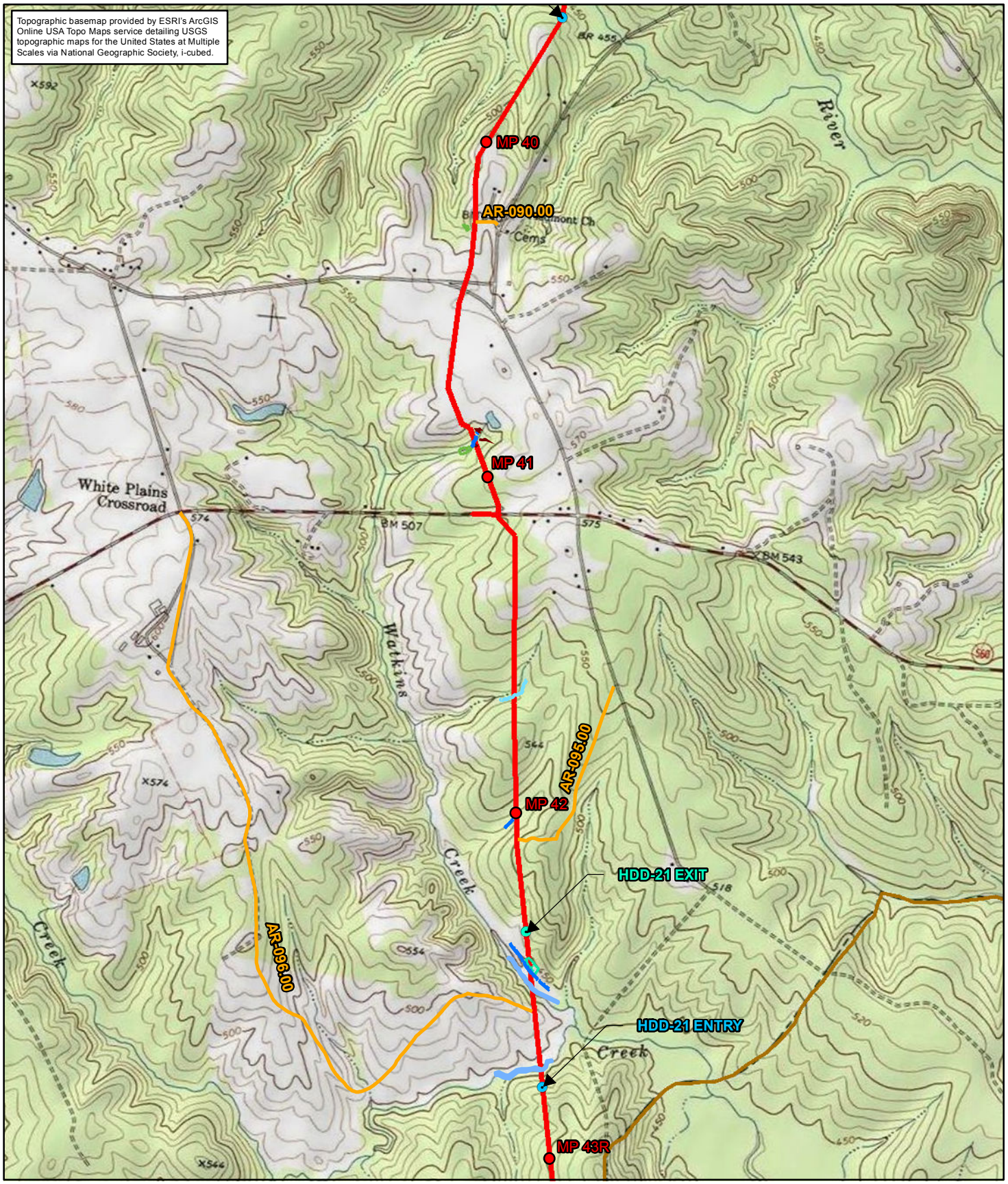

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APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP
CROSS HILL QUADRANGLE

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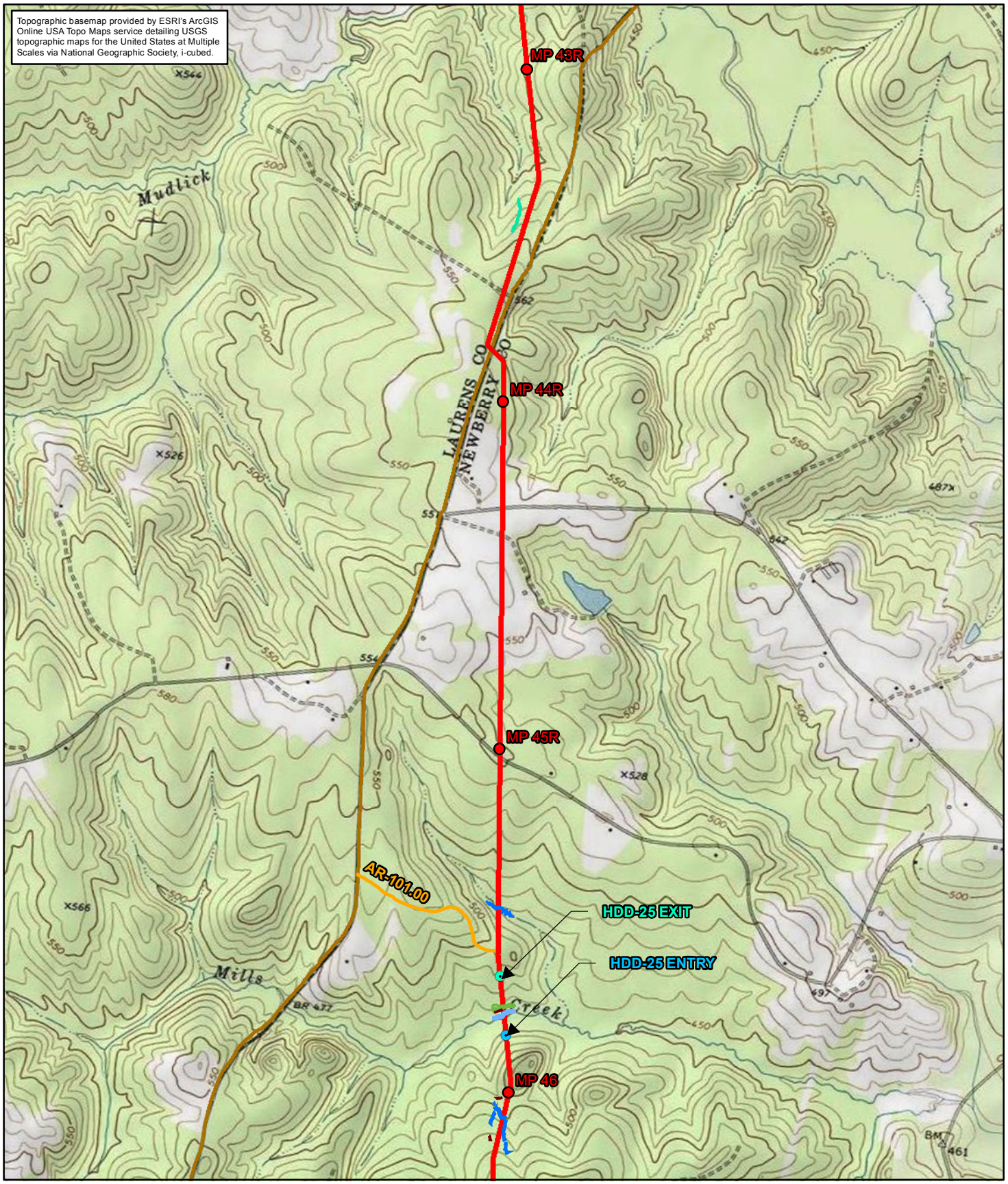

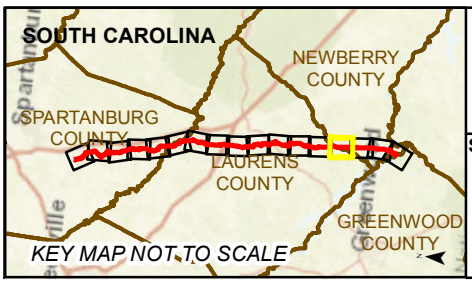

LEGEND:

- MILE POST
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- HDD ENTRY
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SCALE: N, W, E, S; Feet; 0 1,000 2,000

Dominion™ URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP
CROSS HILL QUADRANGLE

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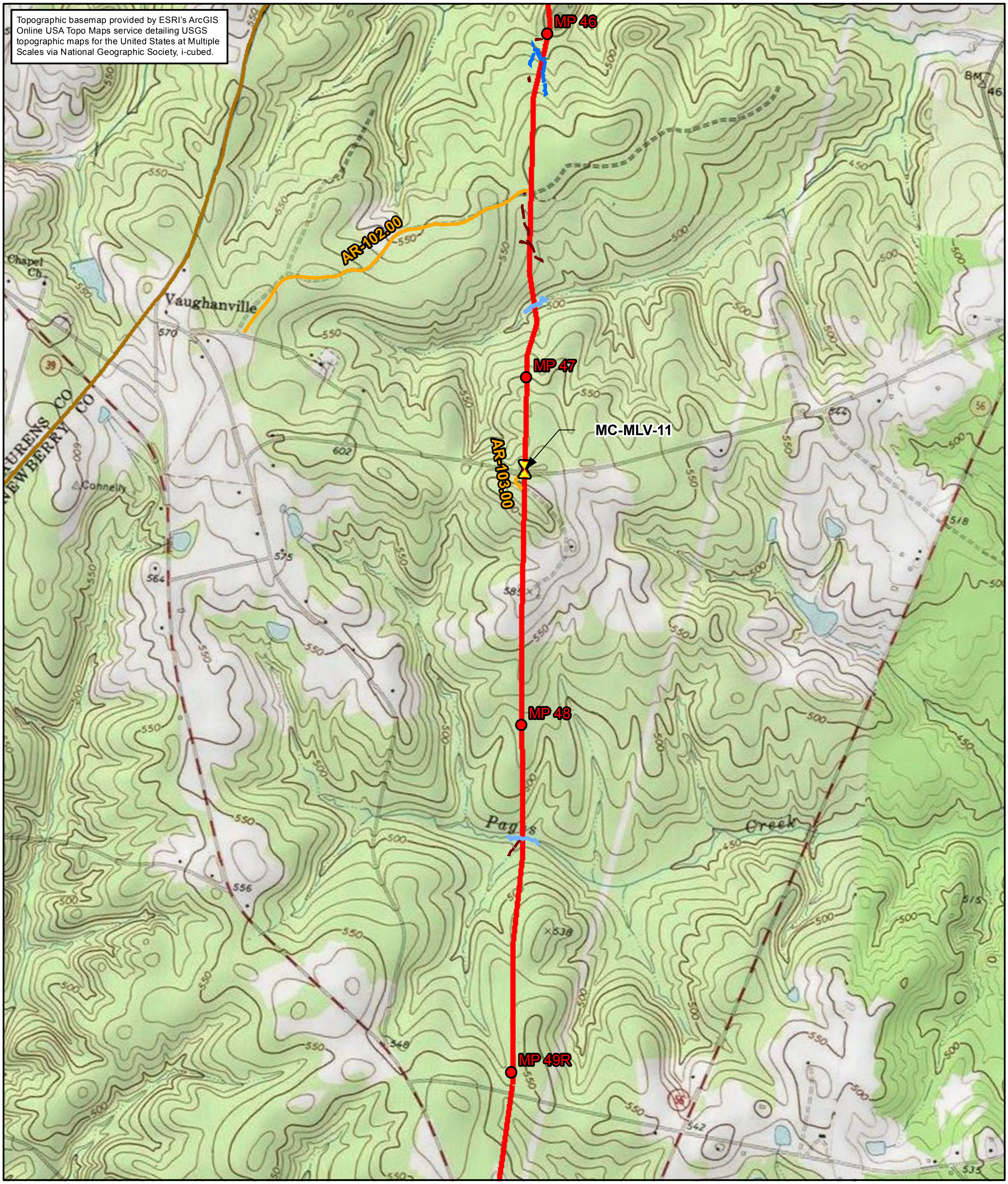

Dominion

URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP
CROSS HILL, DYSON QUADRANGLE

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DATE: 08/19/2016	DRAWING NO.: DCG-MTC-TOP-015	SHEET 16 OF 18	REV: F

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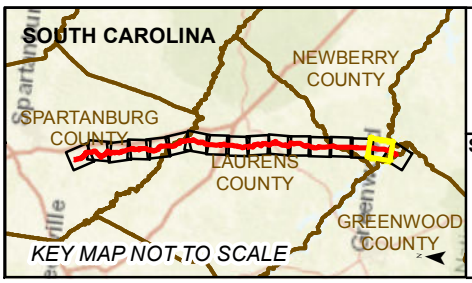

LEGEND:

- MILE POST
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- HDD EXIT
- PROPOSED PIPELINE
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SCALE:

N W E

Feet

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Dominion™

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APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP
DYSON QUADRANGLE

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
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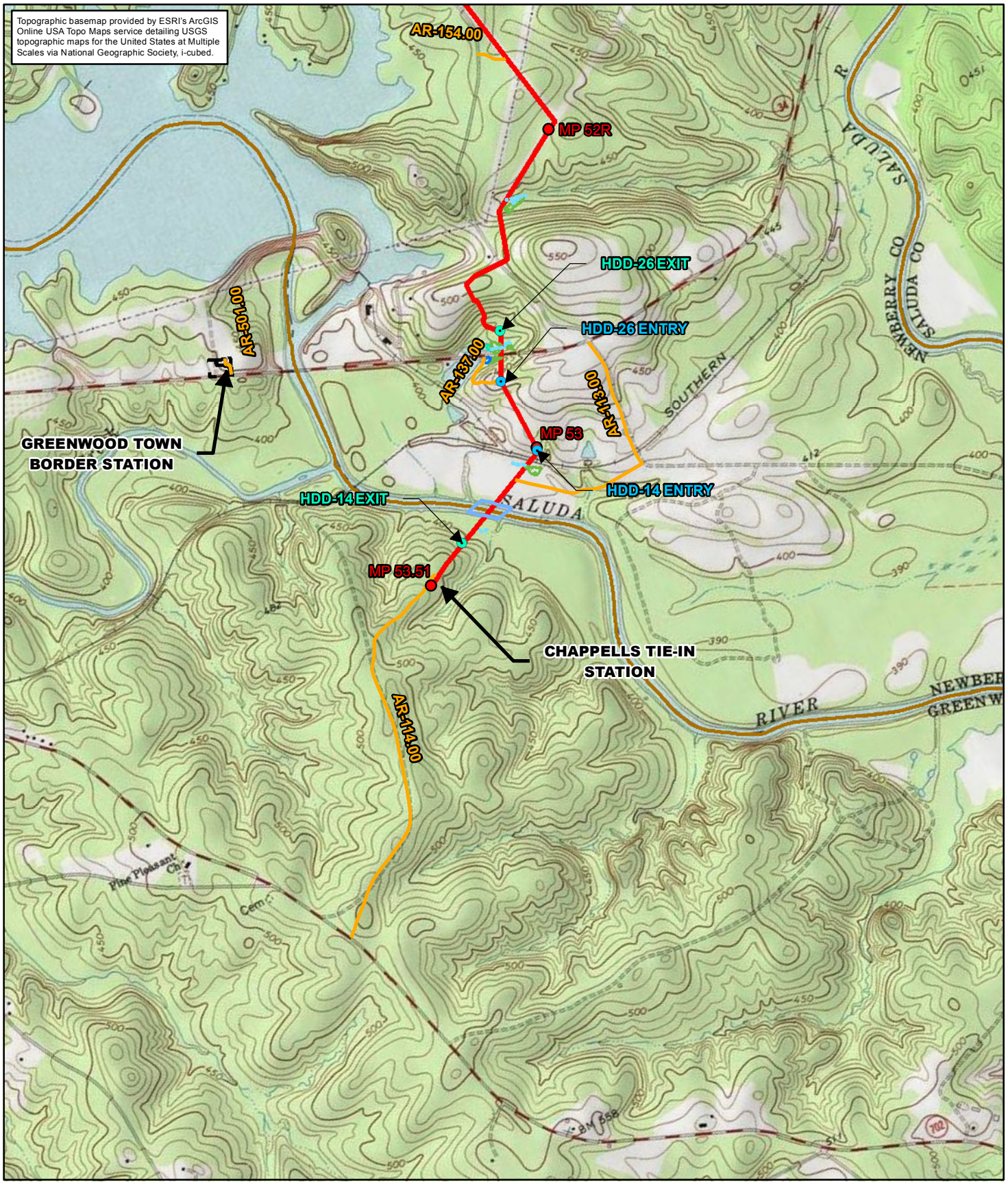

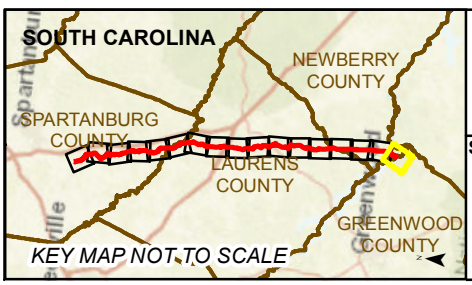

LEGEND:

- MILE POST
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SCALE:

N E S W

Feet

0 1,000 2,000

Dominion™

URS

APPENDIX 1A
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
USGS TOPOGRAPHIC QUADRANGLE MAP
DYSON QUADRANGLE

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
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Appendix B

Proposed Access Roads

APPENDIX B

Project Access Roads

County, State	Milepost	Road from which access road originates	Name	Existing Land Use Type	Existing or New Road	Width (feet)	Length (mile)	Road Surface Type	Extent of Improve-ments Needed a/	Access Road Type	Temporary Impact (acres)	Permanent Impact (acres) b/
Moore To Chappells Pipeline												
Spartanburg, SC	1.2	Center Point	AR-117.00	Agriculture, Forest, Industrial/Commercial, Residential	Existing	30	0.6	Dirt, Gravel	1, 2	Permanent	2.22	0
Spartanburg, SC	2.0R	Hwy 221	AR-139.00	Industrial/Commercial, Residential	Existing	30	0.1	Dirt	1	Permanent	0.26	0
Spartanburg, SC	3.1R	Hobbysville Road/ S-86E	AR-004.00	Agriculture	Existing	30	0	Dirt	2	Permanent	0.02	0
Spartanburg, SC	3.2R	Hobbysville Road/ S-86E	AR-135.00	Agriculture, Industrial/Commercial	Existing	30	0	Dirt	1	Permanent	0.04	0
Spartanburg, SC	3.4R	Hobbysville Road/ S-86E	AR-126.00	Agriculture, Industrial/Commercial	Existing	30	0	Dirt	1	Permanent	0.10	0
Spartanburg, SC	3.7R	Hobbysville Road/ S-86E	AR-140.00	Agriculture, Industrial/Commercial	Existing	30	0	Dirt	1	Permanent	0.04	0
Spartanburg, SC	3.8R	Hobbysville Road/ S-86E	AR-141.00	Agriculture, Industrial/Commercial	Existing	30	0	Dirt	2	Permanent	0.03	0
Spartanburg, SC	4.1R	Hobbysville Road/ S-86E	AR-136.00	Agriculture, Industrial/Commercial, Residential	Existing	30	0.2	Dirt	2	Permanent	0.88	0
Spartanburg, SC	5.3R	Old Switzer Road	AR-143.00	Forest, Industrial/Commercial	Existing	30	0	Dirt	3	Permanent	0.03	0.03
Spartanburg, SC	5.6R	Old Switzer Road	AR-145.00	Forest, Industrial/Commercial	Existing	30	0	Dirt	1	Permanent	0.12	0
Spartanburg, SC	5.8R	Old Switzer Road	AR-129.00	Forest, Industrial/Commercial	Existing	30	0.1	Dirt	2	Permanent	0.31	0
Spartanburg, SC	6.2R	Old Switzer Road	AR-130.00	Forest, Industrial/Commercial	Existing	30	0	Dirt	1	Permanent	0.06	0
Spartanburg, SC	6.5R	Old Switzer Road	AR-010.00	Forest, Industrial/Commercial	Existing	30	0	Dirt, Gravel	1	Permanent	0.06	0
Spartanburg, SC	7.0R	Oakview Farms Road	AR-013.00	Agriculture, Forest	Existing	30	0.8	Dirt, Gravel	1, 2	Permanent	2.83	0
Spartanburg, SC	7.3R	Oakview Farms Road	AR-014.00	Forest, Industrial/Commercial	Existing	30	0.1	Dirt	1	Temporary	0.27	0

APPENDIX B

Project Access Roads

County, State	Milepost	Road from which access road originates	Name	Existing Land Use Type	Existing or New Road	Width (feet)	Length (mile)	Road Surface Type	Extent of Improve-ments Needed a/	Access Road Type	Temporary Impact (acres)	Permanent Impact (acres) b/
Spartanburg, SC	7.8R	Oakview Farms Road	AR-015.00	Agriculture, Industrial/Commercial	Existing	30	0.1	Dirt	1	Temporary	0.26	0
Spartanburg, SC	8.5	Skinner Road	AR-016.00	Agriculture, Residential	Existing	30	0.4	Dirt	1	Permanent	1.37	0
Spartanburg, SC	8.8R	Old Switzer Road	AR-146.00	Forest, Industrial/Commercial	Existing	30	0.1	Dirt	3	Permanent	0.19	0.19
Spartanburg, SC	9.6R	Aiken Road	AR-122.00	Agriculture, Forest	Existing	30	0.3	Dirt	2	Permanent	1.05	0
Spartanburg, SC	9.9R	Aiken Road	AR-019.00	Agriculture	Existing	30	0.5	Dirt	3	Permanent	1.84	1.84
Spartanburg, SC	10.5R	Kilgore Bridge Road	AR-021.00	Forest	Existing	30	0.2	Dirt	2	Permanent	0.85	0
Spartanburg, SC	11.1	Roddy Road	AR-022.00	Industrial/Commercial, Open Land	Existing	30	0.1	Dirt	2	Permanent	0.38	0
Spartanburg, SC	13.0R	Mountain Shoals Road	AR-026.00	Forest, Open Land, Residential	Existing	30	0.2	Gravel	1	Temporary	0.73	0
Spartanburg, SC	13.3R	Mount Shoals Road	AR-148.00	Forest	Existing	30	0.2	Dirt	2, 3	Permanent	0.74	0.43
Spartanburg, SC	13.4	Mount Shoals Road	AR-149.00	Forest, Residential	Existing	30	0.2	Dirt	3	Permanent	0.61	0
Spartanburg, SC	13.5	Mountain Shoals Road	AR-029.00	Forest, Industrial/Commercial	Existing	30	0.1	Gravel	1	Permanent	0.28	0
Spartanburg, SC	14.5	Mountain Shoals Road	AR-030.00	Forest	Existing	30	0.1	Dirt, Gravel	1	Permanent	0.51	0
Spartanburg, SC	15.3	Charles Street	AR-033.00	Open Land	Existing	30	0.1	Dirt	2	Temporary	0.20	0
Spartanburg, SC	16.1R	Long Branch Road	AR-118.00	Industrial/Commercial	Existing	30	0.1	Dirt	2	Permanent	0.43	0
Spartanburg, SC	16.7R	Long Branch Road	AR-038.00	Open Land	Existing	30	0.2	Dirt	1, 3	Permanent	0.84	0.78
Laurens, SC	16.9R	AR-039.00	AR-039.01	Agriculture	Existing	30	0.3	Dirt	3	Permanent	0.96	0.96
Laurens, SC	17.0R	White Dogwood Road	AR-039.00	Agriculture, Forest, Open Land	Existing	30	0.6	Dirt, Gravel	1	Permanent	2.14	0

APPENDIX B

Project Access Roads

County, State	Milepost	Road from which access road originates	Name	Existing Land Use Type	Existing or New Road	Width (feet)	Length (mile)	Road Surface Type	Extent of Improve-ments Needed a/	Access Road Type	Temporary Impact (acres)	Permanent Impact (acres) b/
Laurens, SC	17.6	Patterson Plant Road	AR-041.00	Agriculture, Forest	Existing	30	0.6	Dirt	2, 3	Permanent	2.27	0.63
Laurens, SC	17.8	Patterson Plant Road	AR-042.00	Agriculture, Forest	Existing	30	0.5	Dirt	2, 3	Permanent	1.85	0.74
Laurens, SC	18	AR-043.00	AR-150.00	Agriculture, Forest	Existing	30	0.3	Dirt	2, 3	Permanent	0.96	0.45
Laurens, SC	18.3R	Patterson Plant Road	AR-043.00	Agriculture, Residential	Existing	30	0.5	Dirt	1	Permanent	1.76	0
Laurens, SC	18.6R	Patterson Plant Road	AR-045.00	Agriculture	Existing	30	0.5	Dirt	2	Temporary	1.94	0
Laurens, SC	18.8R	Patterson Plant Road	AR-046.00	Agriculture	Existing	30	0.5	Dirt	2	Permanent	1.76	0
Laurens, SC	19.2R	Patterson Plant Road	AR-157.00	Agriculture	Existing	30	0.2	Dirt	1	Temporary	0.56	0
Laurens, SC	20.3	Granny Apple Road	AR-051.00	Agriculture, Residential	Existing	30	0.8	Dirt, Gravel	1	Permanent	2.80	0
Laurens, SC	21.4	Granny Apple Road	AR-120.00	Agriculture, Forest	Existing	30	0.1	Dirt	1, 3	Permanent	0.30	0.12
Laurens, SC	22.5R	SC 49 N	AR-119.00	Agriculture, Forest, Industrial/Commercial	Existing	30	0.5	Dirt	1, 2	Temporary	1.91	0
Laurens, SC	22.7R	SC 308 E	AR-053.00	Agriculture, Forest, Open Land	Existing	30	0.7	Dirt	2	Permanent	2.49	0
Laurens, SC	24.8	SC 308 E	AR-057.00	Forest, Industrial/Commercial, Residential	Existing	30	0.4	Dirt	2, 3	Permanent	1.30	0.88
Laurens, SC	25.1	Bellview Church Road	AR-152.00	Agriculture, Industrial/Commercial	Existing	30	0.1	Dirt	2	Permanent	0.54	0
Laurens, SC	25.2R	AR-155.00	AR-153.00	Open Land	Existing	30	0.1	Dirt	2	Permanent	0.20	0.2
Laurens, SC	25.7	Bellview Church Road	AR-155.00	Forest, Open Land	Existing	30	0.9	Dirt	2	Permanent	3.20	0
Laurens, SC	26.3	Mt Vernon Road	AR-060.00	Forest, Industrial/Commercial, Open Land	Existing	30	0.2	Dirt	1	Permanent	0.62	0

APPENDIX B

Project Access Roads

County, State	Milepost	Road from which access road originates	Name	Existing Land Use Type	Existing or New Road	Width (feet)	Length (mile)	Road Surface Type	Extent of Improve-ments Needed a/	Access Road Type	Temporary Impact (acres)	Permanent Impact (acres) b/
Laurens, SC	28	Longleaf Dr	AR-063.00	Forest, Open Land	Existing	30	0.2	Dirt	3	Permanent	0.63	0.63
Laurens, SC	28.4	Torrington Road	AR-064.00	Agriculture, Industrial/Commercial	Existing	30	0.1	Dirt	2	Temporary	0.46	0
Laurens, SC	29.6R	Grandview Acres	AR-067.00	Forest, Industrial/Commercial	Existing	30	0	Pavement	1	Permanent	0.01	0
Laurens, SC	29.7R	Torrington Road	AR-138.00	Agriculture, Forest, Industrial/Commercial	Existing	30	0.4	Dirt	1, 3	Permanent	1.55	0.21
Laurens, SC	30.6R	A B Jacks Road/ S-43 N	AR-069.00	Forest, Open Land	Existing	30	0	Dirt	2	Permanent	0.14	0
Laurens, SC	30.8R	AB Jacks Road	AR-124.00	Agriculture, Forest, Industrial/Commercial	Existing	30	0.1	Dirt	2	Permanent	0.50	0
Laurens, SC	31.3R	Apple Orchard Road	AR-072.00	Agriculture	Existing	30	0.4	Dirt	1, 2	Permanent	1.59	0
Laurens, SC	32.1	Charlottes Road	AR-156.00	Forest, Industrial/Commercial	Existing	30	0.5	Dirt	3	Permanent	1.68	1.68
Laurens, SC	32.6	Charlottes Road	AR-076.00	Agriculture, Forest, Open Land, Residential	Existing	30	0.9	Dirt	1, 2, 3	Permanent	3.13	1.46
Laurens, SC	34.1R	Keller Dr	AR-077.00	Forest	Existing	30	0	Dirt	2	Permanent	0.02	0
Laurens, SC	35.3	Bell Ave	AR-078.00	Agriculture, Forest	Existing	30	1.3	Dirt	1, 2	Permanent	4.83	0
Laurens, SC	35.7	Old Milton Road	AR-081.00	Agriculture, Forest	Existing	30	0.8	Dirt	1	Permanent	2.82	0
Laurens, SC	36.5R	Old Milton Road	AR-082.00	Agriculture, Forest	Existing	30	0.4	Dirt	1, 3	Permanent	1.48	0
Laurens, SC	37.4R	Old Milton Road	AR-083.00	Agriculture	Existing	30	0	Dirt	1	Temporary	0.02	0
Laurens, SC	38.0R	Old Milton Road	AR-085.00	Forest	Existing	30	0	Dirt	1	Permanent	0.03	0
Laurens, SC	38.5	Old Milton Road	AR-086.00	Forest, Residential	Existing	30	0.3	Dirt, Gravel	2, 3	Temporary	1.08	0.55

APPENDIX B

Project Access Roads

County, State	Milepost	Road from which access road originates	Name	Existing Land Use Type	Existing or New Road	Width (feet)	Length (mile)	Road Surface Type	Extent of Improve-ments Needed a/	Access Road Type	Temporary Impact (acres)	Permanent Impact (acres) b/
Laurens, SC	39.3R	Lisbon Road	AR-089.00	Forest, Industrial/Commercial, Open Land	Existing	30	0.2	Dirt	1, 3	Permanent	0.67	0.17
Laurens, SC	40.2	Jefferson Davis Road	AR-090.00	Forest	Existing	30	0.1	Dirt, Gravel	1	Permanent	0.24	0
Laurens, SC	42.1	Mountville Road/ S-250 E	AR-095.00	Agriculture, Industrial/Commercial, Open Land	Existing	30	0.6	Dirt	1, 3	Permanent	2.14	0.41
Laurens, SC	42.6R	SC 560 E	AR-096.00	Agriculture, Forest	Existing	30	2.5	Dirt, Gravel	1	Permanent	9.10	0
Newberry, SC	45.6R	Poplar Spring Road	AR-101.00	Agriculture, Open Land	Existing	30	0.5	Dirt	1, 2	Permanent	1.83	0
Newberry, SC	46.5	Vaughnville Road	AR-102.00	Agriculture, Forest, Residential	Existing	30	1	Dirt	1, 2	Permanent	3.56	0
Newberry, SC	47.3	Salter Road/ S-347N	AR-103.00	Agriculture, Open Land	Existing	30	0.1	Gravel	1	Permanent	0.19	0
Newberry, SC	50.6	Scurry Church Road	AR-107.00	Forest	Existing	30	0.3	Dirt	1	Permanent	1.01	0
Newberry, SC	50.8	Scurry Church Road	AR-108.00	Forest	Existing	30	0.2	Dirt	1	Permanent	0.72	0
Newberry, SC	51.7R	Scurry Church Road	AR-154.00	Forest, Industrial/Commercial, Open Land	Existing	30	0.1	Dirt, Gravel	1	Permanent	0.32	0
Newberry, SC	52.8	Hwy 34	AR-137.00	Forest, Open Land	Existing	30	0.2	Dirt	1, 3	Permanent	0.57	0.32
Newberry, SC	53.1	Hwy 34	AR-113.00	Agriculture, Forest	Existing	30	0.8	Dirt	1	Permanent	2.84	0
Greenwood, SC	53.5	Lemon Tree Road	AR-114.00	Forest, Industrial/Commercial	Existing	30	1.2	Dirt	1	Permanent	4.29	0
Moore To Chappells Pipeline Total							*25.8*				*92.53*	*12.68*

APPENDIX B

Project Access Roads

County, State	Milepost	Road from which access road originates	Name	Existing Land Use Type	Existing or New Road	Width (feet)	Length (mile)	Road Surface Type	Extent of Improve-ments Needed a/	Access Road Type	Temporary Impact (acres)	Permanent Impact (acres) b/
Dillon Pipeline												
Dillon, SC	0	Reedy Creek Road	AR-211.00	Open Land, Forest	New	30	0	Gravel	New	Permanent	0.05	0.05
Dillon, SC	0.2	Reedy Creek Road	AR-210.00	Open Land, Agriculture	New	30	0.2	Gravel	2	Temporary	0.72	0
Dillon, SC	0.6	Reedy Creek Road	AR-209.00	Open Land	New	30	0	Gravel	2	Temporary	0.01	0
Dillon, SC	1.4	S-17-700 (Reedy Creek Road)	AR-206.00	Open Land, Agriculture	Existing	30	0	Gravel	1	Temporary	0.0049	0
Dillon, SC	1.9	S-17-323 (Free States Road)	AR-205.00	Open Land, Agriculture	Existing	30	0.1	Dirt	1	Permanent	0.45	0
Dillon, SC	1.9	AR-205.00	AR-205.01	Agriculture	Existing	30	0.4	Dirt	1, 2	Temporary	1.42	0
Dillon, SC	2.8	S-17-316 (Williamette Road)	AR-204.00	Agriculture, Open Land, Residential	Existing	30	0.8	Dirt, Gravel	1, 2	Temporary	2.95	0
Dillon, SC	3.9	SC 34	AR-203.00	Open Land, Agriculture	Existing	30	0	Dirt	2	Permanent	0.01	0
Dillon, SC	5.3	Caldwell Drive	AR-201.00	Open Land, Agriculture	New	30	0	Gravel	New	Permanent	0.05	0.05
Dillon, SC	5.3	Caldwell Drive	AR-201.01	Open Land, Agriculture	New	30	0	Gravel	New	Permanent	0.06	0.06
Dillon Pipeline Total							*1.5*				*5.72*	*0.16*
Aboveground Facilities												
Spartanburg, SC	1.7	AR-003.00	AR-003.01	Forest, Industrial/Commercial	Existing	30	0.1	Pavement	3	Permanent	0.19	0.04
Spartanburg, SC	1.8	Highway 221/ US-221 N	AR-003.00	Industrial/Commercial	Existing	30	0.2	Pavement	1	Permanent	0.75	0.00
Dorchester, SC	N/A	Gavins Road	AR-301.00	Agriculture, Industrial/Commercial	Existing	30	0.1	Dirt	1	Permanent	0.38	0.00

APPENDIX B

Project Access Roads

County, State	Milepost	Road from which access road originates	Name	Existing Land Use Type	Existing or New Road	Width (feet)	Length (mile)	Road Surface Type	Extent of Improve-ments Needed a/	Access Road Type	Temporary Impact (acres)	Permanent Impact (acres) b/
Dorchester, SC	N/A	AR-301.00	AR-301.01	Agriculture	New	30	0.1	Dirt	New	Permanent	0.19	0.19
Charleston, SC	N/A	Ancrum Road	AR-401.00	Agriculture, Industrial/Commercial	Existing	30	0.2	Pavement	1	Permanent	0.34	0.00
Greenwood, SC	N/A	SC 34	AR-501.00	Industrial/Commercial, Open Land	Existing	30	0.0	Pavement, Gravel	1	Permanent	0.13	0.00
Greenwood, SC	N/A	SC 34	AR-501.00	Industrial/Commercial, Open Land	New	30	0.0	Dirt	New	Permanent	0.07	0.07
Aiken, SC	N/A	Dibble Road	AR-601.00	Industrial/Commercial	Existing	30	0.1	Pavement	1	Permanent	0.00	0.00
Aiken, SC	N/A	AR-601.00	AR-601.01	Industrial/Commercial	Existing	30	0.0	Pavement	1	Permanent	0.00	0.00
Aboveground Facilities Total							*0.8*				*2.06*	*0.30*
Project Total							***28.1***				***100.32***	***13.14***

a Anticipated level of improvements are as follows:

1 - Road is currently in good condition, but may contain some minor areas of improvement including light grading and minimal stone application in areas. Road will need to be maintained during construction activities and restored back to original existing conditions after construction activities end.

2 - Road is in need of minor improvements, including subbase grading and installation of up to 6" stone section (crusher run material).

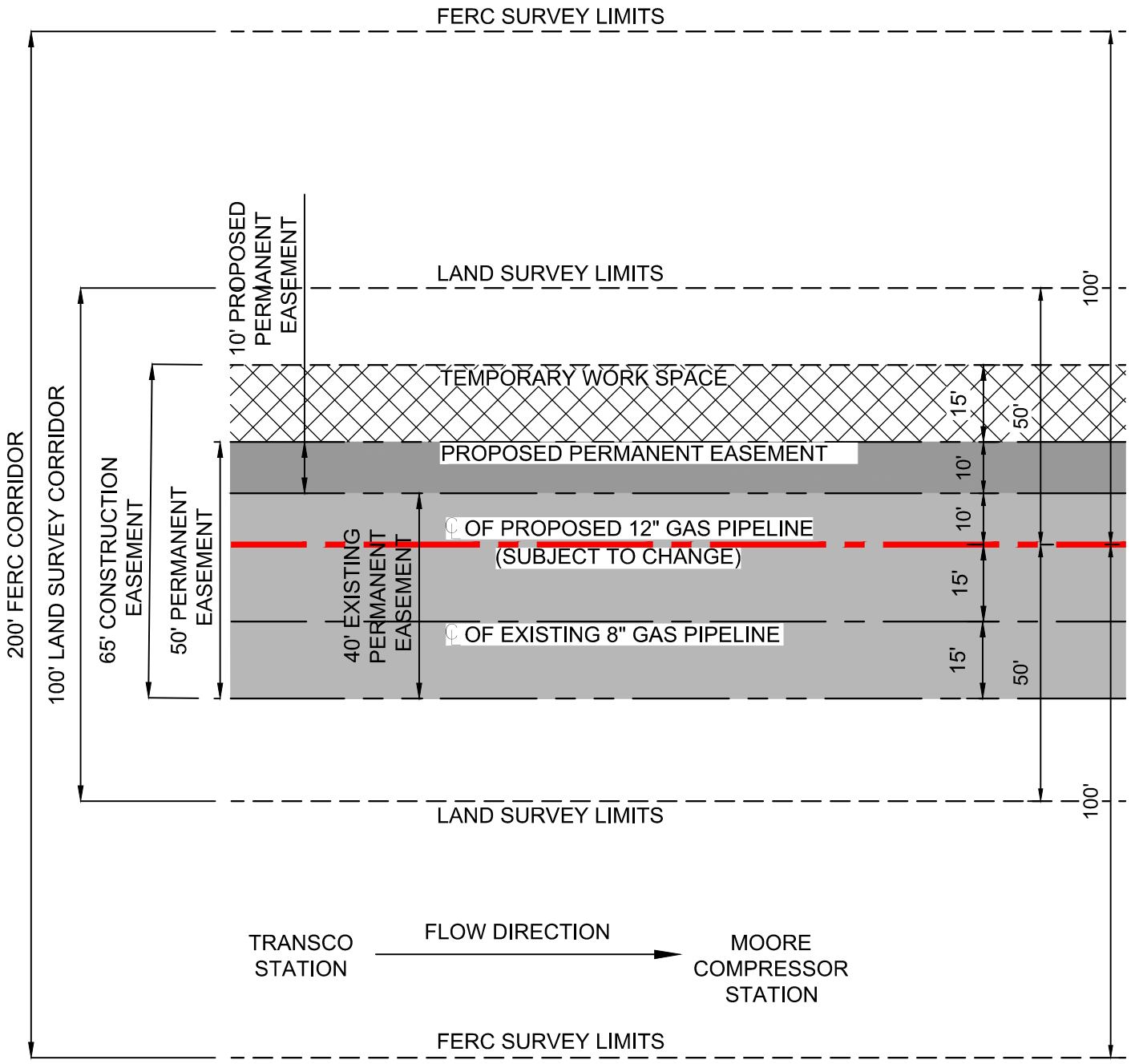
3 - Road is in need of major improvements, including major subbase grading and installation of up to 12" stone section, with larger ballast beneath crusher run surface.

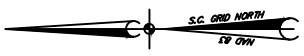
b Temporary/construction disturbance would occur within the current road surface area. New permanent disturbance associated with the existing roads would be limited to areas widened from the current roadbed.

NEW – Road would be constructed.

Appendix C

Typical Right-of-Way Configurations and Construction Techniques





REVISIONS					
NO.	DATE	DESCRIPTION	ENG.	DRAWN	CHK.

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DATE

PROJECT ENGINEER

Dominion

FIGURE 1.2
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
TYPICAL WORKSPACE LAYOUT
MP 0.0 TO 2.4

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
MJ	AE	FH	N.T.S.

DATE: 12/08/2015

DRAWING NO: MOORE TO CHAPPELLS-TYPICAL WORK SPACE LAYOUT EXHIBIT

SHEET 1 OF 4

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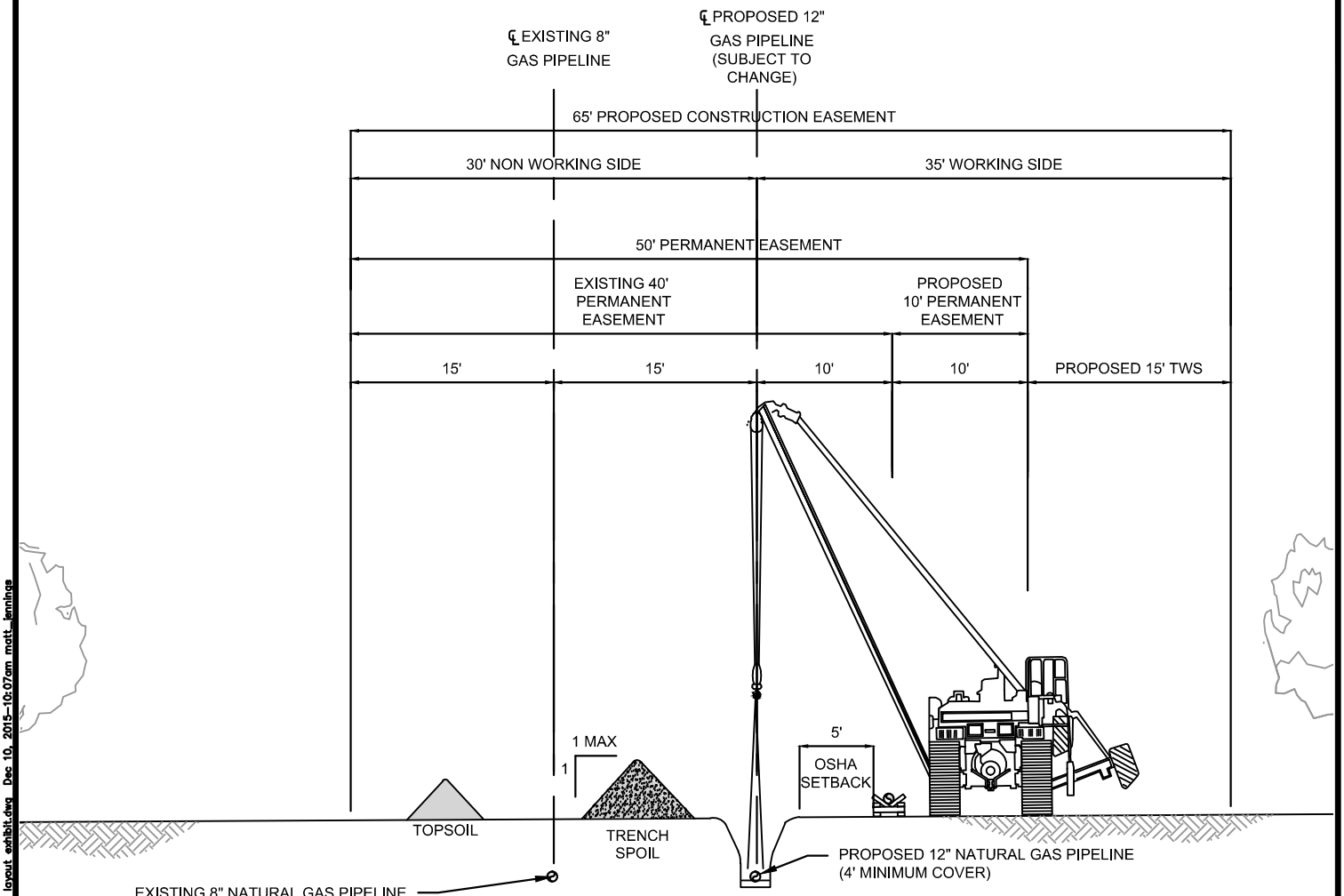

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DATE

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FIGURE 1.2
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
TYPICAL WORKSPACE SECTION
METHOD 1 - OPEN-CUT CONVENTIONAL
MP 0.0 TO 2.4

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
MJ	AE	FH	N.T.S.

DATE: 12/08/2015

DRAWING NO: MOORE TO CHAPPELLS-TYPICAL WORK SPACE LAYOUT EXHIBIT

SHEET 2 OF 4

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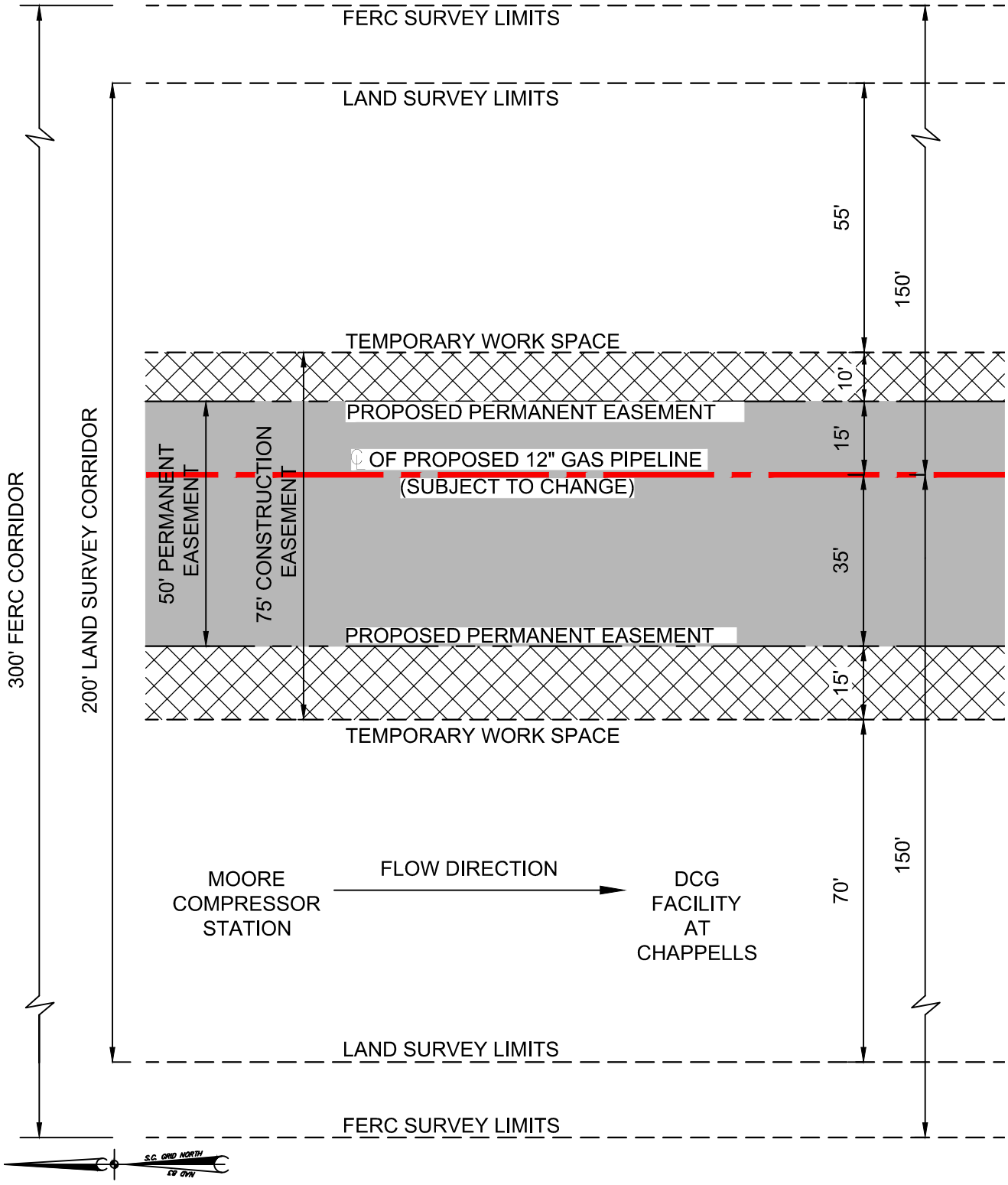

REVISIONS					
NO.	DATE	DESCRIPTION	ENG.	DRAWN	CHK.

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DATE

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FIGURE 1.2
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
TYPICAL WORKSPACE LAYOUT
MP 2.4 TO 53.5

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
MJ	AE	FH	N.T.S.

DATE: 12/08/2015

DRAWING NO: MOORE TO CHAPPELLS-TYPICAL WORK SPACE LAYOUT EXHIBIT

SHEET 3 OF 4

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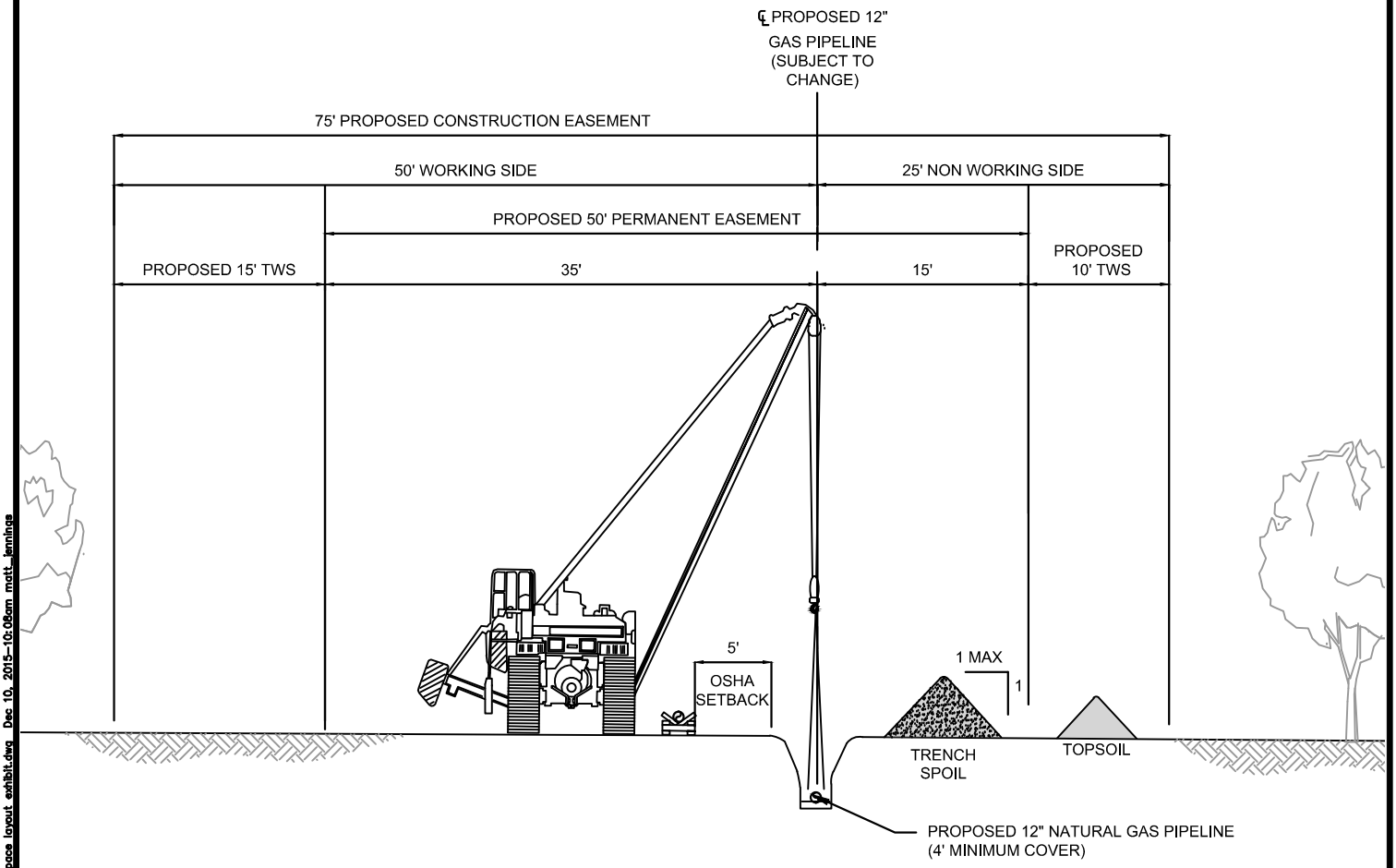

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DATE

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FIGURE 1.2
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
TYPICAL WORKSPACE SECTION
METHOD 1 - OPEN-CUT CONVENTIONAL
MP 2.4 TO 53.5

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
MJ	AE	FH	N.T.S.

DATE: 12/08/2015

DRAWING NO: MOORE TO CHAPPELLS-TYPICAL WORK SPACE LAYOUT EXHIBIT

SHEET 4 OF 4

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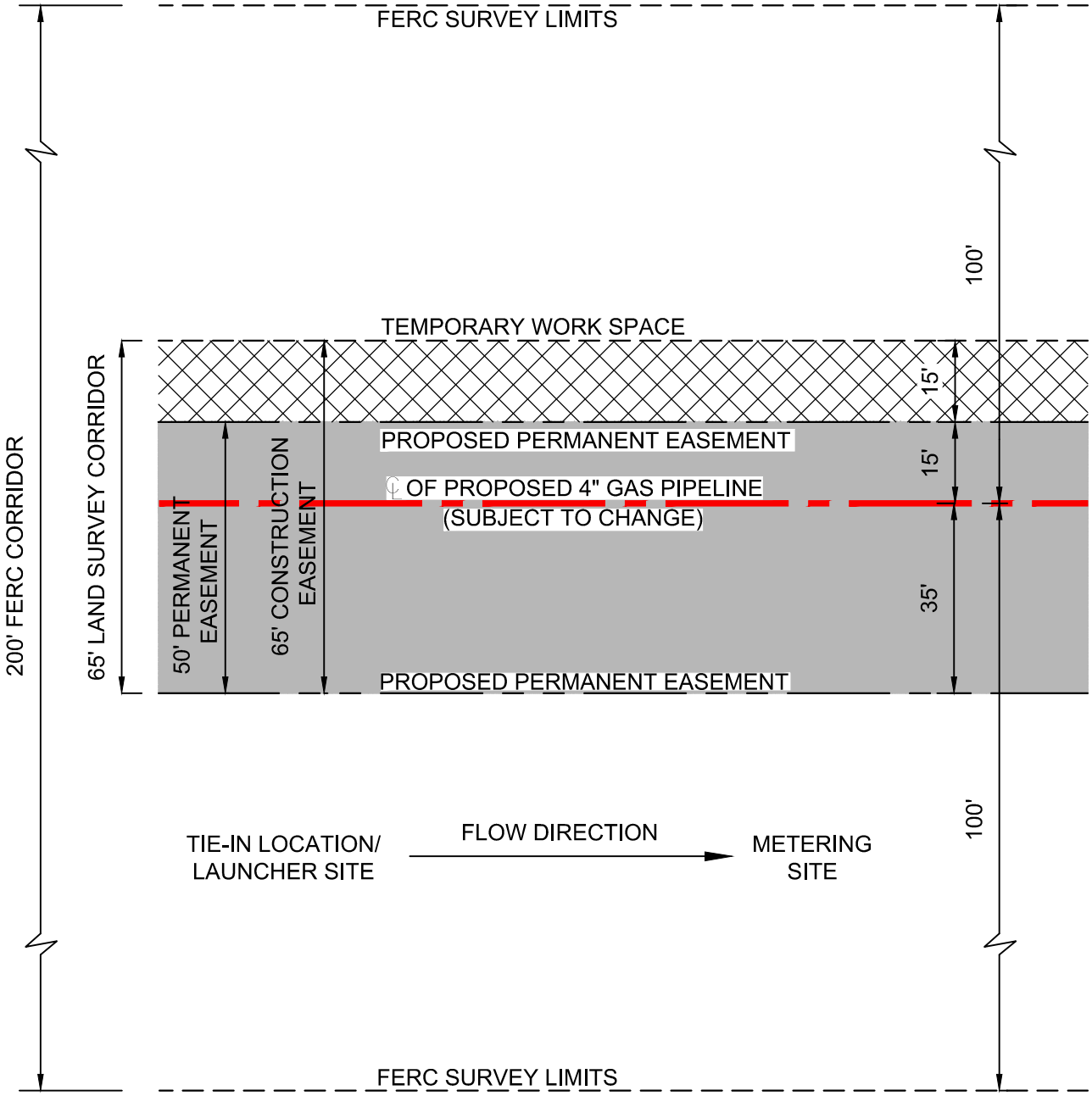

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URS JOB NO. 46423571
CLIENT JOB NO.

DATE

PROJECT ENGINEER

Dominion

FIGURE 1.2
TRANSCO TO CHARLESTON PROJECT
DILLON PIPELINE
TYPICAL WORKSPACE LAYOUT
MP 0.0 TO 5.3

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
MJ	BT	FH	N.T.S.

DATE: 8/20/2015
DRAWING NO: DILLON LATERAL-TYPICAL WORK SPACE LAYOUT EXHIBIT
SHEET 1 OF 2

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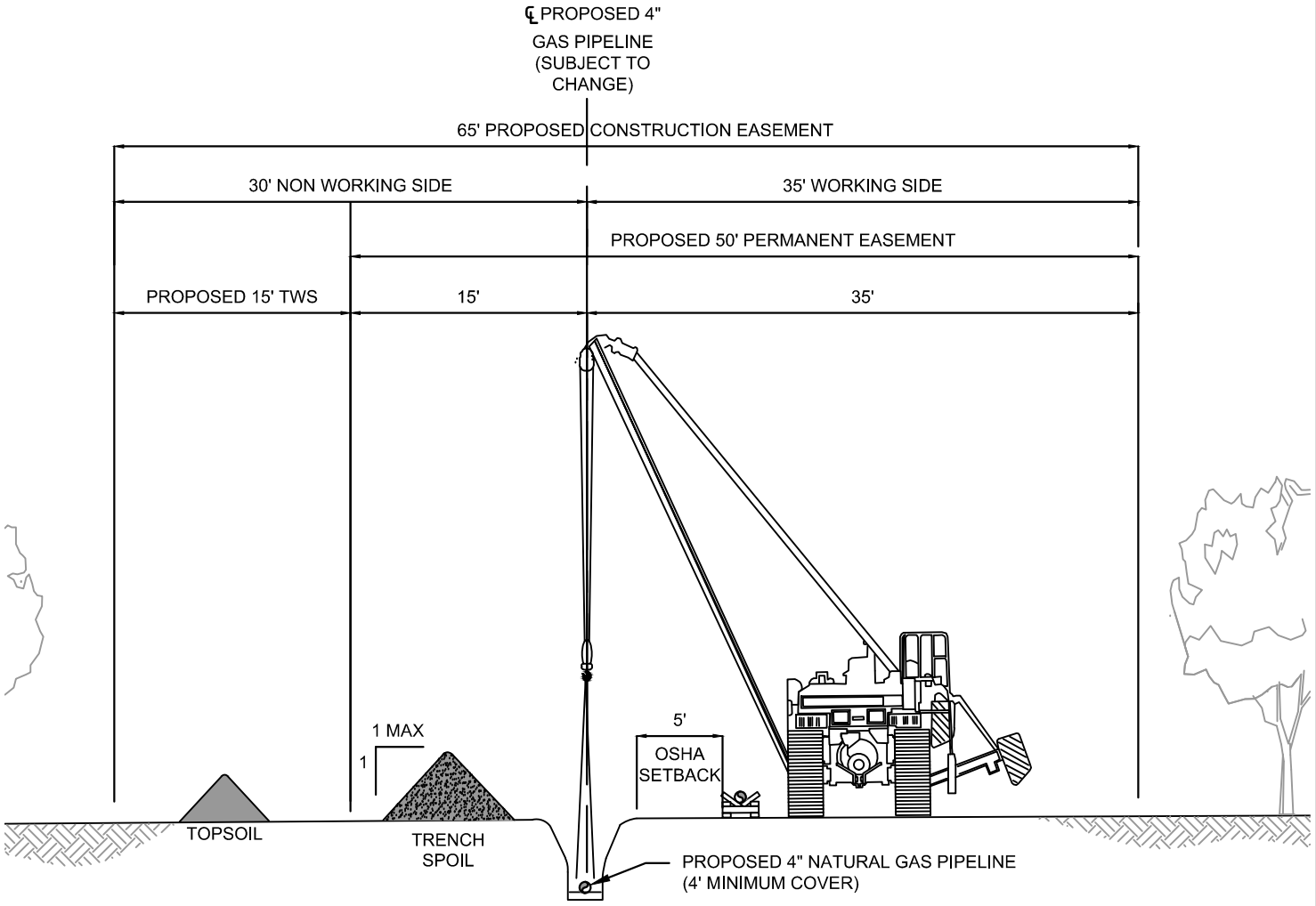

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NO.	DATE	DESCRIPTION	ENG.	DRAWN	CHK.

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CLIENT JOB NO.

DATE

PROJECT ENGINEER

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FIGURE 1.2
TRANSCO TO CHARLESTON PROJECT
DILLON PIPELINE
TYPICAL WORKSPACE SECTION
METHOD 1 - OPEN-CUT CONVENTIONAL
MP 0.0 TO 5.3

DRAWN BY:	CHECKED BY:	APPROVED BY:	SCALE:
MJ	BT	FH	N.T.S.

DATE: 8/20/2015

DRAWING NO: DILLON LATERAL-TYPICAL WORK SPACE LAYOUT EXHIBIT

SHEET 2 OF 2

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Appendix D

Proposed Additional Temporary Workspaces

Acreage Affected by Additional Temporary Work Space or Staging Areas

County, SC	Description	Milepost	Side of Easement	Dimension	Area Affected (acres)	Existing Land Use Type	Wetland or Waterbody within 50 feet	Distance from Wetland or Waterbody (feet)
Moore to Chappells Pipeline								
Spartanburg	ATWS	0.0	Left	50' x 125'	0.2	Forest, Open Land		
Spartanburg	ATWS	0.2	Left	50' x 125'	0.2	Open Land		
Spartanburg	ATWS	0.2	Left	Irregular	0.1	Residential		
Spartanburg	ATWS	0.4	Right	25' x 125'	0.1	Residential	6002-NAF, 6001-NAF	24.3, 42.3
Spartanburg	ATWS	0.5	Right	25' x 125'	0.1	Residential	6004-NAF	10.0
Spartanburg	ATWS	0.5	Left	Irregular	<0.1	Residential		
Spartanburg	ATWS	0.9R	Left	50' x 125'	0.2	Residential		
Spartanburg	ATWS	0.9R	Left	Irregular	0.1	Residential		
Spartanburg	ATWS	1.1	Left	50' x 125'	0.2	Forest, Residential		
Spartanburg	ATWS	1.2	Right	25' x 100'	0.1	Forest	6009-TP	10.0
Spartanburg	ATWS	1.2	Left	25' x 125'	0.1	Agriculture, Forest	6009-TP	10.0
Spartanburg	ATWS	1.2	Right	25' x 125'	0.1	Forest	6009-TP	10.0
Spartanburg	ATWS	1.3	Left	50' x 125'	0.1	Forest		
Spartanburg	ATWS	1.3	Left	50' x 125'	0.2	Forest		
Spartanburg	ATWS	1.6R	Left	50' x 125'	0.2	Forest		
Spartanburg	ATWS	1.6R	Left	Irregular	0.2	Forest	6015-NAF	29.8
Spartanburg	ATWS	1.9R	Left	50' x 125'	0.1	Forest, Residential		
Spartanburg	ATWS	1.9R	Left	50' x 125'	0.2	Industrial/Commercial		
Spartanburg	ATWS	2.0	Left	50' x 125'	0.2	Forest, Industrial/Commercial		
Spartanburg	ATWS	2.4	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	2.4	Left	Irregular	<0.1	Forest		
Spartanburg	ATWS	2.4R	Left	Irregular	0.2	Agriculture		
Spartanburg	ATWS	3.1R	Left	50' x 125'	0.2	Agriculture, Forest		
Spartanburg	ATWS	3.2R	Right	50' x 125'	0.2	Agriculture		
Spartanburg	ATWS	4.3R	Left	25' x 50'	<0.1	Agriculture		
Spartanburg	ATWS	4.5R	Left	Irregular	<0.1	Agriculture		
Spartanburg	ATWS	4.5R	Right	Irregular	0.2	Agriculture, Forest		
Spartanburg	ATWS	4.5R	Left	25' x 50'	<0.1	Agriculture		
Spartanburg	ATWS	4.8R	Left	Irregular	0.1	Forest		
Spartanburg	ATWS	4.8R	Right	Irregular	0.1	Forest		
Spartanburg	ATWS	4.9R	Left	Irregular	1.0	Forest		
Spartanburg	ATWS	5.2R	Left	25' x 100'	0.1	Forest		
Spartanburg	ATWS	5.2R	Left	Irregular	0.1	Forest		
Spartanburg	ATWS	5.3R	Left	25' x 100'	0.1	Forest		
Spartanburg	ATWS	5.4R	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	5.5R	Right	50' x 125'	0.2	Forest		
Spartanburg	ATWS	5.5R	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	5.5R	Right	50' x 100'	0.1	Forest		
Spartanburg	ATWS	5.7R	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	5.7R	Left	Irregular	<0.1	Forest		
Spartanburg	ATWS	5.9R	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	6.0R	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	6.4	Left	Irregular	<0.1	Forest		
Spartanburg	ATWS	6.4	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	6.5	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	6.7	Right	75' x 150'	0.3	Forest		
Spartanburg	ATWS	6.9	Right	75' x 150'	0.2	Forest, Open Land		
Spartanburg	ATWS	7.0	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	7.1R	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	7.2	Right	50' x 125'	0.1	Forest		
Spartanburg	ATWS	7.2	Right	50' x 125'	0.1	Forest		
Spartanburg	ATWS	7.3R	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	7.5R	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	7.5R	Right	50' x 125'	0.1	Forest		
Spartanburg	ATWS	7.6R	Right	50' x 125'	0.2	Forest		
Spartanburg	ATWS	7.6R	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	7.8R	Left	25' x 50'	<0.1	Agriculture, Forest		
Spartanburg	ATWS	7.8R	Left	25' x 50'	<0.1	Agriculture, Forest		
Spartanburg	ATWS	8.1R	Left	25' x 50'	<0.1	Agriculture		
Spartanburg	ATWS	8.1R	Left	25' x 50'	<0.1	Forest	6043-NAF, 6042-NAF	14.4, 22.9

Acreage Affected by Additional Temporary Work Space or Staging Areas

County, SC	Description	Milepost	Side of Easement	Dimension	Area Affected (acres)	Existing Land Use Type	Wetland or Waterbody within 50 feet	Distance from Wetland or Waterbody (feet)
Spartanburg	ATWS	8.2	Left	25' x 125'	0.1	Forest	6043-NAF	49.8
Spartanburg	ATWS	8.2	Right	25' x 125'	0.1	Forest		
Spartanburg	ATWS	8.2	Left	25' x 125'	0.1	Agriculture		
Spartanburg	ATWS	8.2	Right	25' x 125'	0.1	Agriculture		
Spartanburg	ATWS	8.3	Left	25' x 50'	<0.1	Agriculture		
Spartanburg	ATWS	8.4	Left	25' x 50'	<0.1	Agriculture		
Spartanburg	ATWS	8.6	Right	50' x 125'	0.1	Agriculture		
Spartanburg	ATWS	8.6R	Left	25' x 50'	<0.1	Agriculture		
Spartanburg	ATWS	8.6R	Right	Irregular	<0.1	Agriculture		
Spartanburg	ATWS	8.8R	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	8.8R	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	8.8R	Left	Irregular	<0.1	Forest		
Spartanburg	ATWS	8.9R	Right	50' x 125'	0.2	Forest		
Spartanburg	ATWS	8.9R	Right	50' x 140'	0.2	Forest		
Spartanburg	ATWS	9.0R	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	9.0R	Right	50' x 125'	0.1	Forest		
Spartanburg	ATWS	9.0R	Right	25' x 50'	<0.1	Agriculture		
Spartanburg	ATWS	9.0	Left	25' x 50'	<0.1	Agriculture		
Spartanburg	ATWS	9.1R	Left	25' x 50'	<0.1	Agriculture		
Spartanburg	ATWS	9.5R	Right	75' x 150'	0.3	Agriculture		
Spartanburg	ATWS	9.8R	Right	75' x 150'	0.3	Forest, Open Land		
Spartanburg	ATWS	9.8R	Left	Irregular	<0.1	Forest		
Spartanburg	ATWS	10.0R	Left	Irregular	1.0	Agriculture, Forest, Open Land		
Spartanburg	ATWS	10.0R	Right	75' x 150'	0.3	Agriculture		
Spartanburg	ATWS	10.3R	Right	75' x 150'	0.2	Forest		
Spartanburg	ATWS	10.3R	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	10.5	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	10.6R	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	10.8R	Left	25' x 50'	<0.1	Agriculture		
Spartanburg	ATWS	10.8R	Right	25' x 125'	0.1	Agriculture	1089-TP	10.0
Spartanburg	ATWS	10.8R	Left	25' x 125'	0.1	Agriculture	1089-TP	10.0
Spartanburg	ATWS	10.9R	Right	25' x 125'	0.1	Agriculture	1089-TP	10.0
Spartanburg	ATWS	10.9R	Left	25' x 125'	0.1	Agriculture	1089-TP	10.0
Spartanburg	ATWS	11.0	Left	25' x 50'	<0.1	Open Land		
Spartanburg	ATWS	11.6	Right	50' x 125'	0.2	Forest		
Spartanburg	ATWS	11.6R	Right	50' x 125'	0.2	Agriculture		
Spartanburg	ATWS	11.8R	Left	25' x 50'	<0.1	Agriculture		
Spartanburg	ATWS	12.0R	Left	25' x 50'	<0.1	Forest, Transportation		
Spartanburg	ATWS	12.2R	Left	25' x 50'	<0.1	Agriculture		
Spartanburg	ATWS	12.3	Right	50' x 125'	0.1	Forest		
Spartanburg	ATWS	12.3	Right	50' x 125'	0.1	Forest		
Spartanburg	ATWS	12.8R	Right	50' x 125'	0.1	Forest		
Spartanburg	ATWS	12.8R	Right	50' x 125'	0.1	Agriculture, Forest		
Spartanburg	ATWS	12.8R	Left	25' x 125'	0.1	Agriculture		
Spartanburg	ATWS	12.9	Left	25' x 50'	<0.1	Agriculture, Forest		
Spartanburg	ATWS	12.9R	Left	25' x 50'	<0.1	Agriculture, Forest		
Spartanburg	ATWS	13.3R	Right	25' x 125'	0.1	Forest	2011-TS	10.0
Spartanburg	ATWS	13.3R	Left	25' x 125'	0.1	Forest	2011-TS, 2012-NAF	10.0, 10.7
Spartanburg	ATWS	13.3R	Right	25' x 125'	0.1	Forest	2011-TS	10.0
Spartanburg	ATWS	13.3R	Left	25' x 125'	0.1	Forest	2011-TS, 2012-NAF	31.8, 10.0
Spartanburg	ATWS	13.4	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	13.4	Right	50' x 125'	0.1	Forest		
Spartanburg	ATWS	13.5	Right	50' x 125'	0.1	Agriculture, Forest		
Spartanburg	ATWS	13.9R	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	14.0R	Right	50' x 125'	0.1	Forest		
Spartanburg	ATWS	14.0R	Right	50' x 125'	0.1	Forest		
Spartanburg	ATWS	14.1R	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	14.1R	Right	50' x 125'	0.2	Forest		
Spartanburg	ATWS	14.2	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	14.2	Right	Irregular	0.1	Forest		
Spartanburg	ATWS	14.2	Right	50' x 125'	0.1	Forest		

Acreage Affected by Additional Temporary Work Space or Staging Areas

County, SC	Description	Milepost	Side of Easement	Dimension	Area Affected (acres)	Existing Land Use Type	Wetland or Waterbody within 50 feet	Distance from Wetland or Waterbody (feet)
Spartanburg	ATWS	14.4	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	14.7R	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	14.8R	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	14.9R	Right	Irregular	0.2	Forest		
Spartanburg	ATWS	14.9R	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	15.1	Right	75' x 150'	0.3	Forest		
Spartanburg	ATWS	15.2	Left	25' x 50'	<0.1	Forest		
Spartanburg	ATWS	15.2	Left	40' x 498'	0.5	Forest		
Spartanburg	ATWS	15.4	Right	50' x 125'	0.2	Forest		
Spartanburg	ATWS	15.5	Right	50' x 125'	0.2	Open Land		
Spartanburg	ATWS	15.5	Left	25' x 50'	<0.1	Open Land		
Spartanburg	ATWS	15.5R	Right	50' x 125'	0.2	Open Land		
Spartanburg	ATWS	15.6R	Left	Irregular	<0.1	Forest		
Spartanburg	ATWS	15.6R	Right	50' x 125'	0.2	Forest		
Spartanburg	ATWS	15.6R	Right	Irregular	0.3	Forest		
Spartanburg	ATWS	15.6R	Left	Irregular	<0.1	Forest		
Spartanburg	ATWS	15.9R	Right	60' x 125'	0.2	Forest		
Spartanburg	ATWS	15.9R	Left	15' x 150'	0.1	Forest		
Spartanburg	ATWS	16.1R	Right	50' x 125'	0.1	Forest		
Spartanburg	ATWS	16.2R	Right	50' x 125'	0.1	Forest		
Spartanburg	ATWS	16.8R	Right	75' x 150'	0.3	Forest		
Laurens	ATWS	17.0R	Right	Irregular	<0.1	Agriculture, Open Land		
Laurens	ATWS	17.0	Right	Irregular	0.2	Agriculture, Open Land		
Laurens	ATWS	17.0	Left	Irregular	<0.1	Agriculture, Open Land		
Laurens	ATWS	17.5R	Left	25' x 125'	0.1	Forest	4003-TS	10.0
Laurens	ATWS	17.5R	Right	25' x 125'	0.1	Forest	4003-TS	10.0
Laurens	ATWS	17.6R	Right	25' x 125'	0.1	Forest	4003-TS	10.0
Laurens	ATWS	17.6R	Left	25' x 125'	0.1	Forest	4003-TS	10.0
Laurens	ATWS	17.6	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	17.7	Right	25' x 125'	0.1	Forest		
Laurens	ATWS	17.7	Left	25' x 125'	0.1	Forest		
Laurens	ATWS	17.7	Right	25' x 125'	0.1	Forest		
Laurens	ATWS	17.7	Left	25' x 125'	0.1	Forest		
Laurens	ATWS	17.8	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	17.8	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	17.9	Right	50' x 125'	0.1	Agriculture, Forest		
Laurens	ATWS	17.9	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	18.5R	Right	50' x 125'	0.1	Agriculture, Forest		
Laurens	ATWS	18.6R	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	18.6R	Right	50' x 125'	0.2	Agriculture		
Laurens	ATWS	18.6R	Right	50' x 125'	0.1	Agriculture		
Laurens	ATWS	18.7R	Right	50' x 125'	0.1	Agriculture		
Laurens	ATWS	18.9R	Left	25' x 50'	0.0	Agriculture		
Laurens	ATWS	19.0R	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	19.4R	Left	25' x 50'	<0.1	Open Land		
Laurens	ATWS	19.4R	Right	50' x 125'	0.2	Agriculture		
Laurens	ATWS	19.4R	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	19.5R	Right	50' x 125'	0.2	Agriculture		
Laurens	ATWS	19.8R	Left	Irregular	<0.1	Agriculture		
Laurens	ATWS	20.0	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	20.1	Right	75' x 150'	0.3	Agriculture		
Laurens	ATWS	20.3	Right	75' x 150'	0.4	Agriculture		
Laurens	ATWS	20.3	Right	40' x 610'	0.5	Agriculture		
Laurens	ATWS	20.4	Right	40' x 522'	0.4	Agriculture		
Laurens	ATWS	20.7R	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	20.7	Right	50' x 125'	0.1	Agriculture		
Laurens	ATWS	20.8	Right	50' x 125'	0.1	Agriculture		
Laurens	ATWS	21.2	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	21.3	Right	75' x 150'	0.3	Agriculture		
Laurens	ATWS	21.5	Right	75' x 150'	0.3	Agriculture		
Laurens	ATWS	21.6	Left	25' x 50'	<0.1	Agriculture		

Acreage Affected by Additional Temporary Work Space or Staging Areas

County, SC	Description	Milepost	Side of Easement	Dimension	Area Affected (acres)	Existing Land Use Type	Wetland or Waterbody within 50 feet	Distance from Wetland or Waterbody (feet)
Laurens	ATWS	21.6	Right	40' x 240'	0.2	Agriculture, Forest	3002-NAF	0.0
Laurens	ATWS	21.7	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	21.8	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	21.8	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	21.9	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	22.0	Right	50' x 125'	0.1	Agriculture		
Laurens	ATWS	22.0	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	22.0R	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	22.1R	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	22.3R	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	22.4R	Right	75' x 150'	0.3	Forest		
Laurens	ATWS	22.6R	Right	75' x 150'	0.3	Forest		
Laurens	ATWS	22.7	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	22.9	Right	50' x 125'	0.2	Agriculture		
Laurens	ATWS	23.0	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	23.0	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	23.0	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	23.1	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	23.1	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	23.3	Right	50' x 125'	0.1	Agriculture		
Laurens	ATWS	23.3	Right	50' x 125'	0.1	Agriculture		
Laurens	ATWS	23.8	Right	50' x 125'	0.2	Agriculture		
Laurens	ATWS	23.8	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	23.8	Right	50' x 125'	0.1	Agriculture		
Laurens	ATWS	23.8	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	24.5	Right	75' x 150'	0.3	Agriculture, Forest		
Laurens	ATWS	24.8	Right	25' x 150'	0.1	Forest		
Laurens	ATWS	24.8	Left	50' x 150'	0.2	Forest		
Laurens	ATWS	24.9	Right	25' x 125'	0.1	Forest		
Laurens	ATWS	25.0	Left	25' x 100'	0.1	Forest		
Laurens	ATWS	25.0	Right	25' x 125'	0.1	Forest, Open Land		
Laurens	ATWS	25.0	Left	25' x 125'	0.1	Forest, Open Land		
Laurens	ATWS	25.1	Left	Irregular	<0.1	Agriculture		
Laurens	ATWS	25.2	Left	Irregular	<0.1	Agriculture		
Laurens	ATWS	25.2	Right	50' x 125'	0.1	Agriculture		
Laurens	ATWS	25.2	Left	Irregular	<0.1	Open Land		
Laurens	ATWS	25.2R	Right	Irregular	0.2	Open Land		
Laurens	ATWS	25.3R	Left	Irregular	0.8	Open Land		
Laurens	ATWS	25.4R	Left	75' x 150'	0.3	Open Land		
Laurens	ATWS	25.6R	Left	75' x 150'	0.3	Open Land		
Laurens	ATWS	25.7R	Left	75' x 150'	0.3	Open Land		
Laurens	ATWS	25.8	Right	75' x 150'	0.3	Forest, Open Land		
Laurens	ATWS	26.0	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	26.0	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	26.7	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	26.8	Right	50' x 117'	0.1	Forest		
Laurens	ATWS	26.8	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	27.2R	Right	50' x 125'	0.1	Agriculture		
Laurens	ATWS	27.3R	Left	50' x 125'	0.2	Agriculture		
Laurens	ATWS	27.7R	Left	50' x 125'	0.2	Forest, Open Land		
Laurens	ATWS	27.8R	Left	50' x 125'	0.1	Forest		
Laurens	ATWS	27.8	Right	25' x 50'	<0.1	Forest		
Laurens	ATWS	28.2	Left	75' x 150'	0.3	Forest		
Laurens	ATWS	28.4	Left	75' x 150'	0.2	Forest		
Laurens	ATWS	28.4	Right	Irregular	<0.1	Agriculture, Forest		
Laurens	ATWS	28.4	Right	Irregular	<0.1	Agriculture		
Laurens	ATWS	28.5	Right	Irregular	0.7	Agriculture		
Laurens	ATWS	28.6R	Left	50' x 125'	0.2	Forest		
Laurens	ATWS	28.6R	Left	50' x 75'	0.1	Forest		
Laurens	ATWS	29.0R	Left	50' x 125'	0.1	Forest		
Laurens	ATWS	29.1R	Right	50' x 125'	0.2	Agriculture		
Laurens	ATWS	29.1R	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	29.2R	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	29.3	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	29.3	Right	50' x 125'	0.1	Agriculture, Forest		

Acreage Affected by Additional Temporary Work Space or Staging Areas

County, SC	Description	Milepost	Side of Easement	Dimension	Area Affected (acres)	Existing Land Use Type	Wetland or Waterbody within 50 feet	Distance from Wetland or Waterbody (feet)
Laurens	ATWS	29.4	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	29.4R	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	29.5R	Left	25' x 50'	<0.1	Open Land		
Laurens	ATWS	29.7	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	29.8R	Left	50' x 150'	0.2	Forest		
Laurens	ATWS	29.8R	Right	25' x 150'	0.1	Forest		
Laurens	ATWS	30.0R	Right	35' x 150'	0.1	Forest		
Laurens	ATWS	30.0R	Left	40' x 150'	0.1	Forest		
Laurens	ATWS	30.3	Right	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	30.6R	Left	Irregular	<0.1	Forest, Open Land		
Laurens	ATWS	30.6R	Left	Irregular	<0.1	Forest		
Laurens	ATWS	30.7R	Right	50' x 125'	0.2	Agriculture		
Laurens	ATWS	30.8	Left	25' x 50'	<0.1	Agriculture, Forest, Open Land		
Laurens	ATWS	30.9R	Left	25' x 50'	<0.1	Forest, Open Land		
Laurens	ATWS	31.1R	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	31.1R	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	31.1R	Left	25' x 125'	0.1	Forest	1080-TS, 1081-TS	10.0, 45.6
Laurens	ATWS	31.1R	Right	25' x 125'	0.1	Forest	1080-TS	10.0
Laurens	ATWS	31.3R	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	31.6R	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	31.6R	Right	50' x 125'	0.1	Agriculture, Forest		
Laurens	ATWS	31.7R	Right	50' x 125'	0.1	Agriculture, Forest		
Laurens	ATWS	31.8R	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	32.0	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	32.1R	Right	50' x 125'	0.2	Agriculture		
Laurens	ATWS	32.1	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	32.1R	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	32.1	Right	50' x 125'	0.2	Forest		
Laurens	ATWS	32.1R	Right	50' x 125'	0.1	Forest, Residential		
Laurens	ATWS	32.2R	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	32.3	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	32.4	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	32.4	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	32.4	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	32.5	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	32.5	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	32.6	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	32.8	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	32.9	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	32.9	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	33.0	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	33.6R	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	33.6R	Left	50' x 125'	0.2	Forest, Open Land		
Laurens	ATWS	33.9R	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	33.9R	Right	50' x 125'	0.2	Forest		
Laurens	ATWS	34.2	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	34.5	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	34.5	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	34.6	Right	50' x 125'	0.1	Agriculture, Forest		
Laurens	ATWS	35.1	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	35.4	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	35.4	Right	50' x 125'	0.1	Agriculture, Forest		
Laurens	ATWS	35.5	Right	50' x 125'	0.1	Agriculture		
Laurens	ATWS	35.6	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	35.8	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	35.9	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	36.1	Left	25' x 50'	<0.1	Open Land		
Laurens	ATWS	36.3	Right	50' x 125'	0.1	Open Land		
Laurens	ATWS	36.3	Right	50' x 125'	0.1	Open Land		
Laurens	ATWS	36.4	Left	25' x 50'	<0.1	Agriculture, Forest		
Laurens	ATWS	36.6R	Right	50' x 125'	0.1	Agriculture, Forest		
Laurens	ATWS	36.7R	Right	50' x 125'	0.1	Agriculture, Forest		

Acreage Affected by Additional Temporary Work Space or Staging Areas

County, SC	Description	Milepost	Side of Easement	Dimension	Area Affected (acres)	Existing Land Use Type	Wetland or Waterbody within 50 feet	Distance from Wetland or Waterbody (feet)
Laurens	ATWS	38.3R	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	38.7	Right	75' x 150'	0.3	Forest		
Laurens	ATWS	38.8	Right	75' x 150'	0.3	Agriculture		
Laurens	ATWS	38.9R	Right	Irregular	<0.1	Agriculture		
Laurens	ATWS	39.0R	Right	50' x 125'	0.1	Residential		
Laurens	ATWS	39.1R	Right	50' x 125'	0.2	Agriculture		
Laurens	ATWS	39.1R	Left	25' x 50'	<0.1	Agriculture	5004-NAF	49.3
Laurens	ATWS	39.3R	Left	40' x 510'	0.5	Forest		
Laurens	ATWS	39.3R	Left	Irregular	0.1	Forest		
Laurens	ATWS	39.4R	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	39.4	Right	75' x 150'	0.3	Forest		
Laurens	ATWS	39.6	Right	Irregular	0.2	Forest		
Laurens	ATWS	39.6	Left	Irregular	0.1	Forest		
Laurens	ATWS	40.0	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	40.4	Right	50' x 125'	0.1	Agriculture, Forest		
Laurens	ATWS	40.4	Right	50' x 125'	0.1	Agriculture		
Laurens	ATWS	40.7R	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	40.8R	Left	25' x 50'	<0.1	Agriculture		
Laurens	ATWS	40.9	Right	50' x 125'	0.1	Forest		
Laurens	ATWS	40.9	Right	50' x 125'	0.1	Agriculture, Forest		
Laurens	ATWS	41.1	Right	50' x 125'	0.2	Forest, Open Land		
Laurens	ATWS	41.1R	Right	Irregular	0.1	Forest		
Laurens	ATWS	41.2R	Left	25' x 50'	<0.1	Forest		
Laurens	ATWS	41.6	Right	50' x 125'	0.1	Agriculture		
Laurens	ATWS	41.7	Right	50' x 125'	0.1	Agriculture		
Laurens	ATWS	42.3R	Right	75' x 150'	0.3	Agriculture, Forest		
Laurens	ATWS	42.8R	Right	75' x 150'	0.3	Agriculture		
Laurens	ATWS	43.3R	Left	25' x 50'	<0.1	Agriculture, Forest		
Laurens	ATWS	43.8R	Left	25' x 50'	<0.1	Agriculture, Forest		
Laurens	ATWS	43.8R	Right	50' x 125'	0.2	Agriculture, Forest		
Newberry	ATWS	43.9R	Right	50' x 125'	0.2	Forest		
Newberry	ATWS	43.9R	Left	25' x 50'	<0.1	Forest		
Newberry	ATWS	44.3R	Right	50' x 125'	0.1	Forest		
Newberry	ATWS	44.3R	Right	50' x 125'	0.1	Forest		
Newberry	ATWS	45.0R	Right	50' x 125'	0.2	Agriculture		
Newberry	ATWS	45.0R	Right	50' x 125'	0.2	Agriculture		
Newberry	ATWS	45.4R	Right	50' x 125'	0.1	Agriculture		
Newberry	ATWS	45.5R	Right	50' x 125'	0.1	Agriculture		
Newberry	ATWS	45.7	Right	75' x 150'	0.3	Agriculture		
Newberry	ATWS	45.8	Right	75' x 150'	0.3	Forest		
Newberry	ATWS	46.0	Right	50' x 63'	0.1	Forest		
Newberry	ATWS	46.1	Right	50' x 125'	0.1	Forest		
Newberry	ATWS	46.8	Right	50' x 125'	0.1	Agriculture		
Newberry	ATWS	46.8	Right	50' x 125'	0.2	Agriculture		
Newberry	ATWS	46.9	Left	25' x 50'	<0.1	Agriculture		
Newberry	ATWS	47.3	Right	50' x 125'	0.1	Agriculture		
Newberry	ATWS	47.3	Right	Irregular	<0.1	Open Land		
Newberry	ATWS	47.3	Right	50' x 125'	0.1	Agriculture, Open Land		
Newberry	ATWS	48.3	Right	50' x 125'	0.1	Agriculture		
Newberry	ATWS	48.4R	Right	50' x 125'	0.1	Agriculture		
Newberry	ATWS	49.1	Left	50' x 125'	0.1	Agriculture		
Newberry	ATWS	49.3R	Right	25' x 50'	<0.1	Agriculture		
Newberry	ATWS	49.6R	Left	50' x 125'	0.2	Agriculture, Residential		
Newberry	ATWS	49.7R	Left	50' x 125'	0.2	Forest		
Newberry	ATWS	50.0	Right	25' x 50'	<0.1	Forest		
Newberry	ATWS	50.0	Left	50' x 125'	0.1	Forest		
Newberry	ATWS	50.1	Right	50' x 125'	0.1	Agriculture		
Newberry	ATWS	50.1	Left	25' x 50'	<0.1	Agriculture		
Newberry	ATWS	50.5	Right	50' x 125'	0.1	Forest		
Newberry	ATWS	50.5	Right	50' x 125'	0.1	Forest		
Newberry	ATWS	50.6	Right	50' x 125'	0.1	Forest		
Newberry	ATWS	50.7	Right	50' x 125'	0.1	Forest		

Acreage Affected by Additional Temporary Work Space or Staging Areas

County, SC	Description	Milepost	Side of Easement	Dimension	Area Affected (acres)	Existing Land Use Type	Wetland or Waterbody within 50 feet	Distance from Wetland or Waterbody (feet)
Newberry	ATWS	51.0	Right	50' x 125'	0.1	Forest		
Newberry	ATWS	51.1	Left	50' x 125'	0.2	Forest		
Newberry	ATWS	52.2R	Left	50' x 125'	0.1	Forest		
Newberry	ATWS	52.3	Left	50' x 125'	0.1	Forest		
Newberry	ATWS	52.4R	Left	Irregular	0.2	Agriculture		
Newberry	ATWS	52.4R	Right	25' x 50'	<0.1	Agriculture		
Newberry	ATWS	52.5R	Right	50' x 125'	0.1	Forest, Residential		
Newberry	ATWS	52.6R	Left	25' x 50'	<0.1	Forest		
Newberry	ATWS	52.6R	Left	Irregular	0.7	Forest		
Newberry	ATWS	52.7R	Right	Irregular	0.1	Forest		
Newberry	ATWS	52.7R	Left	Irregular	0.1	Forest		
Newberry	ATWS	52.8	Right	Irregular	<0.1	Open Land		
Newberry	ATWS	52.8	Right	Irregular	0.3	Open Land		
Newberry	ATWS	53.0	Right	Irregular	<0.1	Open Land		
Newberry	ATWS	53.0	Left	Irregular	0.2	Forest, Open Land		
Greenwood	ATWS	53.4	Right	75' x 150'	0.3	Forest		
TOTAL AREA					***46.4***	***Moore to Chappells***		

Acreage Affected by Additional Temporary Work Space or Staging Areas									
County, SC	**Description**	**Milepost**	**Side of Easement**	**Dimension**	**Area Affected (acres)**	**Existing Land Use Type**	**Wetland or Waterbody within 50 feet**	**Distance from Wetland or Waterbody (feet)**	**Site-Specific Justification**
Dillon Pipeline									
Dillon	ATWS	0.2	Right	10' x 150'	0.0	Agriculture	--	--	NA
Dillon	ATWS	0.2	Left	75' x 150'	0.3	Agriculture	--	--	NA
Dillon	ATWS	0.6	Right	10' x 150'	0.0	Agriculture	--	--	NA
Dillon	ATWS	0.6	Left	75' x 150'	0.3	Agriculture	--	--	NA
Dillon	ATWS	0.8	Left	125' x 50'	0.1	Agriculture	--	--	NA
Dillon	ATWS	0.9	Left	125' x 50'	0.2	Agricultural	--	--	NA
Dillon	ATWS	1.7	Left	125' x 50'	0.2	Agriculture	--	--	NA
Dillon	ATWS	1.7	Left	125' x 50'	0.2	Agriculture	--	--	NA
Dillon	ATWS	2.2	Left	150' x 75'	0.2	Agriculture	--	--	NA
Dillon	ATWS	2.2	Right	194' x 10'	0.0	Agriculture	3023-Ditch, 3022-Pond	18.2, 36.1	Non-aquatic feature (roadside ditch); DCG will follow *Procedures* and BMPs to protect feature.
Dillon	ATWS	2.8	Left	150' x 10'	0.0	Agriculture	--	--	NA
Dillon	ATWS	2.8	Right	150' x 75'	0.3	Agriculture	--	--	NA
Dillon	ATWS	3.6	Right	125' x 50'	0.1	Agriculture	--	--	NA
Dillon	ATWS	3.6	Right	125' x 50'	0.1	Agriculture	--	--	NA
Dillon	ATWS	4.4	Right	125' x 50'	0.2	Agriculture	3049-Ditch	16.6	Non-aquatic feature (roadside ditch); DCG will follow *Procedures* and BMPs to protect feature.
Dillon	ATWS	4.4	Right	125' x 50'	0.1	Agriculture	--	--	NA

Acreage Affected by Additional Temporary Work Space or Staging Areas

County, SC	Description	Milepost	Side of Easement	Dimension	Area Affected (acres)	Existing Land Use Type	Wetland or Waterbody within 50 feet	Distance from Wetland or Waterbody (feet)	Site-Specific Justification
Dillon	ATWS	4.4	Right	125' x 50'	0.2	Agriculture	--	--	NA
Dillon	ATWS	4.5	Right	125' x 50'	0.2	Agriculture	3055-Ditch	10.2	Non-aquatic feature (roadside ditch); DCG will follow *Procedures* and BMPs to protect feature.
TOTAL AREA					**2.7**	**Dillon**			

Appendix E

Waterbodies Crossed by the Project

APPENDIX E
Waterbodies Crossed by the Moore to Chappells Pipeline

Milepost No. or Access Road (AR)	Waterbody/Ditch ID	Waterbody Name	Waterbody Type	Channel Width (feet) g/	FERC Waterbody Classification c/	SCDHEC Water Quality Classification a/	Fishery Type b/	Proposed Crossing Method e/
Moore to Chappells Pipeline								
1.2	6009-TP	Unnamed Tributary to South Tyger River	Perennial	15	Intermediate	FW	WW	Flume/Dam-and-Pump
1.3	6012-TP	Unnamed Tributary to South Tyger River	Perennial	15	Intermediate	FW	WW	Flume/Dam-and-Pump
1.3	6012-TP	Unnamed Tributary to South Tyger River	Perennial	15	Intermediate	FW	WW	Flume/Dam-and-Pump
1.3	6012-TP	Unnamed Tributary to South Tyger River	Perennial	15	Intermediate	FW	WW	Flume/Dam-and-Pump
1.7	1016-TS	Unnamed Tributary to South Tyger River	Intermittent	3	Minor	FW	WW	Flume/Dam-and-Pump
1.9R	5024-Ditch	Jurisdictional Ditch	Intermittent	12	Intermediate	FW	WW	Bore
AR-139.00	9069-TP	Unnamed Tributary to South Tyger River	Perennial	8	Intermediate	FW	WW	Existing Culvert
2.0R, AR- 139.00	5021-TS	Unnamed Tributary to South Tyger River	Intermittent	10	Minor	FW	WW	Existing Culvert
4.6R	2070-TP	Unnamed Tributary to	Perennial	5	Minor	FW	WW	HDD 24
4.6R	5007-TP	South Tyger River	Perennial	80	Intermediate	FW	WW	HDD 24
6.8	2004-TP	Ferguson Creek	Perennial	50	Intermediate	FW	WW	HDD 2
7.2	2005-TS	Unnamed Tributary to Ferguson Creek	Intermittent	10	Minor	FW	WW	Flume/Dam-and-Pump
8.2	2002-TP	Unnamed Tributary to Ferguson Creek	Perennial	15	Intermediate	FW	WW	Flume/Dam-and-Pump
8.6	2003-TS	Unnamed Tributary to	Intermittent	10	Minor	FW	WW	Flume/Dam-and-
AR-122.00	9070-TP	Unnamed Tributary to Jimmies Creek	Perennial	20	Intermediate	FW	WW	Existing Culvert

APPENDIX E
Waterbodies Crossed by the Moore to Chappells Pipeline

Milepost No. or Access Road (AR)	Waterbody/Ditch ID	Waterbody Name	Waterbody Type	Channel Width (feet) g/	FERC Waterbody Classification c/	SCDHEC Water Quality Classification a/	Fishery Type b/	Proposed Crossing Method e/
9.7	1032-TP	Jimmies Creek	Perennial	20	Intermediate	FW	WW	HDD 3
10.2R	1048-TP	Unnamed Tributary to Jimmies Creek	Perennial	10	Minor	FW	WW	HDD 4
10.9R	1089-TP	Unnamed Tributary to Jimmies Creek	Perennial	10	Minor	FW	WW	Flume/Dam-and-Pump
12.3	2001-TP	Unnamed Tributary to Two	Perennial	10	Minor	FW	WW	Flume/Dam-and-
13.3R	2011-TS	Unnamed Tributary to Two	Intermittent	5	Minor	FW	WW	Flume/Dam-and-
15.0	2014-TP	Hannah Creek	Perennial	20	Intermediate	FW	WW	HDD 5
16.9R	4001-TP	Enoree River	Perennial	110	Major	FW	WW	HDD 7
17.0R	4002-TS	Unnamed Tributary to the Enoree River	Intermittent	25	Intermediate	FW	WW	HDD 7
17.5R	4003-TS	Unnamed Tributary to the Enoree River	Intermittent	20	Intermediate	FW	WW	Flume/Dam-and-Pump
17.7	4008-TP	Unnamed Tributary to the	Perennial	35	Intermediate	FW	WW	Flume/Dam-and-
17.9	4005-TI	Unnamed Tributary to the Enoree River	Ephemeral	6	Minor	FW	WW	Flume/Dam-and-Pump
18.5R	9040-TP	Buckhead Creek	Perennial	16	Intermediate	FW	WW	Flume/Dam-and-
20.2	1079-TP	Warrior Creek	Perennial	30	Intermediate	FW	WW	HDD 8
21.3	3020-TP	Unnamed Tributary to Warrior Creek	Perennial	20	Intermediate	FW	WW	HDD 17
21.4	3023-TS	Unnamed Tributary to Warrior Creek	Intermittent	30	Intermediate	FW	WW	HDD 17

APPENDIX E
Waterbodies Crossed by the Moore to Chappells Pipeline

Milepost No. or Access Road (AR)	Waterbody/Ditch ID	Waterbody Name	Waterbody Type	Channel Width (feet) g/	FERC Waterbody Classification c/	SCDHEC Water Quality Classification a/	Fishery Type b/	Proposed Crossing Method e/
21.7	3003-TS	Unnamed Tributary to Warrior Creek	Intermittent	15	Intermediate	FW	WW	Flume/Dam-and-Pump
22.4, AR-119.00	3025-TP	Unnamed Tributary to the Enoree River	Perennial	18	Intermediate	FW	WW	HDD 18
22.9	1069-TP	Unnamed Tributary to Enoree River	Perennial	10	Minor	FW	WW	Flume/Dam-and-Pump
22.9	1070-TS	Unnamed Tributary to	Intermittent	3	Minor	FW	WW	Flume/Dam-and-
24.6	2018-TP	Duncan Creek	Perennial	25	Intermediate	FW	WW	HDD 9
25	2020-TI	Unnamed Tributary to	Ephemeral	5	Minor	FW	WW	Flume/Dam-and-
25.5	2017-TP	Long Branch	Perennial	15	Intermediate	FW	WW	HDD 19, New
26.8	2022-TP	Unnamed Tributary to the Enoree River	Perennial	8	Minor	FW	WW	Flume/Dam-and-Pump
27.7R	1066-TP	Unnamed Tributary to Beards Fork Creek	Perennial	12	Intermediate	FW	WW	Flume/Dam-and-Pump
28.3	2025-TI	Unnamed Tributary to Beards Fork Creek	Ephemeral	3	Minor	FW	WW	HDD 20
29.4	2031-Ditch	Jurisdictional Ditch	Ephemeral	3	Minor	FW	WW	Flume/Dam-and-
29.7	2032-TS	Unnamed Tributary to North Creek	Intermittent	6	Minor	FW	WW	Flume/Dam-and-Pump
29.8R	1064-TS	Unnamed Tributary to North Creek	Intermittent	5	Minor	FW	WW	HDD 11
30.0R	6036-TP	Unnamed Tributary to North Creek	Perennial	40	Intermediate	FW	WW	HDD 11
31.1R	1080-TS	Unnamed Tributary to North Creek	Intermittent	9	Minor	FW	WW	Flume/Dam-and-Pump

APPENDIX E
Waterbodies Crossed by the Moore to Chappells Pipeline

Milepost No. or Access Road (AR)	Waterbody/Ditch ID	Waterbody Name	Waterbody Type	Channel Width (feet) g/	FERC Waterbody Classification c/	SCDHEC Water Quality Classification a/	Fishery Type b/	Proposed Crossing Method e/
31.6R	9010-TS	Unnamed Tributary to North Creek	Intermittent	6	Minor	FW	WW	Flume/Dam-and-Pump
AR-156.00	9068-TS	Unnamed Tributary to North Creek	Intermittent	3	Minor	FW	WW	New Culvert
32.4	2048-TP	Unnamed Tributary to North Creek	Perennial	6	Minor	FW	WW	Flume/Dam-and-Pump
32.5	2042-TS	Unnamed Tributary to North Creek	Intermittent	10	Minor	FW	WW	Flume/Dam-and-Pump
32.9	2044-TP	Unnamed Tributary to North Creek	Perennial	10	Minor	FW	WW	Flume/Dam-and-Pump
34.5	1095-TP	Unnamed Tributary to North Creek	Perennial	10	Minor	FW	WW	Flume/Dam-and-Pump
35.5	6020-TP	Unnamed Tributary to North Creek	Perennial	40	Intermediate	FW	WW	Flume/Dam-and-Pump
35.8	9001-TP	Unnamed Tributary to North Creek	Perennial	10	Minor	FW	WW	Flume/Dam-and-Pump
36.7R, AR-082.00	2055-TS	Unnamed Tributary to North Creek	Intermittent	8	Minor	FW	WW	Flume/Dam-and-Pump
38.7	4006-TP	Little River	Perennial	40	Intermediate	FW	WW	HDD 12
38.8	6032-TP	Unnamed Tributary to	Perennial	25	Intermediate	FW	WW	HDD 12
39.5	2046-TP	Beaverdam Creek	Perennial	20	Intermediate	FW	WW	HDD 13
40.9	3033-TS	Unnamed Tributary to Watkins Creek	Intermittent	6	Minor	FW	WW	Flume/Dam-and-Pump
41.7	9033-TI	Unnamed Tributary to Watkins Creek	Intermittent	10	Minor	FW	WW	Flume/Dam-and-Pump

APPENDIX E
Waterbodies Crossed by the Moore to Chappells Pipeline

Milepost No. or Access Road (AR)	Waterbody/Ditch ID	Waterbody Name	Waterbody Type	Channel Width (feet) g/	FERC Waterbody Classification c/	SCDHEC Water Quality Classification a/	Fishery Type b/	Proposed Crossing Method e/
42.5R	1102-TS	Unnamed Tributary to	Intermittent	10	Minor	FW	WW	HDD 21
42.5R	1101-TP	Watkins Creek	Perennial	20	Intermediate	FW	WW	HDD 21
42.7R	9032-TP	Mudlick Creek	Perennial	20	Intermediate	FW	WW	HDD 21
45.5R	2065-TS	Unnamed Tributary to Mills	Intermittent	10	Minor	FW	WW	Flume/Dam-and-
45.8	8017-TP	Mills Creek	Perennial	20	Intermediate	FW	WW	HDD 25
46.1	8013-TS	Unnamed Tributary to Mills Creek	Intermittent	15	Intermediate	FW	WW	Flume/Dam-and-Pump
46.8	2066-TP	Unnamed Tributary to Mills	Perennial	20	Intermediate	FW	WW	Flume/Dam-and-
48.3	2051-TP	Pages Creek	Perennial	6	Minor	FW	WW	Flume/Dam-and-Pump
50.5	2059-TS	Unnamed Tributary to the Saluda River	Intermittent	6	Minor	FW	WW	Flume/Dam-and-Pump
50.6	1071-TS	Unnamed Tributary to the Saluda River	Intermittent	8	Minor	FW	WW	Flume/Dam-and-Pump
52.7	9046-TI	Unnamed Tributary to the	Ephemeral	3	Minor	FW	WW	HDD 26
53.1	1042-TI	Unnamed Tributary to the	Ephemeral	5	Minor	FW	WW	HDD 14
AR-113.00	1039-TI	Unnamed Tributary to the	Ephemeral	3	Minor	FW	WW	Culvert
53.2	1043-TP	Saluda River	Perennial	237	Major	FW	WW	HDD 14

APPENDIX E
Waterbodies Crossed by the Moore to Chappells Pipeline

Milepost No. or Access Road (AR)	Waterbody/Ditch ID	Waterbody Name	Waterbody Type	Channel Width (feet) g/	FERC Waterbody Classification c/	SCDHEC Water Quality Classification a/	Fishery Type b/	Proposed Crossing Method e/
Dillon Pipeline								
0.2	3003-Ditch	Jurisdictional Ditch	TBD	3	Minor	TBD	TBD	HDD 1
0.2	3004-Ditch	Jurisdictional Ditch	TBD	2.5	Minor	TBD	TBD	HDD 1
0.36	d/	Little Reedy Creek*	Perennial	Braided, no defined channel	Intermediate	FW	WW	HDD 1
1.9	3032-Ditch	Jurisdictional Ditch	Intermittent	6	Minor	FW	WW	Flume/Dam-and-
2.2	3030-Pond	Pond	Pond	20	Intermediate	FW	WW	HDD 2
2.2	3023-Ditch	Jurisdictional Ditch	TBD	8	Minor	TBD	TBD	HDD 2
2.6	d/	Reedy Creek f/	Perennial	Braided, no defined channel	Intermediate	FW	WW	HDD 2
3.9	3047-Ditch	Jurisdictional Ditch	TBD	8	Minor	TBD	TBD	Flume/Dam-and-
4.4	3049-Ditch	Jurisdictional Ditch	TBD	8	Minor	TBD	TBD	Bore
4.4	3055-Ditch	Jurisdictional Ditch	TBD	9	Minor	TBD	TBD	Bore
5.2	3058-Ditch	Jurisdictional Ditch	TBD	10	Minor	TBD	TBD	Flume/Dam-and-

APPENDIX E
Waterbodies Crossed by the Moore to Chappells Pipeline

Milepost No. or Access Road (AR)	Waterbody/Ditch ID	Waterbody Name	Waterbody Type	Channel Width (feet) g/	FERC Waterbody Classification c/	SCDHEC Water Quality Classification a/	Fishery Type b/	Proposed Crossing Method e/

a. FW (Freshwater): A waterbody suitable for primary and secondary contact recreation and as a source for drinking water supply after conventional treatment in accordance with the requirements of the Department. Suitable for fishing and the survival and propagation of a balanced indigenous aquatic community of fauna and flora. Suitable also for industrial and agricultural uses.

b. WW (Warmwater): Warmwater fish species can tolerate temperatures above 80 degrees Fahrenheit.

c. Waterbodies would be defined in accordance with FERC definitions: Minor Waterbody ≤10 feet wide at water's edge at the time of crossing; Intermediate Waterbody >10 feet but ≤100 feet wide at water's edge at the time of crossing; and Major Waterbody >100 feet at water's edge at the time of crossing; to be verified as field surveys are completed.

d. Identified as wetland feature during field survey due to absence of defined channels. NHD and other available desktop resources confirm the presence of defined perennial channel through adjacent wetland areas. Wetland portion that is being crossed is provided in Table 2.3-1.

e. The crossing methodology for waterbodies not crossed by HDD is dependent on whether water is present/flowing at the time of the crossing. If no water is flowing at the time of the crossing, the waterbody would be crossed using open-cut methodology. If water is flowing at the time of the crossing and there are no sensitive species known to be present in the waterbody, the waterbody would be crossed using the dam and pump methodology. If water is flowing at the time of the crossing and sensitive species are known to be present in the waterbody, the waterbody would be crossed using flume crossing methodology.

f Waterbodies identified through desktop review of the USGS National Hydrography Dataset. These waterbodies have not been field surveyed. Waterbody ID, waterbody

Appendix F

Wetlands Crossed by the Project

APPENDIX F
Wetlands within the Project Limit of Disturbance

Facility	Type/ Classification a/	Area (Acres)	ID	MP/ (Access Road)	Length of Crossing (feet)	Area (Acres) Affected by Construction/ Operations	Proposed Crossing Method
Moore to Chappells Pipeline							
Pipeline	PSS	0.03	3011-PSS	20.8	16	0.00	BORE-54
Pipeline	PEM	0.39	2019-PEM	24.6	341	0.00	HDD-09
Pipeline	PFO	0.02	2026-PFO	28.3	35	0.00	HDD-20
Pipeline	PEM	0.14	1100-PEM	(42.2R)	142	0.00	HDD-21
Pipeline	PFO	0.05	8018-PFO	45.7	37	0.00	HDD-25
Pipeline	PFO	0.07	9044-PFO	52.7	32	0.00	HDD-26
Pipeline	PFO	0.03	1046-PFO	52.7	15	0.00	BORE-47
Pipeline	PFO	0.00	1041-PFO	53.1	23	0.00	HDD-14
					Total:	*0.00*	
Dillion Pipeline							
Pipeline	PFO	0.78	3002-PFO	0.3	706	0.0	HDD-1
Pipeline	PFO	2.03	3031-PFO	2.6	1765	0.0	HDD-2
					Total:	*0.0*	*0.0*

Appendix G

Special Status Species and State Priority Species

Special Status Species Identified as Potentially Occurring within the Project Area					
Common Name	**Scientific Name**	**Status[1]**	**Habitat**	**Potential for Occurrence within Project Area**	**Retained in Detailed Analysis? (Y/N)**
BIRDS					
Bachman's warbler	*Vermivora bachmanii*	FE, SE	The species inhabits low water saturated forested environments including palustrine forested wetlands.	None. In SC, the species has been documented in Charleston County. Based on field surveys, suitable habitat was not identified within the Project area in Charleston County.	No. The USFWS concurred with a 'No Effect' determination for this species (USFWS 2016b).
Bald eagle	*Haliaeetus leucocephalus*	BGEPA, ST	Ideal habitat includes areas with clean water and undisturbed land with large trees in which individuals roost, perch, and nest. Nesting habitat includes coastlines, rivers, and large lakes which provide adequate feeding grounds.	Moderate. Based on agency consultation, the closest bald eagle nest is approx. 2.7 miles from the proposed pipeline route. Due to the proximity of the proposed pipeline route to Lake Greenwood, foraging or nesting bald eagles may be present. Based on field surveys, suitable habitat was identified within the vicinity of the proposed Dorchester Compressor Station; however, no bald eagles or bald eagle nests were observed during field surveys.	Yes.
Red-cockaded woodpecker	*Picoides borealis*	FE, SE	The species inhabits open, mature pine woodlands and savannahs with large old pines for foraging and nesting.	None. In SC, the species has been documented in Aiken, Charleston, Dillon, Dorchester, Laurens, and Newberry Counties. Based on field surveys, no individuals or cavity trees were observed; however, suitable foraging habitat may be present in Dorchester, Newberry, and Laurens Counties.	Yes. The USFWS concurred with a 'May Affect, Not Likely to Adversely Affect' determination for the species (USFWS 2016b).
Swallow-tailed kite	*Elanoides forficatus*	SE	The species inhabits floodplain forests and other large tracts of forested wetlands/mixed pine habitats of the outer Coastal Plain of SC.	Low. In SC, the species has been documented in Charleston and Dorchester Counties. Based on field surveys, suitable habitat was identified within the Project area in Dorchester County; however, suitable habitat was not identified within the Project area in Charleston County. No species were identified within the Project area in Dorchester or Charleston Counties.	Yes.

Special Status Species Identified as Potentially Occurring within the Project Area					
Common Name	**Scientific Name**	**Status[1]**	**Habitat**	**Potential for Occurrence within Project Area**	**Retained in Detailed Analysis? (Y/N)**
Wood stork	*Mycteria americana*	FT, SE	The species prefers shallow, brackish and freshwater wetland areas for feeding. The species are highly colonial and nest in cypress or mangrove swamps, or on islands surrounded by open water.	None. In SC, the species has been documented in Charleston and Dorchester Counties. Based on field surveys, no individuals or suitable habitat was identified within the Project area in Charleston or Dorchester Counties.	No. The USFWS concurred with a 'No Effect' determination for this species (USFWS 2016b).
MAMMALS					
Northern long-eared bat	*Myotis septentrionalis*	FT	During the summer, the species roosts beneath bark in both live trees and snags. Winter hibernacula can be found within various sized caves or mines with constant temperatures and high humidity.	Low. The USFWS indicated that suitable active season habitat for the species has been documented in Laurens, Newberry, and Spartanburg Counties. Potential habitat was identified along 94 percent to the proposed Moore to Chappells pipeline route. However, based on USFWS and SCDNR Heritage Trust records, no hibernacula or maternity trees have been documented within 0.25 mile of the Project area in Laurens, Newberry, Spartanburg, or Greenwood Counties.	Yes. The USFWS concurred with a 'May Affect, Not Likely to Adversely Affect' determination for this species (USFWS 2016e).
Rafinesque's big-eared bat	*Corynorhinus rafinesquii*	SE, ARS	The species is a permanent resident of the Coastal Plain and characteristically roosts in abandoned buildings or tree cavities near water.	Low. In SC, the species may occur in Charleston, Dillon, and Dorchester Counties. Based on field surveys, no individuals or suitable habitat was identified within the Project area in Dorchester County; however, suitable habitat was identified along the Project route in Dillon County. If the building present within the Project area in Charleston County is determined to be abandoned, suitable habitat may be present at this location.	Yes.
Tri-colored bat	*Perimyotis subflavus*	ARS	The species utilizes T-beam bridges, abandoned buildings, mines, tunnels, caves, and hollow trees for roosting.	Low. Based on field surveys, no individuals or suitable habitat was identified within the Project area in Dorchester County; however, suitable habitat was identified along the Project route in Dillon County. If the building present within the Project area in Charleston County is determined to be abandoned, suitable habitat may be present at this location.	No. Dominion would implement its Plan and Procedures to minimize impacts to the species and its associated habitat.

Special Status Species Identified as Potentially Occurring within the Project Area					
Common Name	**Scientific Name**	**Status[1]**	**Habitat**	**Potential for Occurrence within Project Area**	**Retained in Detailed Analysis? (Y/N)**
AMPHIBIANS					
Frosted flatwoods salamander	*Ambystoma cingulatum*	FT, SE	This fossorial species inhabits crayfish burrows, root channels, rodent burrows, and other subterranean structures. Adults migrate to wetland areas or ponds to breed.	None. Although the species has been identified in Charleston County, suitable habitat for the species is not present within the Project area.	No. The USFWS concurred with a 'No Effect' determination for this species (USFWS 2016b).
REPTILES					
Gopher tortoise	*Gopherus polyphemus*	FC, SE	The species inhabits xeric longleaf pine sandhills where soils are ideal for creating burrows.	Southern Compressor Station: None. Although the species has been identified in Aiken County, suitable habitat for the species was not identified within the Project area. Further, no surface disturbance is anticipated in Aiken County as a result of Project implementation. Dorchester Compressor Station: Low. Based on field surveys, low quality suitable habitat was identified within the Project area; however, no individuals or burrows were observed.	Yes.
Southern hognose snake[2]	*Heterdon simus*	ARS	The species inhabits xeric longleaf pine forests.	Low. Although the species has been documented in Aiken, Dorchester, and Charleston Counties, suitable habitat is not present within the Project area in Aiken or Charleston Counties. However, suitable habitat may be present within the Project area in Dorchester County.	No. Dominion would implement its Plan and Procedures to minimize impacts to the species and its associated habitat.
INVERTEBRATES					
Broad River spiny crayfish[3]	*Cambarus spicatus*	ARS, State Priority Species	The species inhabits streams and rivers where flash floods occur, and uses sand deposits, log jams and other debris for cover. The species is known to occur in the Little and Broad River Basins in Spartanburg County.	Burrow excavation surveys were conducted along the proposed Moore to Chappells pipeline route between May to October 2016. The species was identified within the Project area in Laurens County in Watkins Creek.	Yes.
Carolina heelsplitter	*Lasmigona decorata*	FE, SE	The species inhabits well-oxygenated, cool, clean water	None. The species has been documented in Greenwood County. Visual and tactile mussel	No.

Special Status Species Identified as Potentially Occurring within the Project Area					
Common Name	**Scientific Name**	**Status[1]**	**Habitat**	**Potential for Occurrence within Project Area**	**Retained in Detailed Analysis? (Y/N)**
			with stable, silt-free stream bottoms. Stable areas typically occur where stream banks are well-vegetated with trees and shrubs.	surveys were conducted along the Moore to Chappells pipeline route in 2015 and 2016; however, no live mussels or shells were documented.	
Mimic crayfish[3]	*Distocambarus carlsoni*	ARS; State Priority Species	The species is a terrestrial obligate burrower that is known to occur in the Santee and Savannah River Basins in Laurens, Newberry, and Greenwood Counties.	Burrow excavation surveys were conducted along the proposed Moore to Chappells pipeline route between May to October 2016. The species was not identified within the survey area.	Yes.
Monarch butterfly[2]	*Danaus plexippus*	ARS	The species inhabits a wide variety of habitats including cropland; conifer, hardwood, and mixed woodlands; grasslands; old fields; sand/dune complexes; savannas; shrubland; orchards; and suburban areas.	Low. The species may occur within the Project area as a summer resident where forage (i.e., milkweed) is available.	No. Dominion would implement its Plan and Procedures to minimize impacts to the species and its associated habitat.
Newberry burrowing crayfish[3]	*Distocambarus youngineri*	ARS; State Priority Species	The species is a primary burrower which inhabits moist, terrestrial areas with leaf litter and mixed-hardwood overstory near stream headwaters or intermittent streams. The species is known to occur in the Santee River Basin in Newberry County.	Burrow excavation surveys were conducted along the proposed Moore to Chappells pipeline route between May to October 2016. The species was identified within the Project area in Newberry County within the following waterbodies: Unnamed Tributary to Pages Creek, Unnamed Tributary Sharps Branch, and two Unnamed Tributaries to Lake Greenwood.	Yes.
Savannah lilliput[3]	*Toxolasma pullus*	ARS; State Priority Species	The species inhabits shallow water and the edges of streams, rivers, and lakes but also backwaters in mud or silty sand substrates. The host fish is the sunfish (*Lepomis*) species. The species is known to occur in the Santee,	Low. The species is known to occur in Lake Greenwood in Greenwood County. Visual and tactile mussel surveys were conducted along the Moore to Chappells pipeline route in 2015 and 2016; however, no live mussels or shells were documented.	No.

Special Status Species Identified as Potentially Occurring within the Project Area					
Common Name	**Scientific Name**	**Status[1]**	**Habitat**	**Potential for Occurrence within Project Area**	**Retained in Detailed Analysis? (Y/N)**
			Savannah, and Pee Dee River Basins.		
FISH					
American eel[2]	*Anguilla rostrata*	ARS	The species inhabits a variety of aquatic habitats including estuarine, brackish and freshwater tidal channels; tidal creeks; coastal impoundments; ponds; lakes and nearly all accessible freshwater habitats associated within river basins as far inland as the fall-line and beyond. Within SC, the species occur from estuaries to the headwaters of coastal streams and at least as far inland as the fall line in longer river basins, including the Savannah, Santee and Pee Dee.	Low. Based on the species range and distribution, suitable habitat may occur along the proposed Moore to Chappells Pipeline and along the proposed Dillon Pipeline. For waterbodies that would be crossed using HDD, no impacts to the species or its habitat are anticipated. For waterbodies crossed by open cut methods, impacts to the species and its habitat may occur.	No. Dominion would implement its Plan and Procedures to minimize impacts to the species and its associated habitat.
Atlantic sturgeon	*Acipenser oxyrinchus*	FE	Due to the anadromous nature of the species, it requires an expansive variety of high quality freshwater and marine habitats. In SC, the species uses nearshore shelf waters and enters coastal sounds, bays, inlets, and river basins.	None. Although the species may be present in Aiken, Charleston, Dillon, and Dorchester Counties, suitable habitat for the species is not present within the Project area.	No.
Blueback herring	*Alosa aestivalis*	ARS	The species typically spawns in freshwater marshlands or small tributaries. In SC, the species occurs in the Santee-Cooper and Savannah watersheds.	Low. Based on the species range and distribution, suitable habitat may occur along the proposed Moore to Chappells Pipeline and along the proposed Dillon Pipeline. For waterbodies that would be crossed using HDD, no impacts to the species or its habitat are anticipated. For waterbodies crossed by open cut methods, impacts to the species and its habitat may occur.	No. Dominion would implement its Plan and Procedures to minimize impacts to the species and its associated habitat.

Special Status Species Identified as Potentially Occurring within the Project Area					
Common Name	**Scientific Name**	**Status[1]**	**Habitat**	**Potential for Occurrence within Project Area**	**Retained in Detailed Analysis? (Y/N)**
Shortnose sturgeon	*Acipenser brevirostrum*	FE, SE	The species inhabits brackish water of large rivers and estuaries along the Atlantic seaboard, and spawns in freshwater areas.	None. Although the species may be present in Aiken, Charleston, Dillon, and Dorchester Counties, suitable habitat for the species is not present within the Project area.	No.
PLANTS					
Ravin's sedge[2]	*Carex impressinervia*	ARS	The species inhabits vegetatively diverse, moist to wet deciduous forests.	Low. Data associated with the current range and distribution of the species is lacking. Conservatively, the species and its associated habitat may be present within the Project area, with the exception of the proposed Southern Compressor Station, Charleston Town Border Station, or Greenwood Town Border Station.	No. Dominion would implement its Plan and Procedures to minimize impacts to the species and its associated habitat.
Dwarf-flowered heartleaf	*Hexastylis naniflora*	FT	The species inhabits upper slopes of tributaries and small riparian corridors in oak-hickory forests. Flowering period: March to May.	Low. The species has been documented in Spartanburg County. During field surveys, one population of *Hexastylis* species was identified within the survey corridor. A follow-up survey was conducted during the flowering period, and the species was identified as *H. arifolia* (URS 2016). As such, no impact to the species is anticipated.	No. The USFWS concurred with a 'No Effect' determination for this species (USFWS 2016b).
Pondberry	*Lindera melissifolia*	FE	The species inhabits shallow depression ponds in wetland habitats with hydric soils, along margins of cypress ponds, and in seasonally wet low area along bottomland hardwoods.	None. The species has been identified as potentially occurring within Charleston and Dorchester Counties. Based on field surveys, no individuals, populations, or suitable habitat was identified within Project area in Charleston or Dorchester Counties.	No. The USFWS concurred with a 'No Effect' determination for this species (USFWS 2016b).
Canby's dropwort	*Oxypolis canbyi*	FE	The species inhabits wet pineland ponds, savannas, wet meadows, and around edges of open cypress ponds, and prefers habitat with little or no canopy closure.	None. The species has been identified as potentially occurring within Charleston and Dorchester Counties. Based on field surveys, suitable habitat was not identified for the species within Project area in Charleston County. A small wetland was identified within the Project site in Dorchester County; however, no Project-related activities would impact this wetland. As such, no impacts to the species or its habitat are anticipated in Dorchester County.	No. The USFWS concurred with a 'No Effect' determination for this species (USFWS 2016b).

Special Status Species Identified as Potentially Occurring within the Project Area					
Common Name	**Scientific Name**	**Status[1]**	**Habitat**	**Potential for Occurrence within Project Area**	**Retained in Detailed Analysis? (Y/N)**
American chaffseed	*Schwalbea americana*	FE	The species inhabits moist to dryish pine flatlands, pine savannahs, and longleaf pine/oak sandhills.	None. Based on field surveys, suitable habitat was not identified for the species within Project area in Charleston County.	No. The USFWS concurred with a 'No Effect' determination for this species (USFWS 2016b).
Georgia aster[2]	*Symphyotrichum georgianum*	ARS	The species inhabits dry open woods, roadsides, and other openings.	Low. The species in known to occur in Greenwood and Laurens Counties. Suitable habitat for the species may be present along the proposed Moore to Chappells Pipeline route in Greenwood and Laurens Counties.	No. Dominion would implement its Plan and Procedures to minimize impacts to the species and its associated habitat.

[1]BGEPA = Federally protected under the Bald and Golden Eagle Protection Act; FE = Federally Endangered; FT = Federally Threatened; FC = Federal Candidate; SE = State Endangered; ST = State Threatened; ARS = At Risk Species

[2]Although impacts to the species or its habitat may occur as a result of Project implementation, the species was not retained in detailed analysis due to lack of federal or state legal protection. Dominion would implement its Plan and Procedures to minimize species impacts.

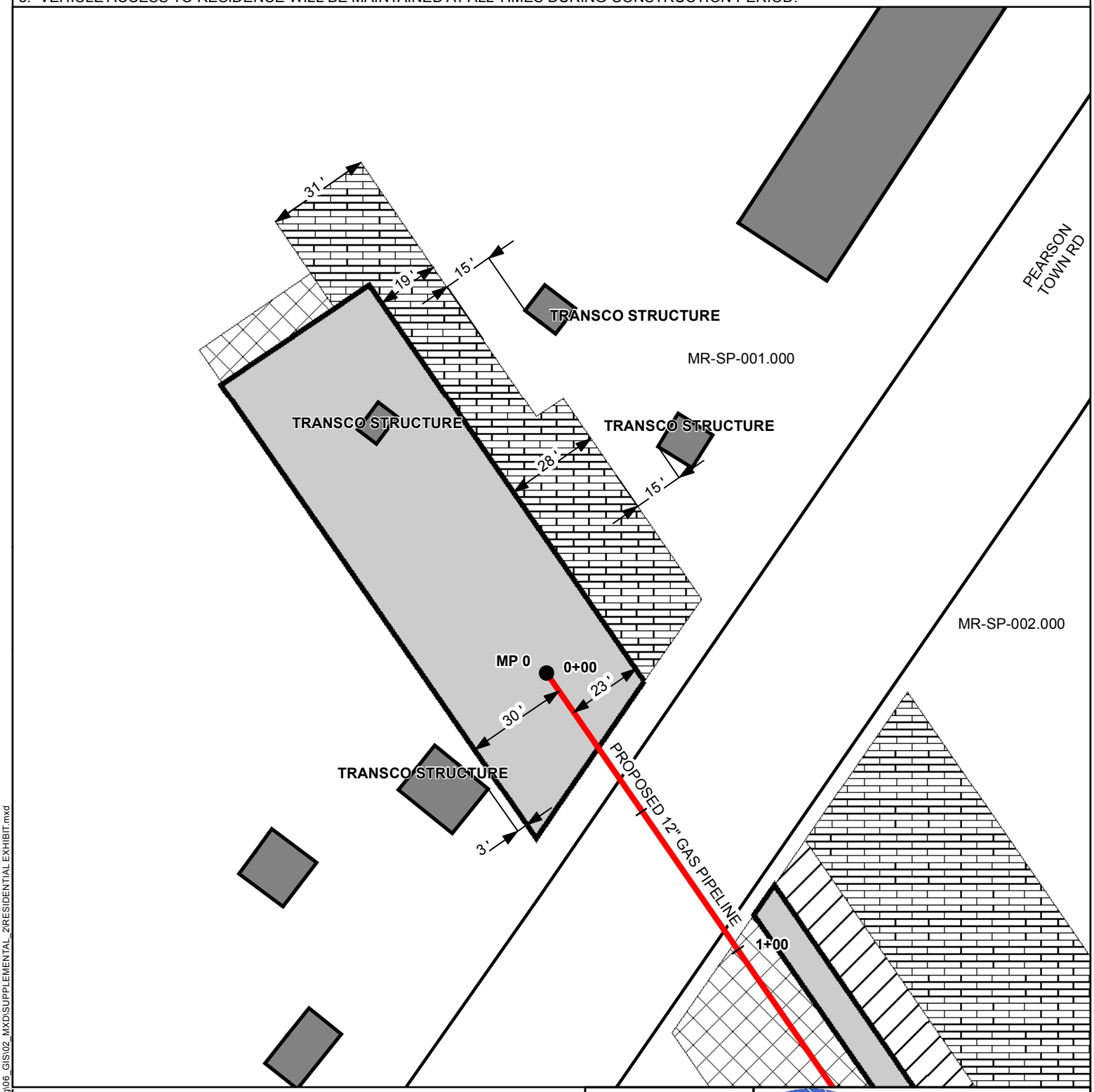
[3]The Newberry burrowing crayfish, Savannah Lilliput, mimic crayfish, and Broad River spiny crayfish are designated At Risk Species and State Priority Species, and are presented within both tables 1 and 2 in Appendix I.

Sources: AES 2016; NatureServe 2016; NOAA Fisheries 2016; SCDNR 2014, 2006; URS 2016; USFWS 2016a,b,c,d,e,f; 2015a-j.

Appendix H

Site Specific Residential Construction Plans

1. CONSTRUCTION TECHNIQUE WILL BE OPEN CUT.
2. ORANGE SAFETY FENCE WILL BE INSTALLED A DISTANCE OF 100 FEET ALONG THE EDGE OF THE CONSTRUCTION WORKSPACE OR ROW ON EITHER SIDE OF THE STRUCTURE.
3. VEHICLE ACCESS TO RESIDENCE WILL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION PERIOD.



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LEGEND

- MLV
- MILE POST TENTHS
- PROPOSED PIPELINE
- MLV #4 & #6 50' BUFFER
- PARCELS
- STRUCTURE
- MLV SITE
- PERMANENT EASEMENT
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- ATWS
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URS

URS JOB NO. 60420377

DRAFT

08/19/2016
DATE

ANSELEM EZIKE
PROJECT ENGINEER

Dominion℠

DOMINION CAROLINA GAS TRANSMISSION, LLC
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
FIGURE 8-2
RESIDENTIAL CONSTRUCTION TECHNIQUES
SPARTANBURG COUNTY, SOUTH CAROLINA

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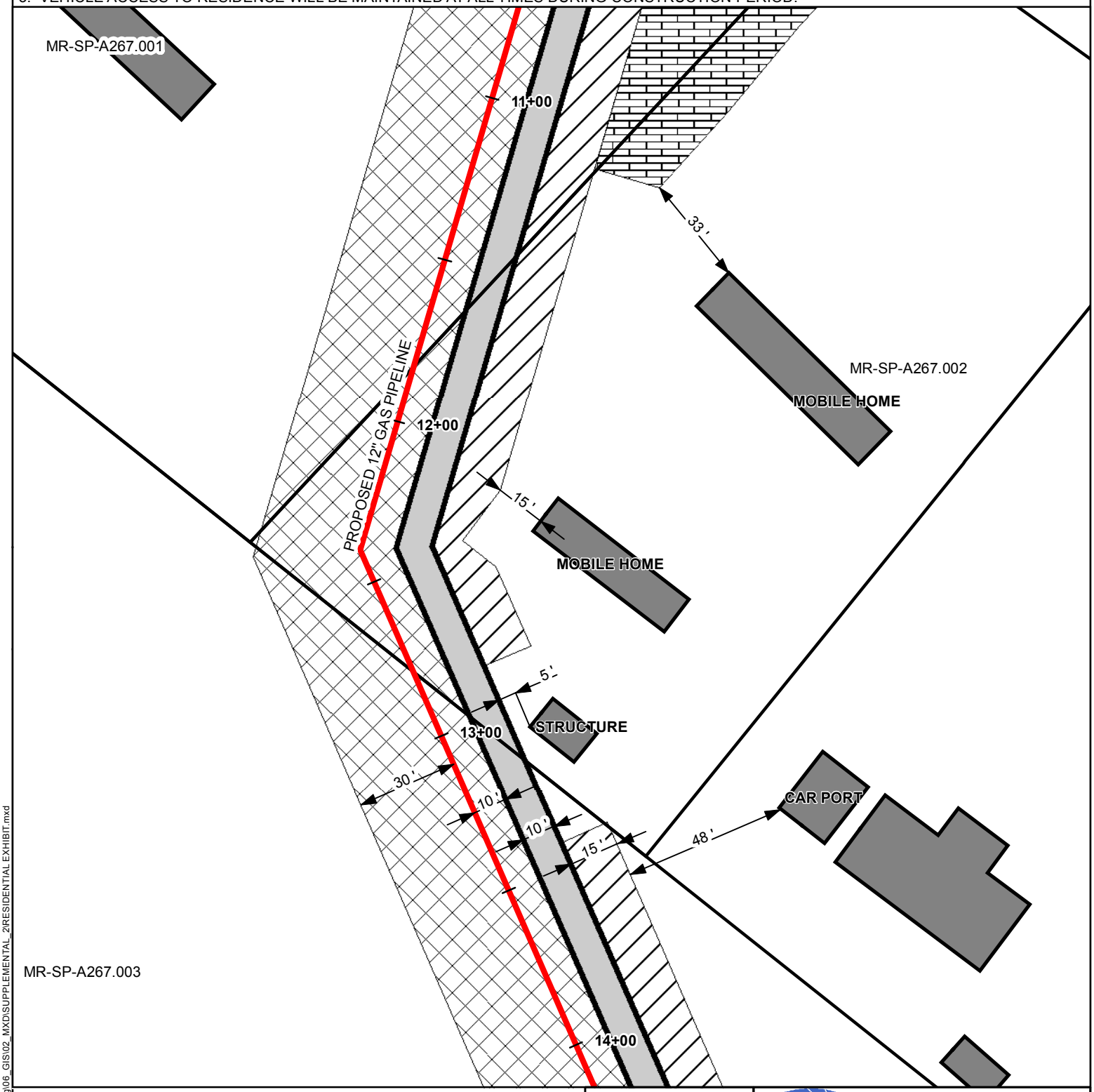

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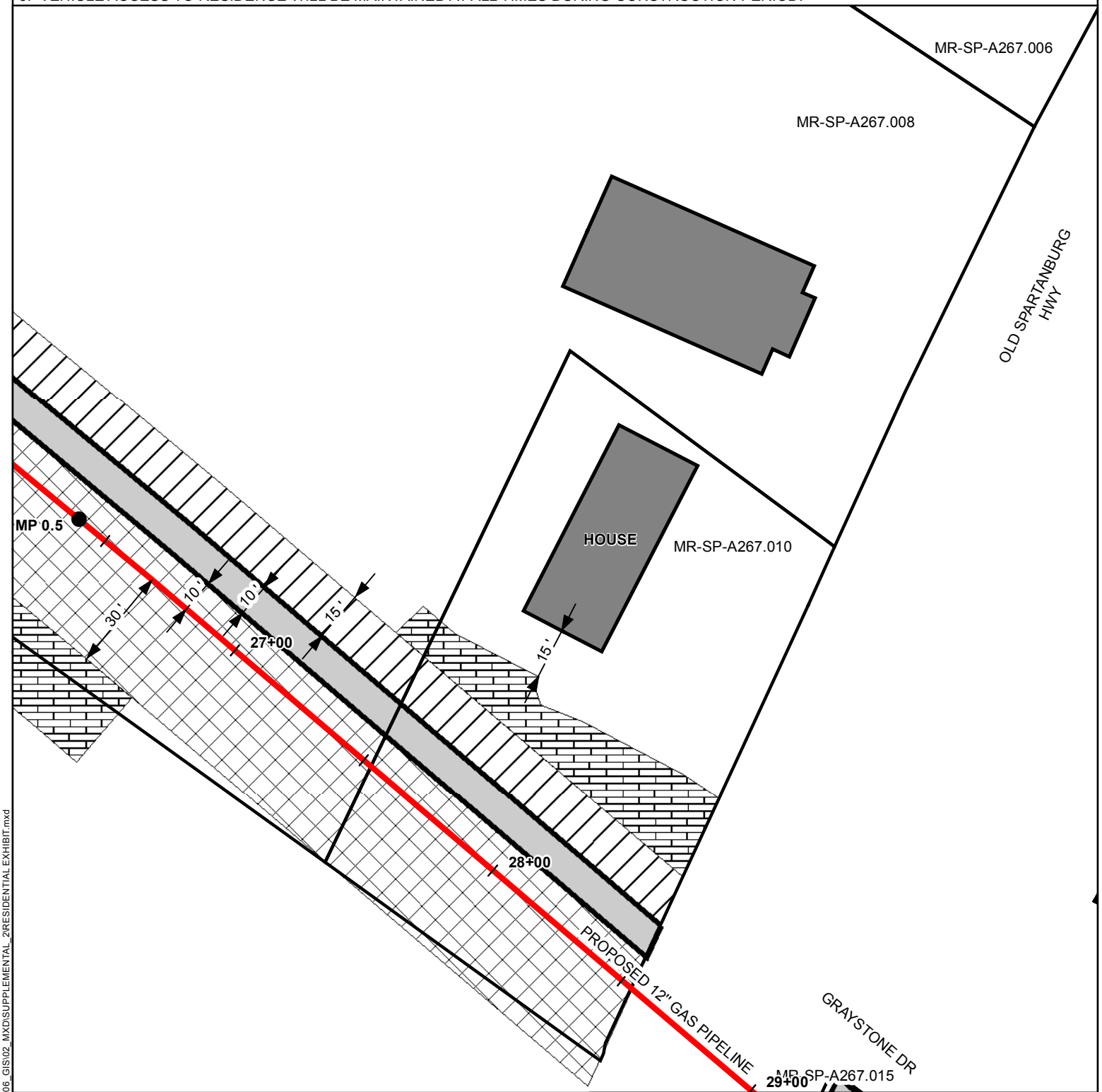

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SPARTANBURG COUNTY, SOUTH CAROLINA

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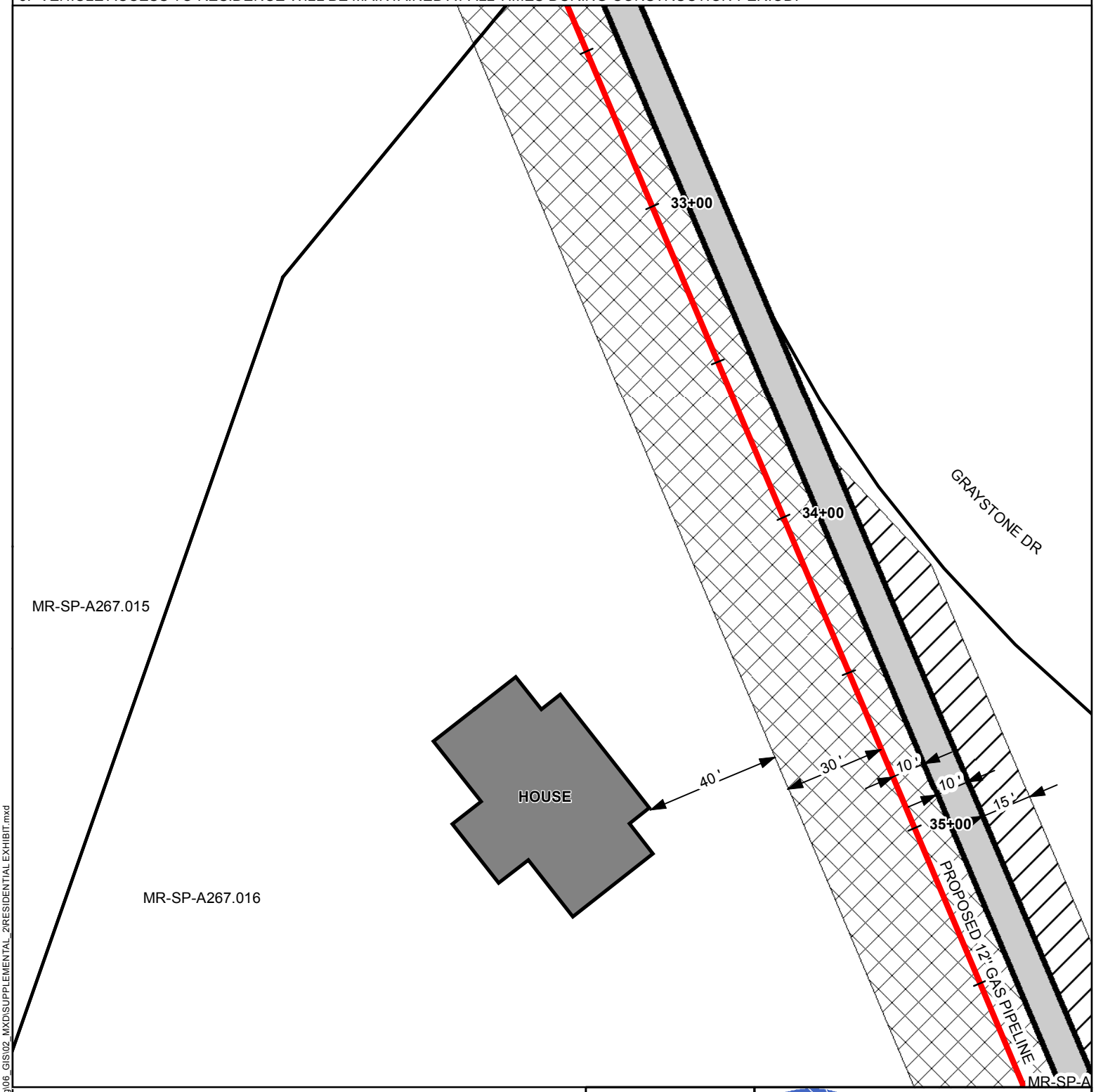

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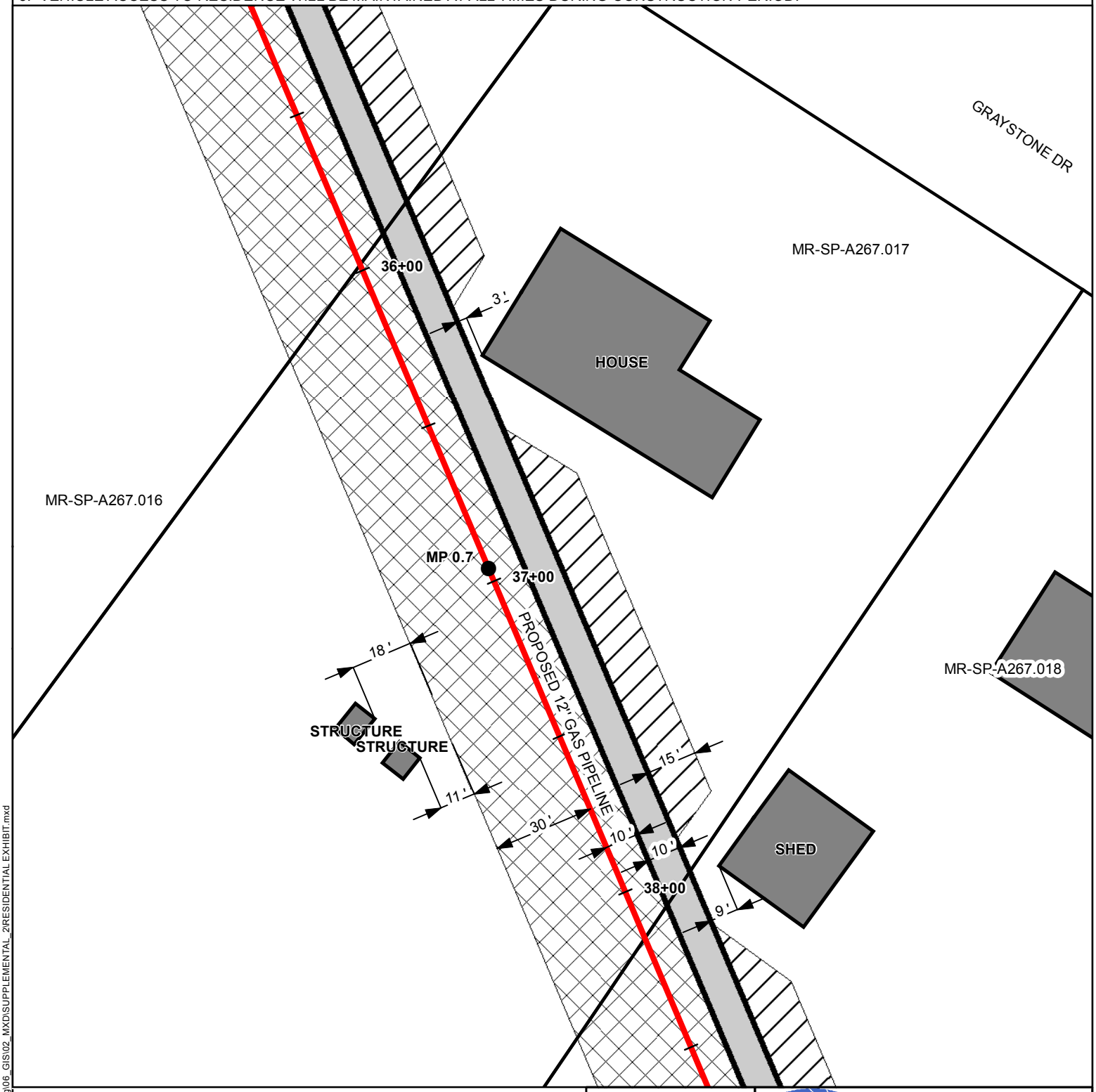

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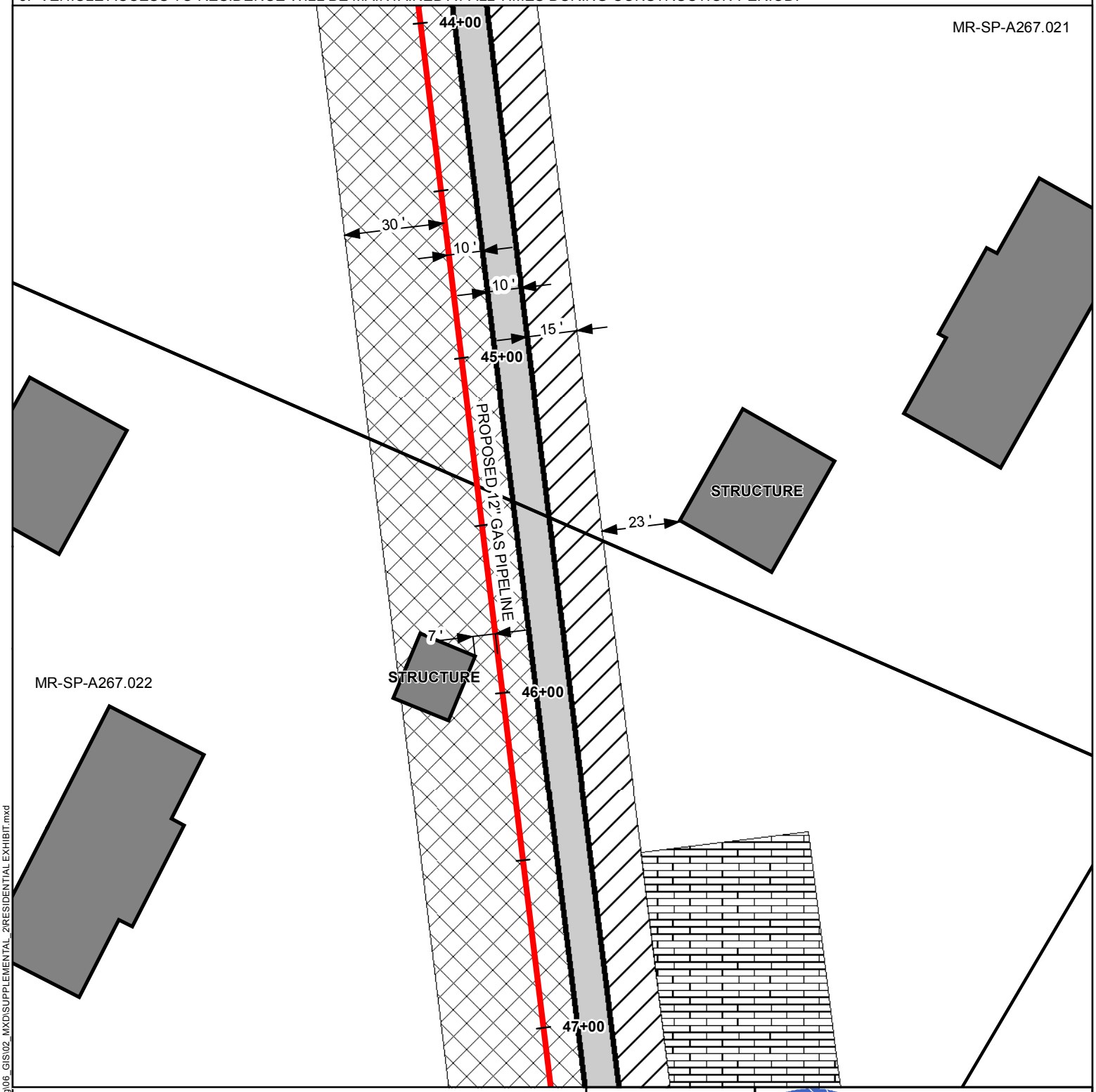

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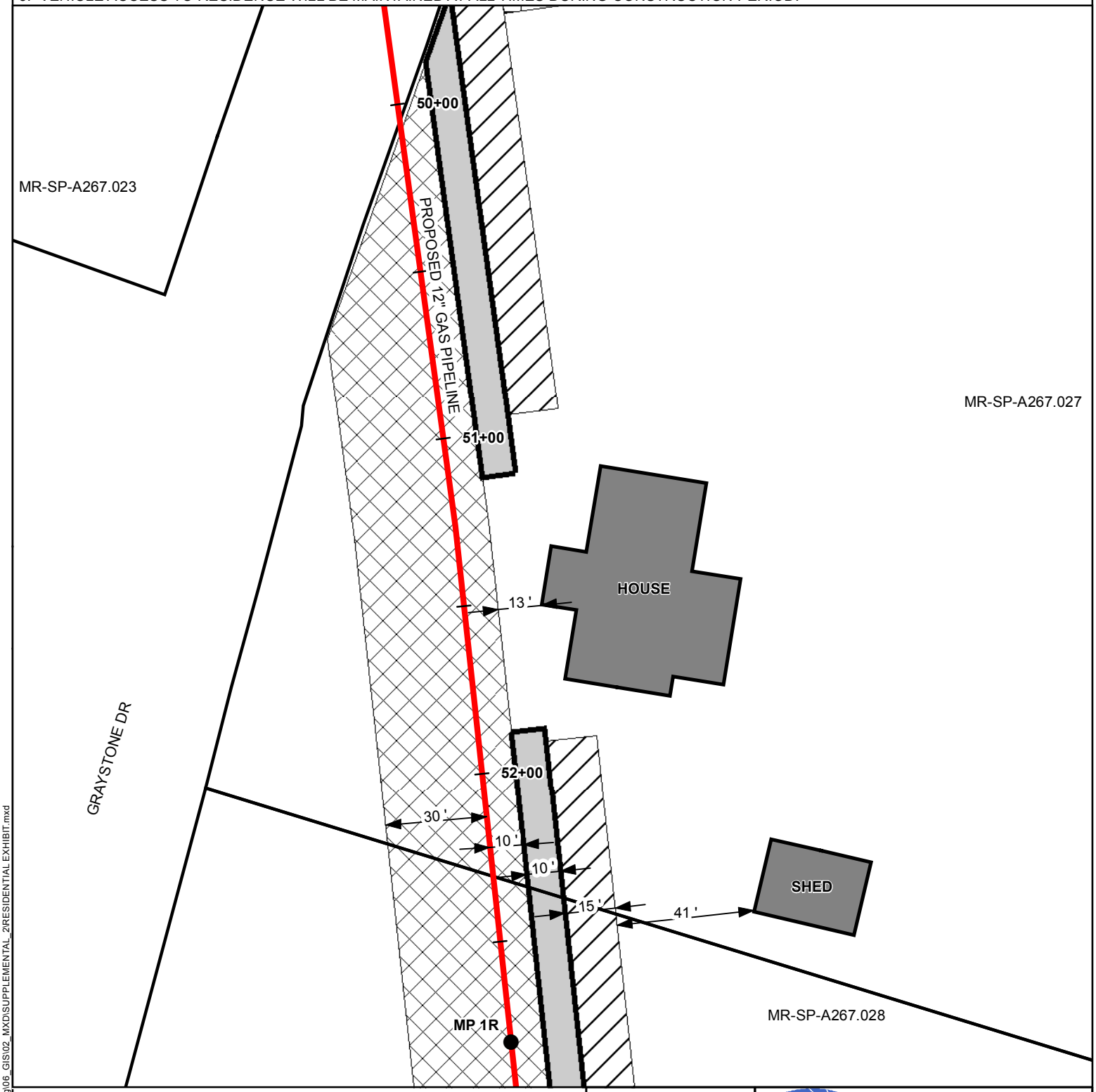

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TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
FIGURE 8-2
RESIDENTIAL CONSTRUCTION TECHNIQUES
SPARTANBURG COUNTY, SOUTH CAROLINA

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1. CONSTRUCTION TECHNIQUE WILL BE OPEN CUT.
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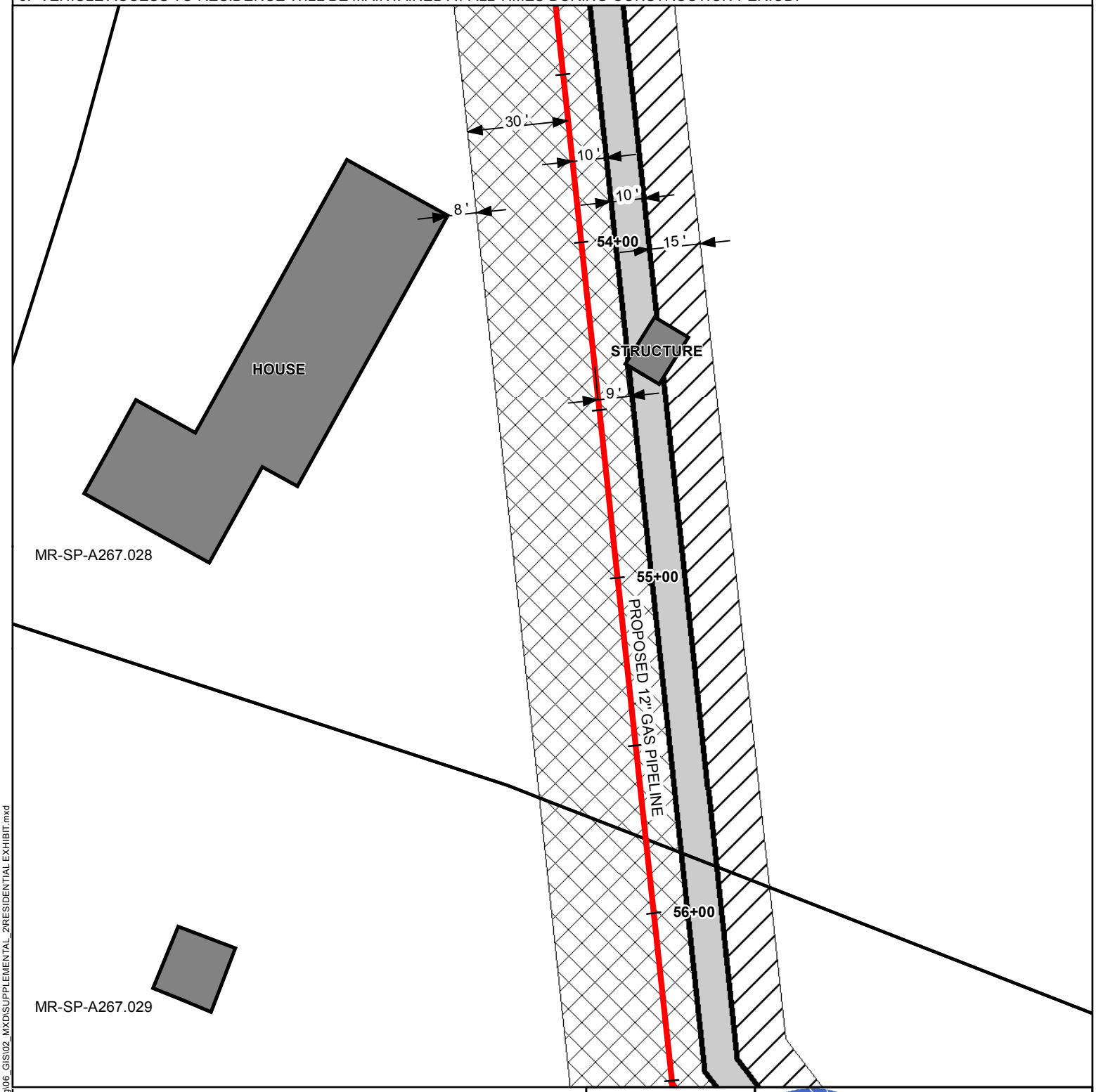
3. VEHICLE ACCESS TO RESIDENCE WILL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION PERIOD.



N

0 20 40 80'

SCALE: 1 " = 40 '

LEGEND

- MLV
- MILE POST TENTHS
- PROPOSED PIPELINE
- MLV #4 & #6 50' BUFFER
- PARCELS
- STRUCTURE
- MLV SITE
- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
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- EXISTING EASEMENT

URS

URS JOB NO. 60420377

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08/19/2016
DATE

ANSELEM EZIKE
PROJECT ENGINEER

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SPARTANBURG COUNTY, SOUTH CAROLINA

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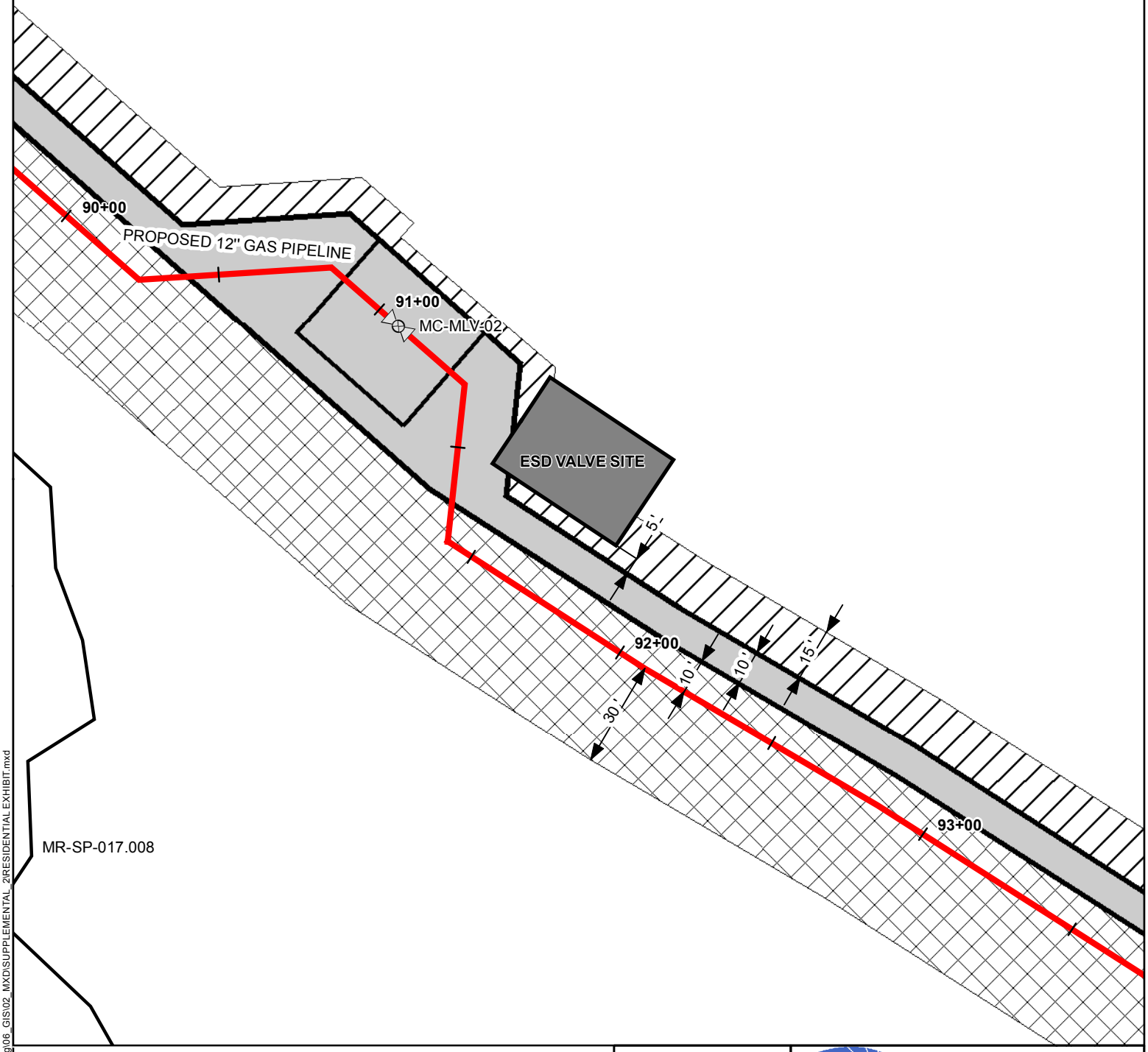

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SPARTANBURG COUNTY, SOUTH CAROLINA

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FIGURE 8-2
RESIDENTIAL CONSTRUCTION TECHNIQUES
SPARTANBURG COUNTY, SOUTH CAROLINA

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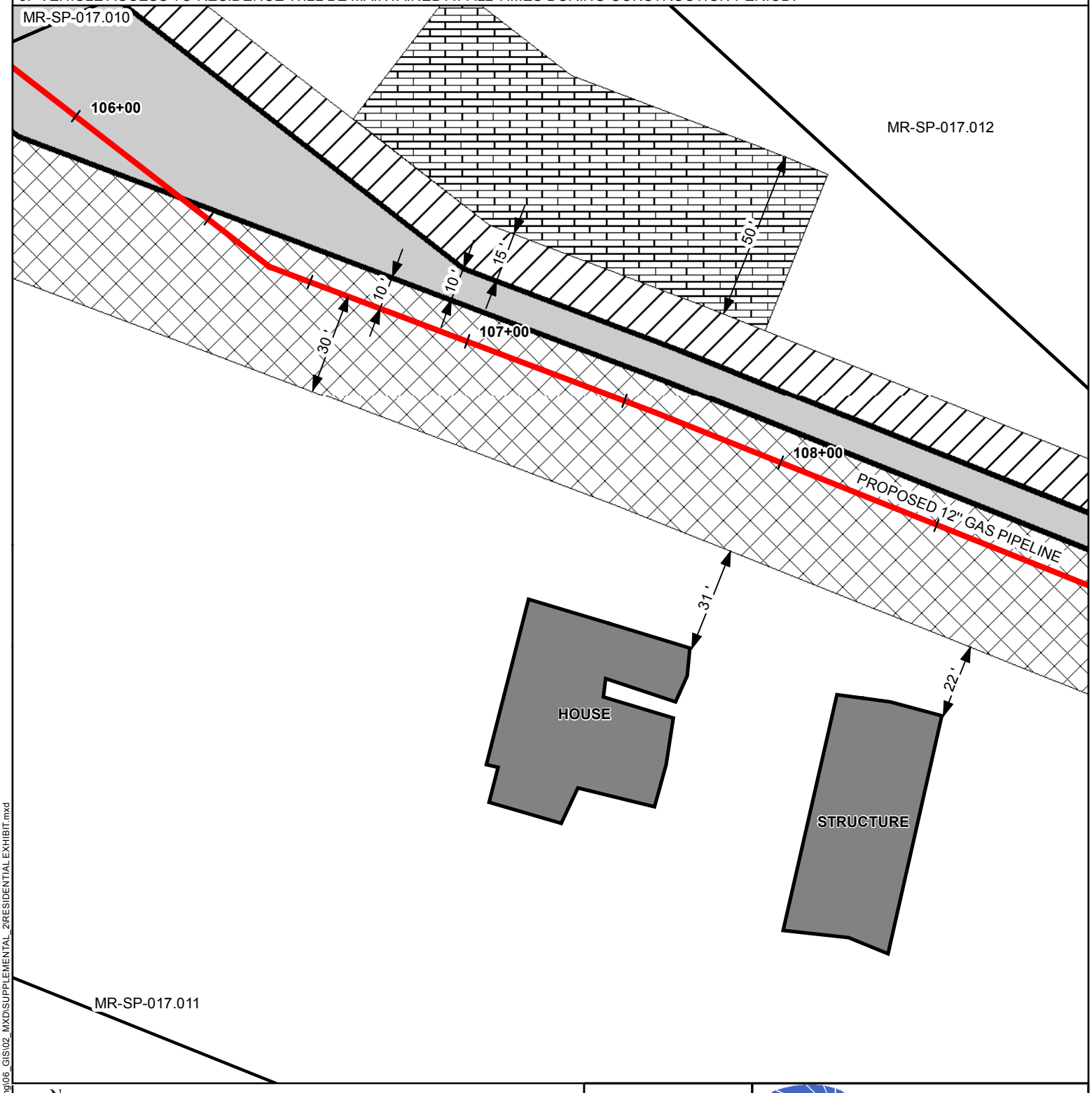

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FIGURE 8-2
RESIDENTIAL CONSTRUCTION TECHNIQUES
SPARTANBURG COUNTY, SOUTH CAROLINA

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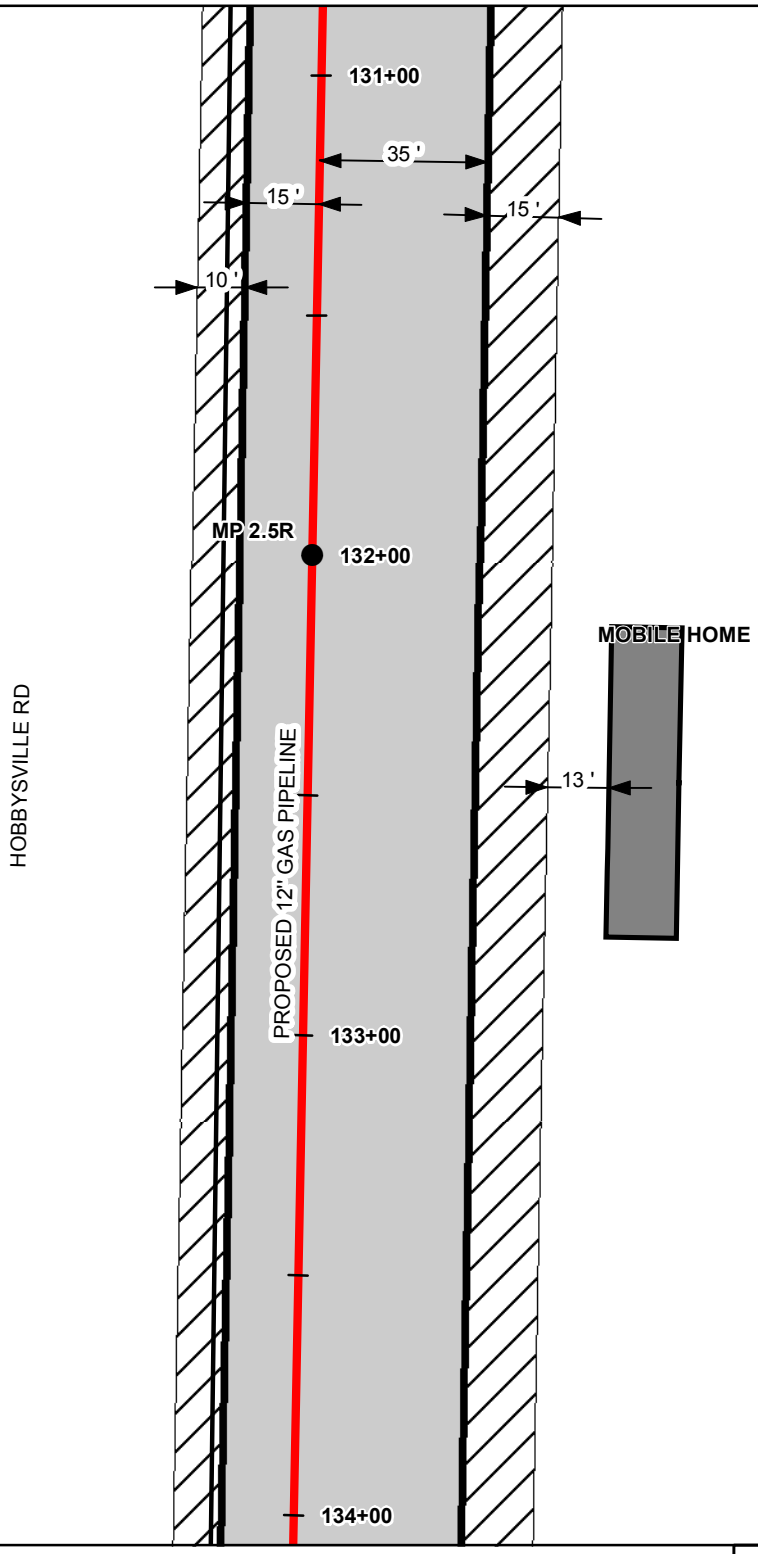

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RESIDENTIAL CONSTRUCTION TECHNIQUES
SPARTANBURG COUNTY, SOUTH CAROLINA

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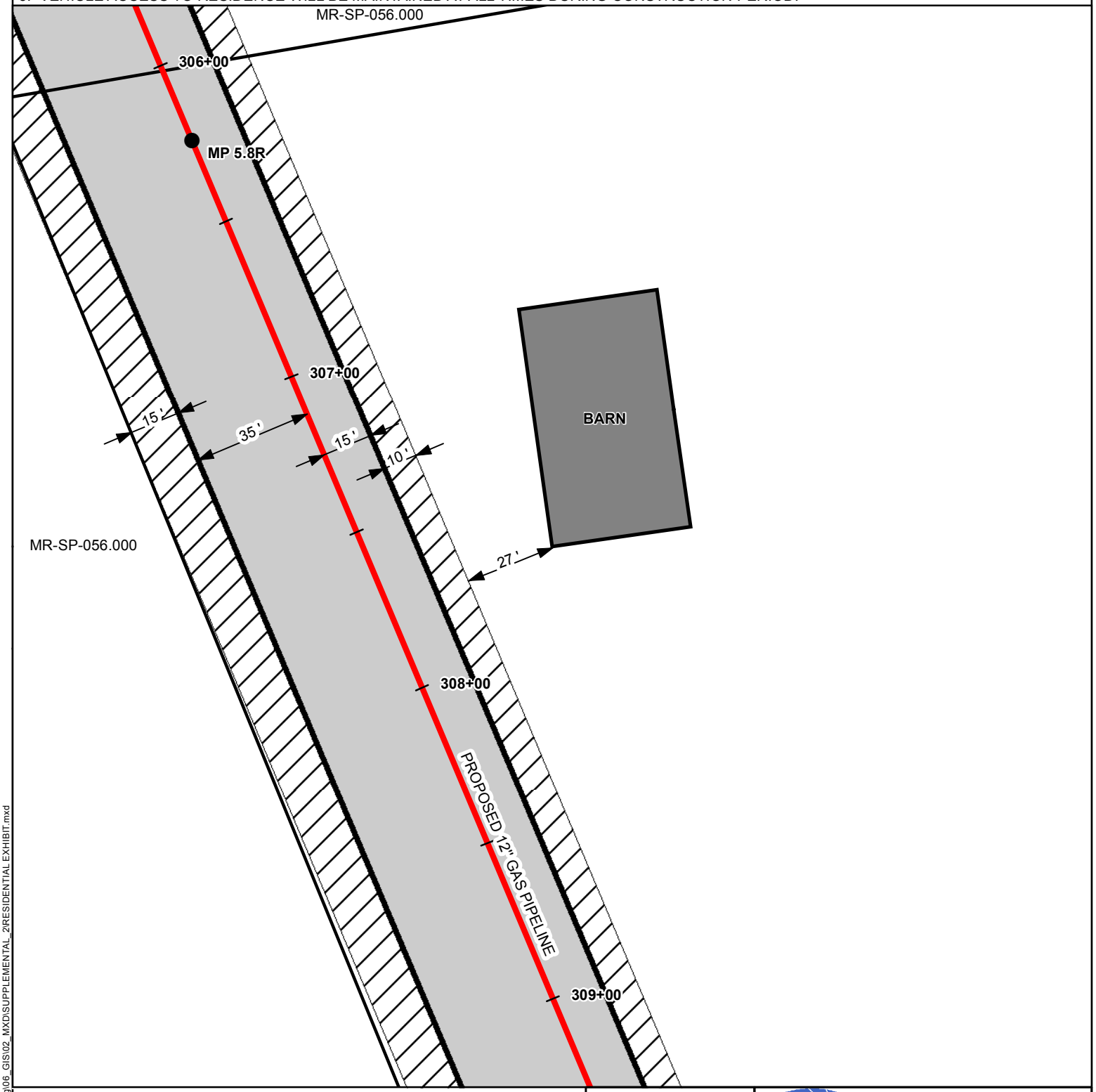

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SPARTANBURG COUNTY, SOUTH CAROLINA

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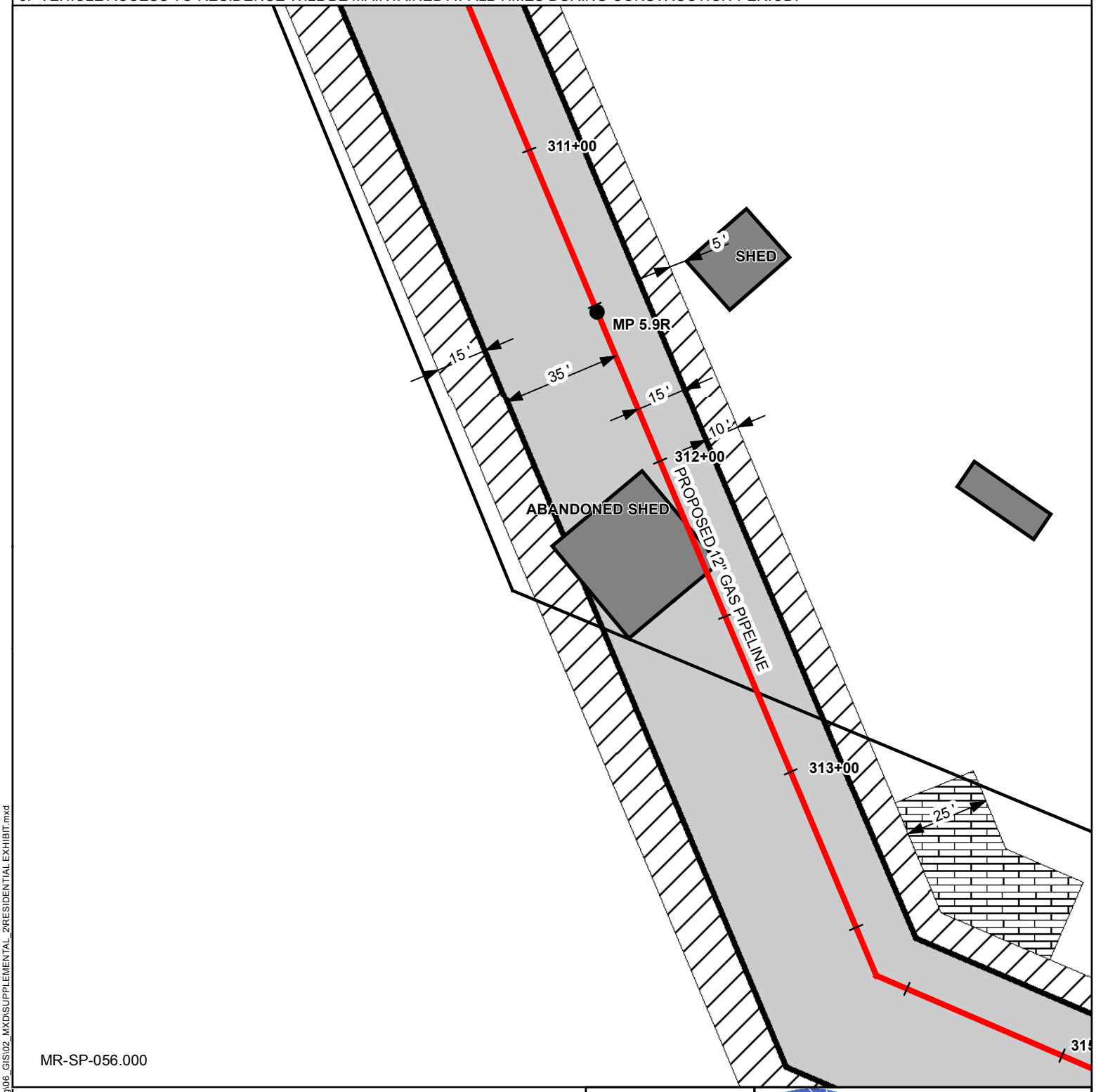

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SPARTANBURG COUNTY, SOUTH CAROLINA

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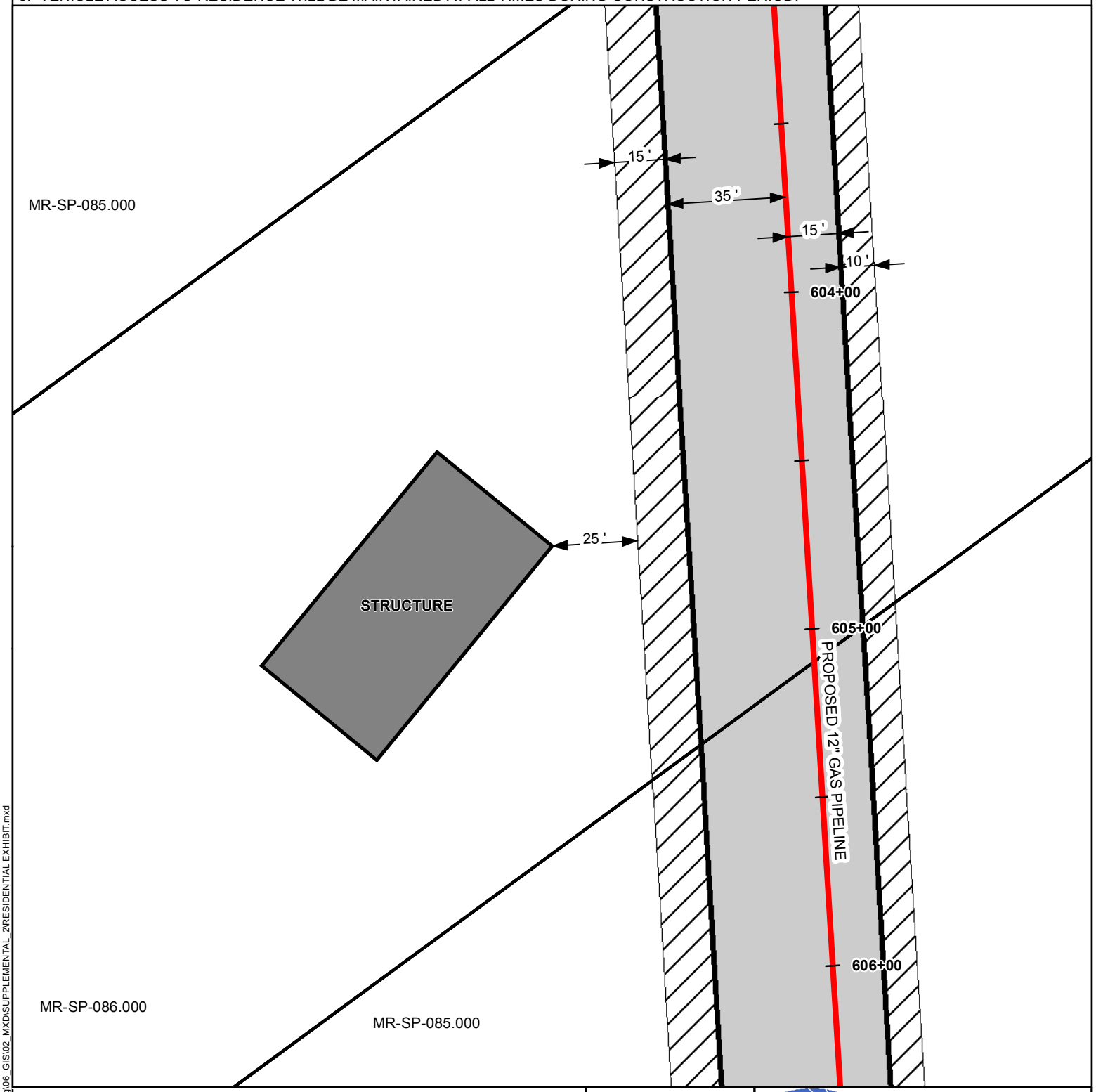

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RESIDENTIAL CONSTRUCTION TECHNIQUES
SPARTANBURG COUNTY, SOUTH CAROLINA

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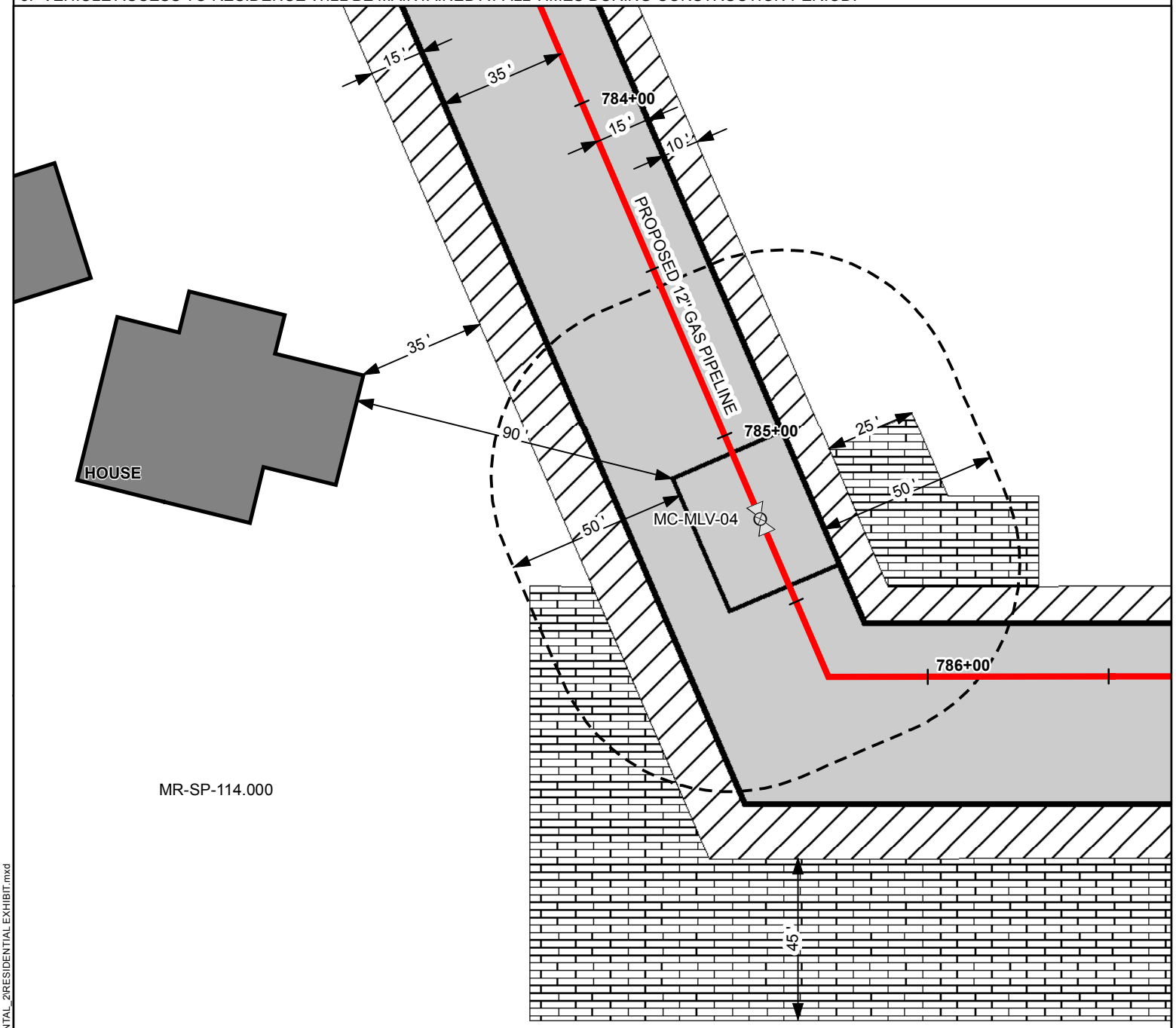

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SPARTANBURG COUNTY, SOUTH CAROLINA

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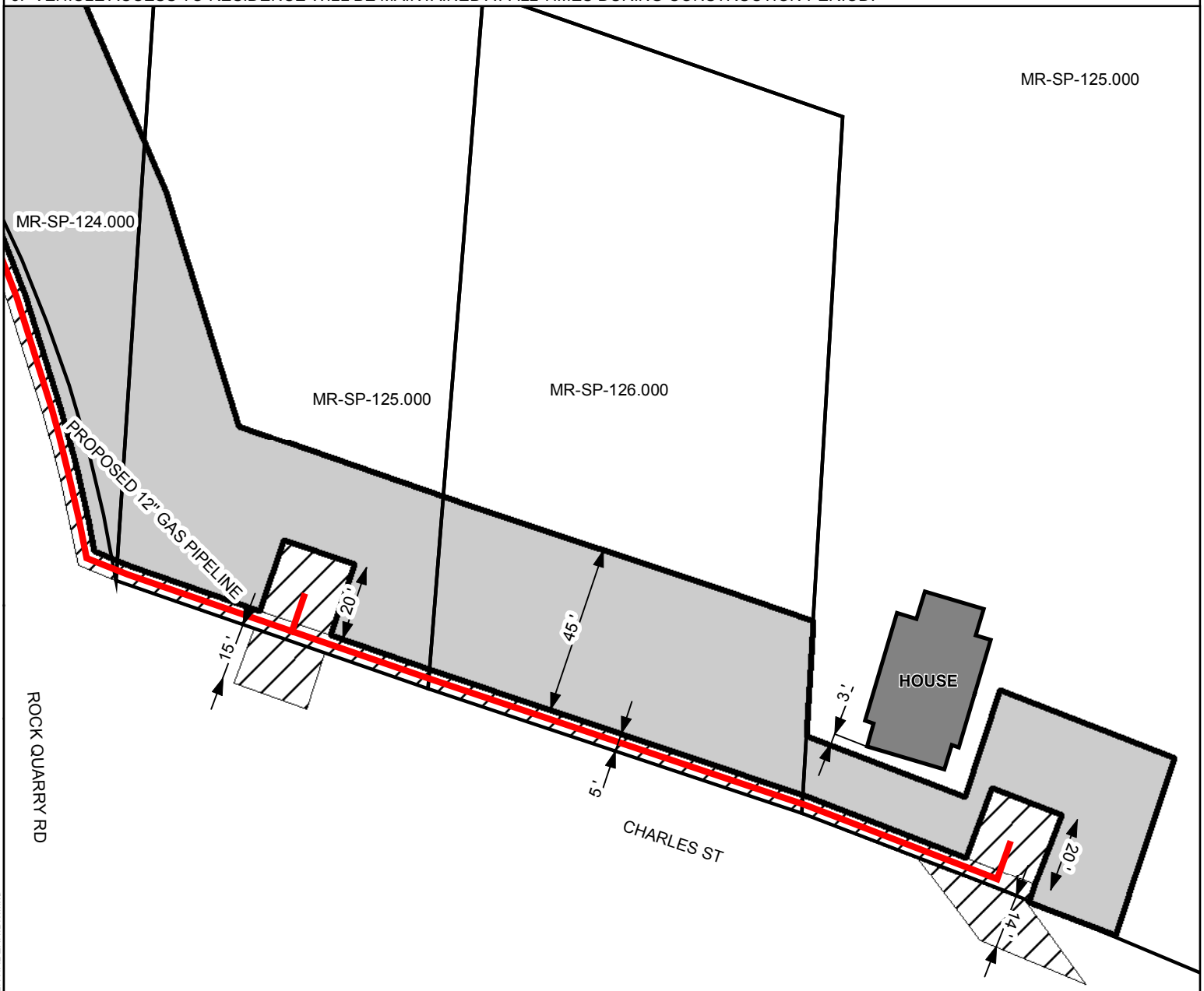

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SPARTANBURG COUNTY, SOUTH CAROLINA

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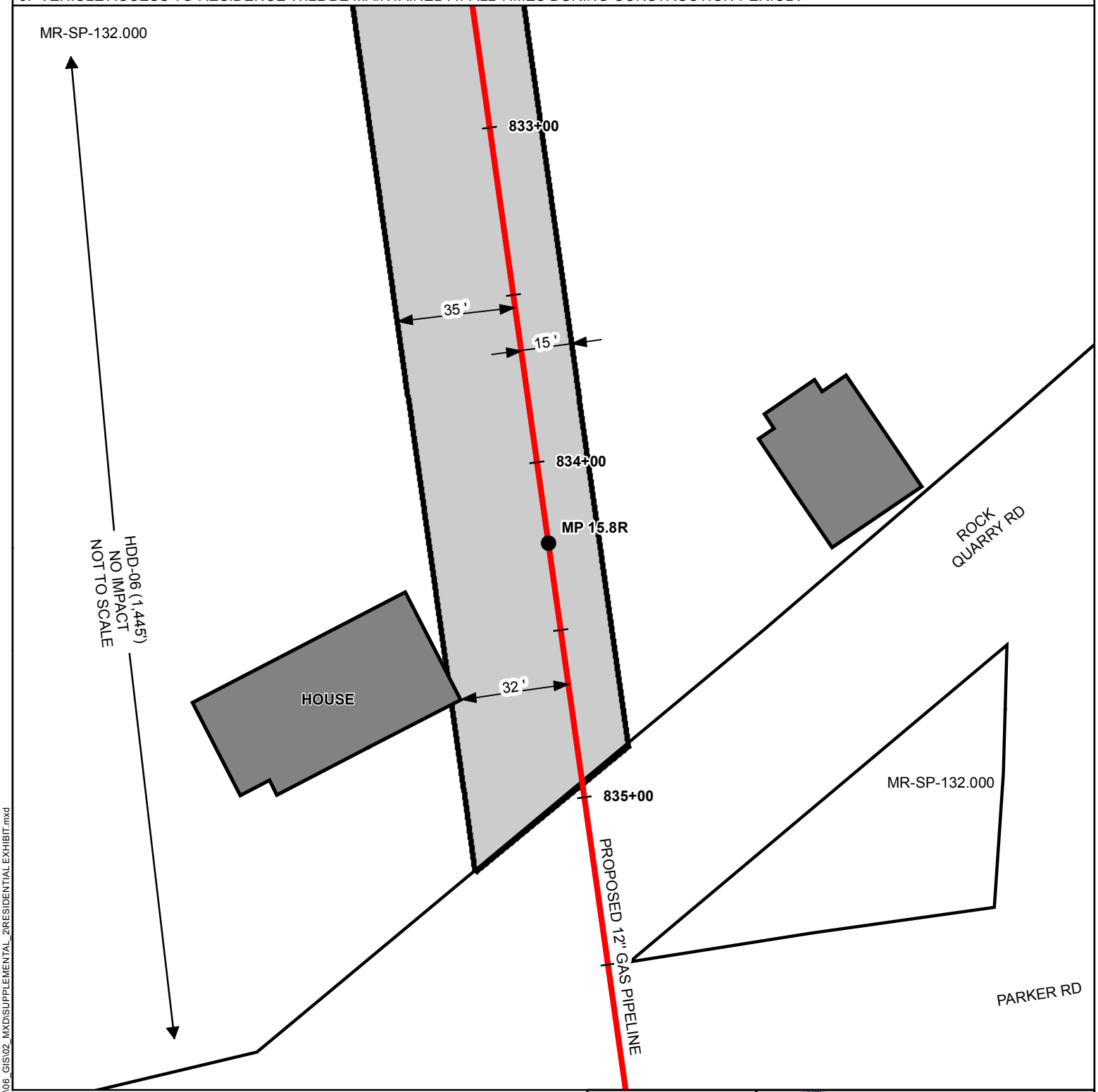

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SPARTANBURG COUNTY, SOUTH CAROLINA

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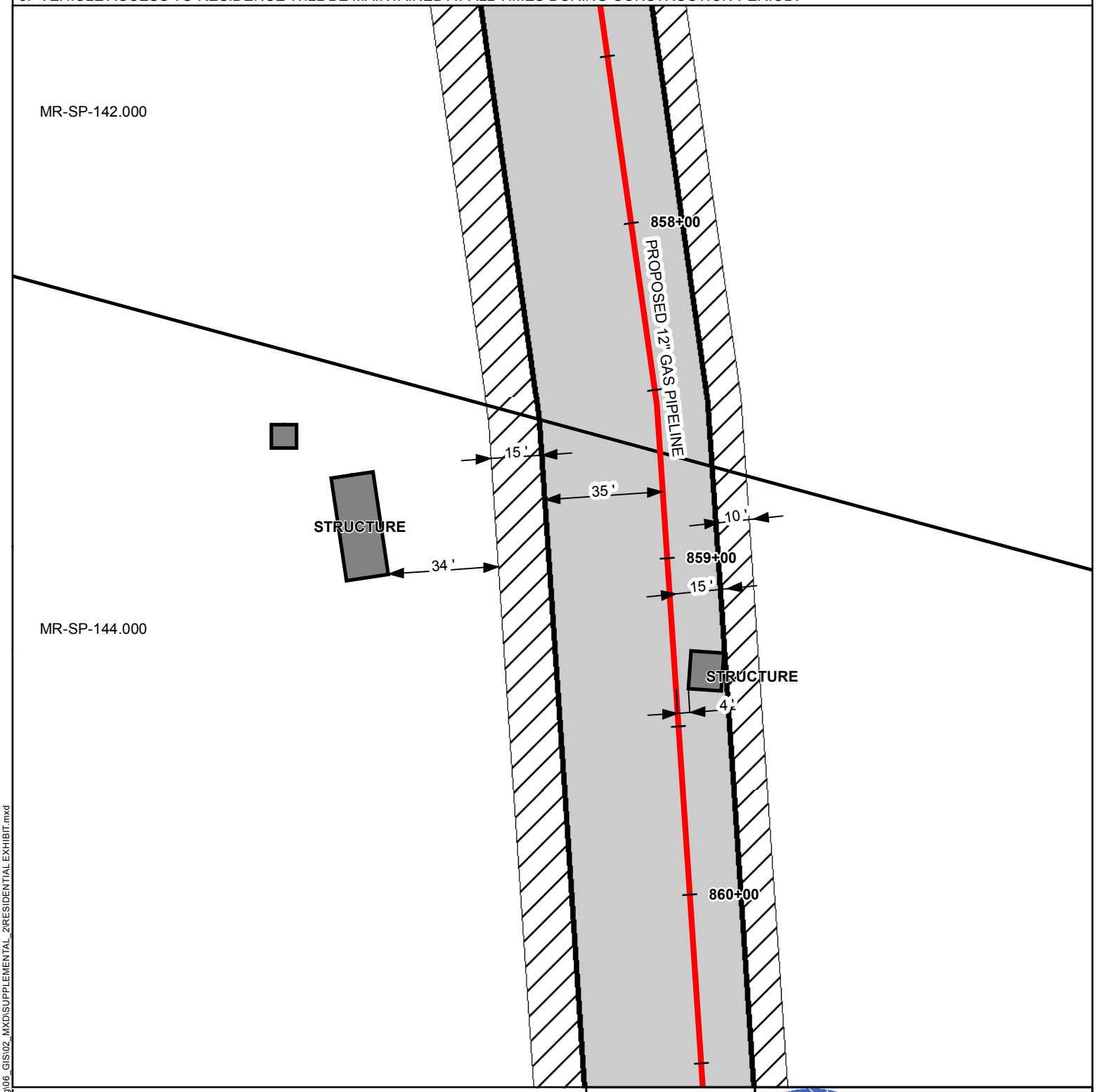

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SPARTANBURG COUNTY, SOUTH CAROLINA

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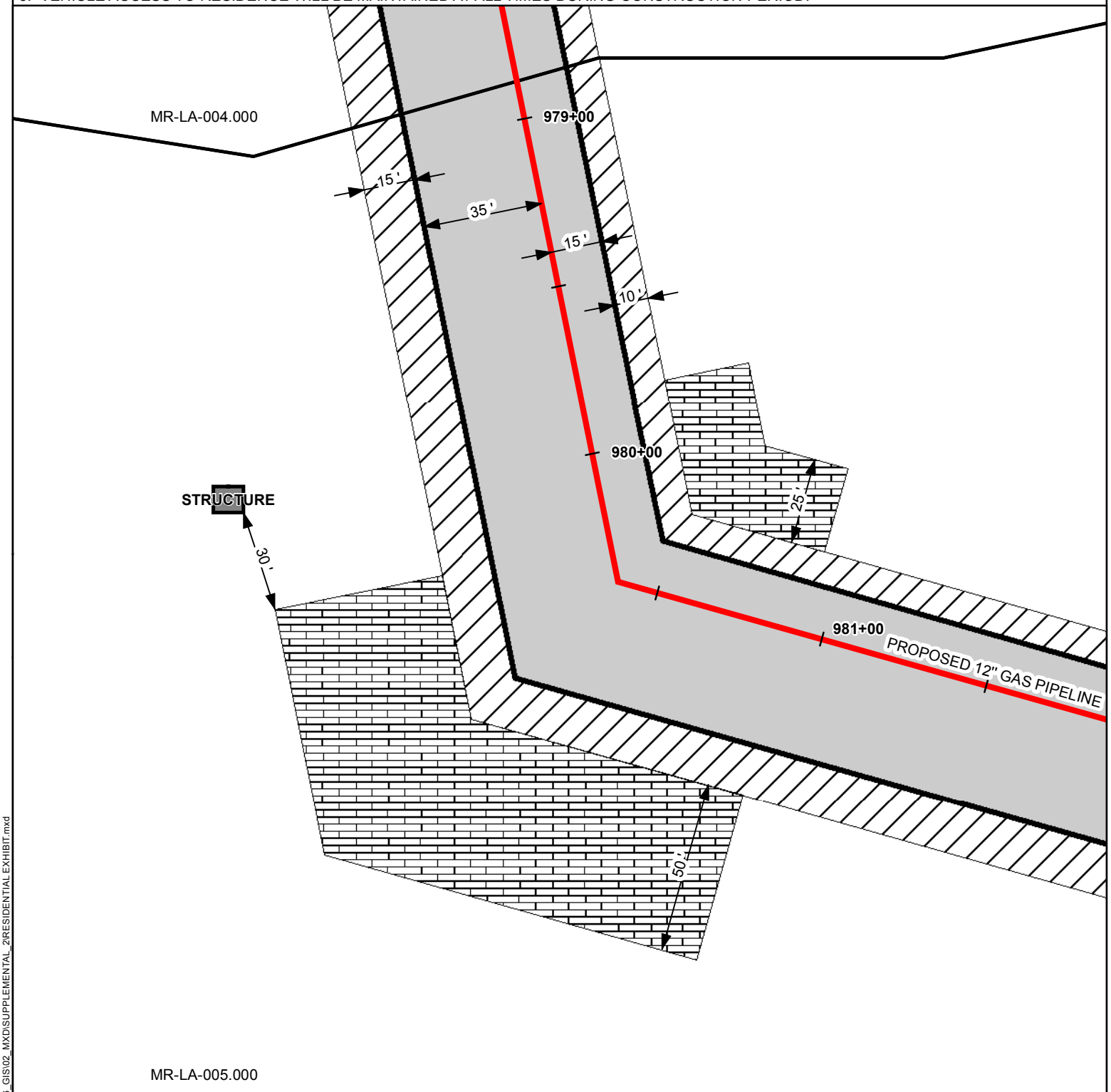

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FIGURE 8-2
RESIDENTIAL CONSTRUCTION TECHNIQUES
LAURENS COUNTY, SOUTH CAROLINA

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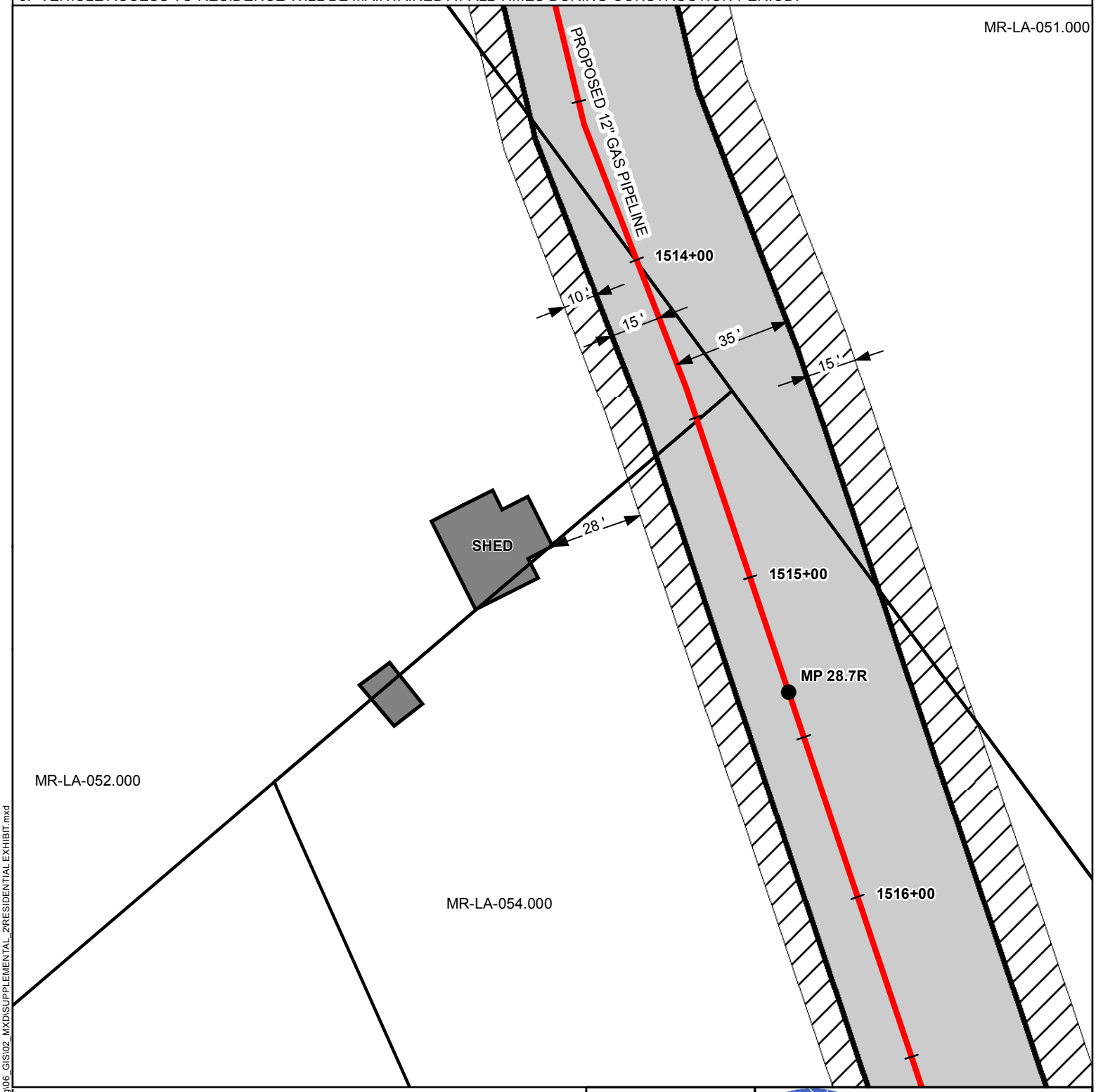

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- MLV #4 & #6 50' BUFFER
- PARCELS
- STRUCTURE
- MLV SITE
- PERMANENT EASEMENT
- TEMPORARY WORKSPACE
- ATWS
- EXISTING EASEMENT

URS

URS JOB NO. 60420377

DRAFT

08/19/2016
DATE

ANSELEM EZIKE
PROJECT ENGINEER

Dominion℠

DOMINION CAROLINA GAS TRANSMISSION, LLC
TRANSCO TO CHARLESTON PROJECT
MOORE TO CHAPPELLS PIPELINE
FIGURE 8-2
RESIDENTIAL CONSTRUCTION TECHNIQUES
LAURENS COUNTY, SOUTH CAROLINA

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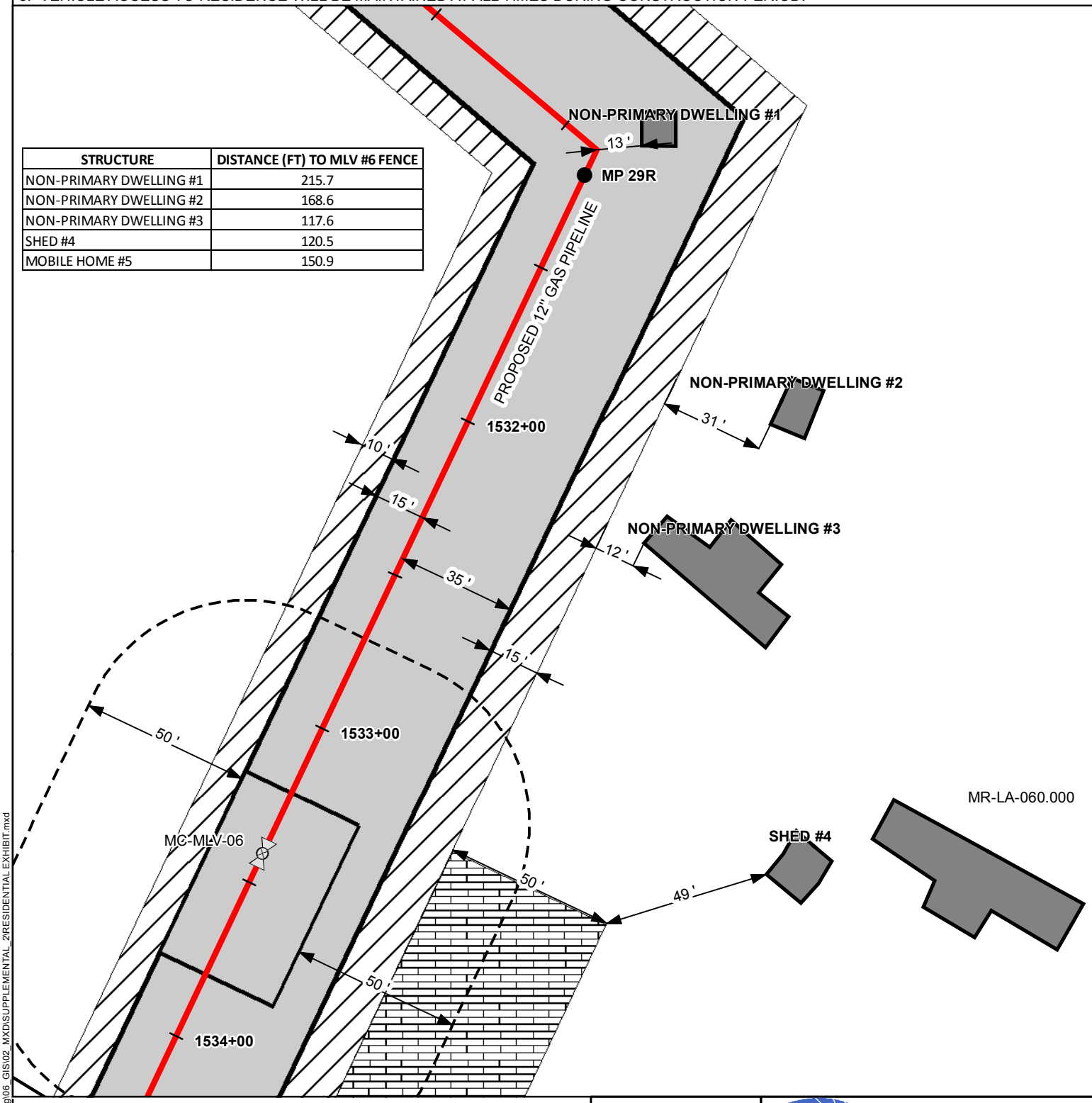
1. CONSTRUCTION TECHNIQUE WILL BE OPEN CUT.
2. ORANGE SAFETY FENCE WILL BE INSTALLED A DISTANCE OF 100 FEET ALONG THE EDGE OF THE CONSTRUCTION WORKSPACE OR ROW ON EITHER SIDE OF THE STRUCTURE.
3. VEHICLE ACCESS TO RESIDENCE WILL BE MAINTAINED AT ALL TIMES DURING CONSTRUCTION PERIOD.

STRUCTURE	DISTANCE (FT) TO MLV #6 FENCE
NON-PRIMARY DWELLING #1	215.7
NON-PRIMARY DWELLING #2	168.6
NON-PRIMARY DWELLING #3	117.6
SHED #4	120.5
MOBILE HOME #5	150.9



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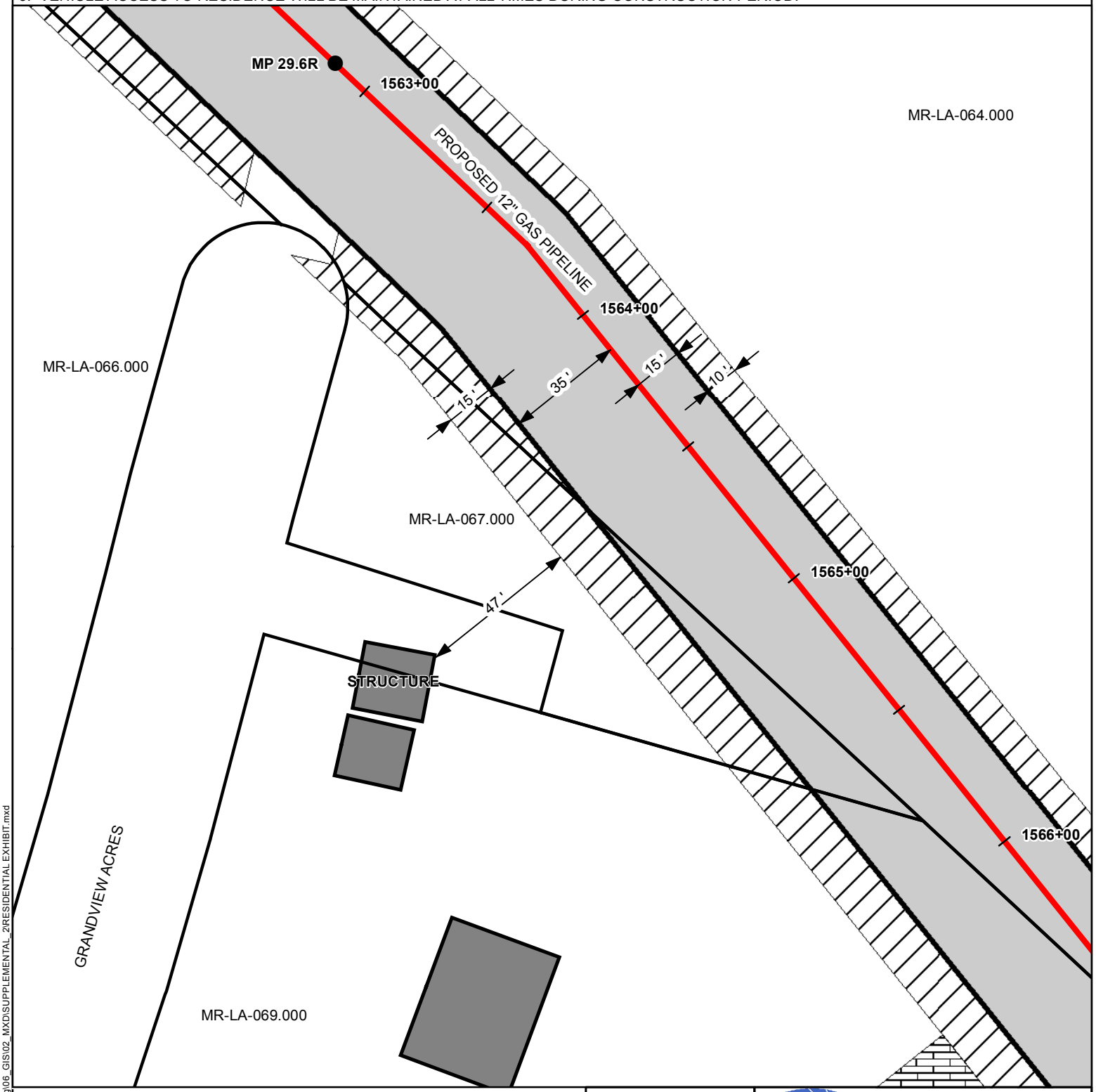

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0 20 40 80'

SCALE: 1 " = 40 '

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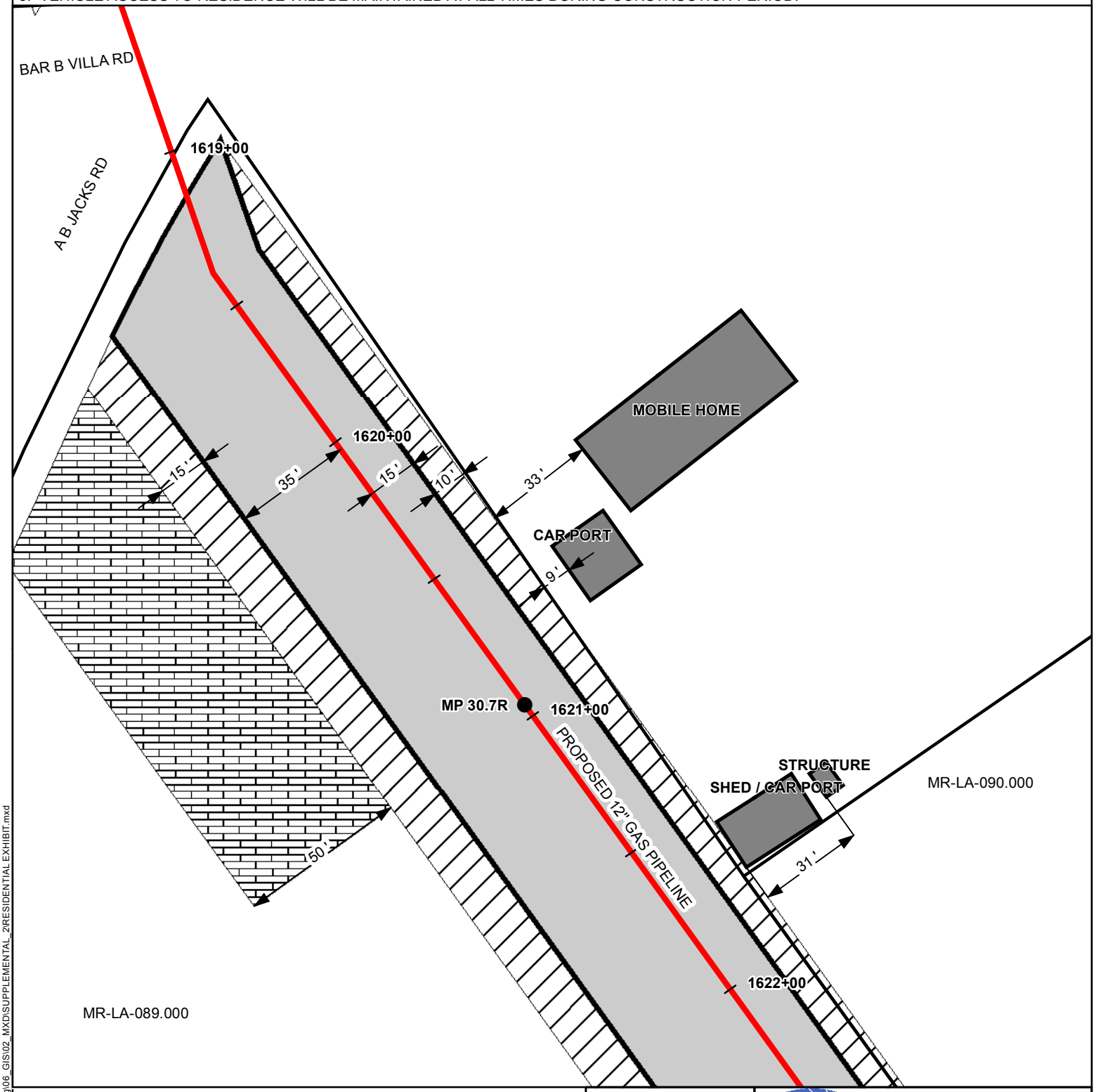

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LAURENS COUNTY, SOUTH CAROLINA

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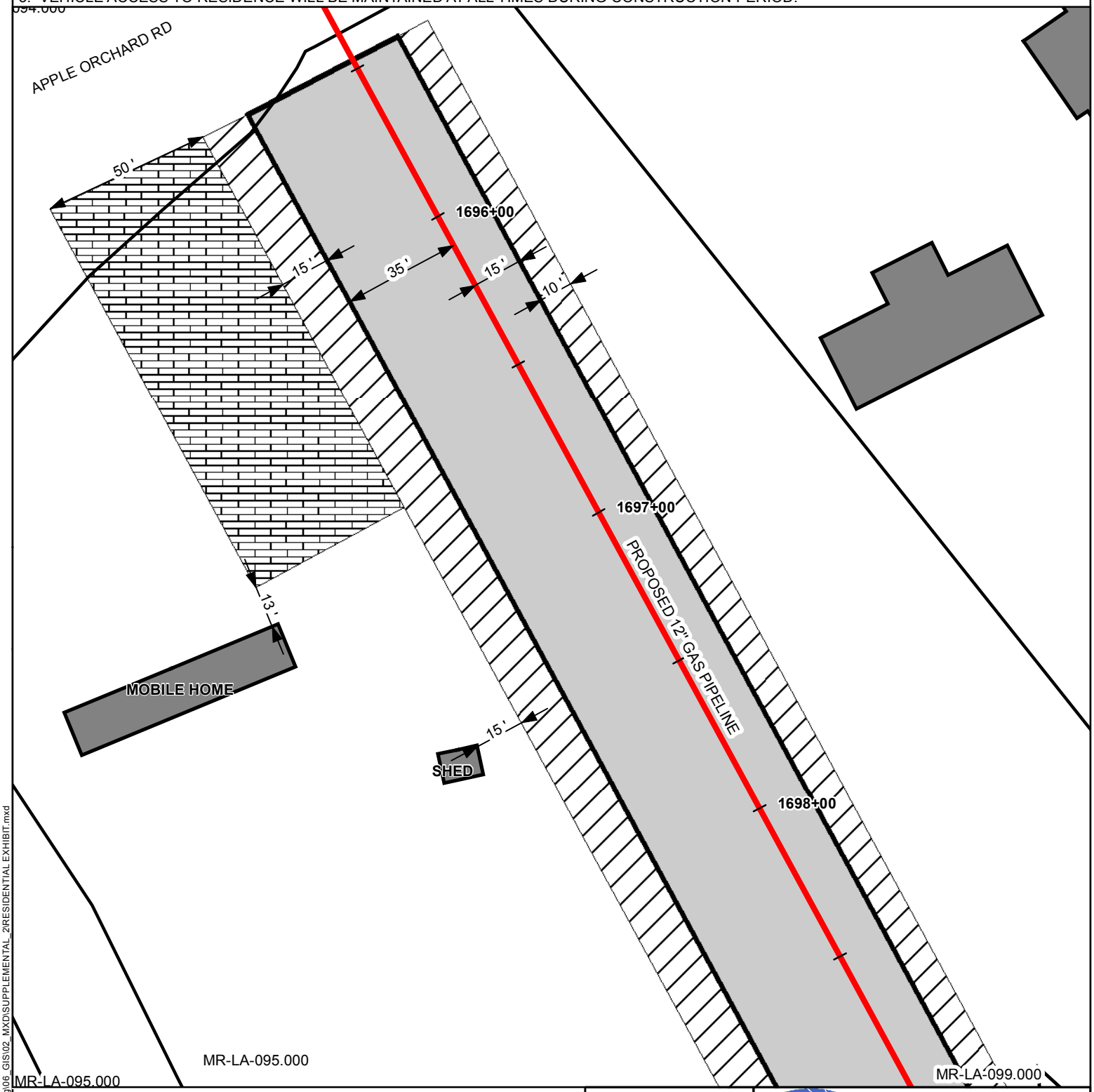

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LAURENS COUNTY, SOUTH CAROLINA

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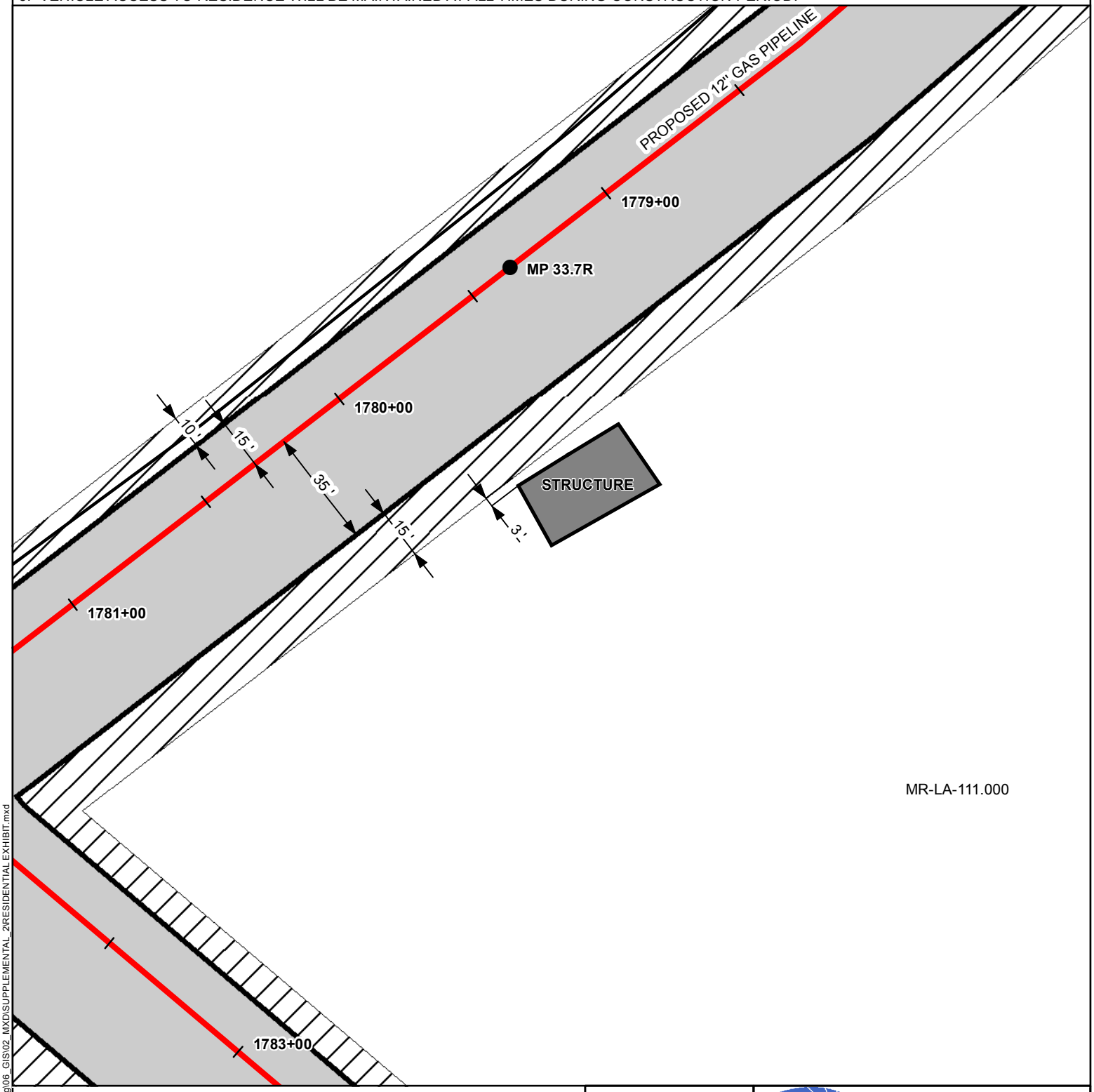

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LAURENS COUNTY, SOUTH CAROLINA

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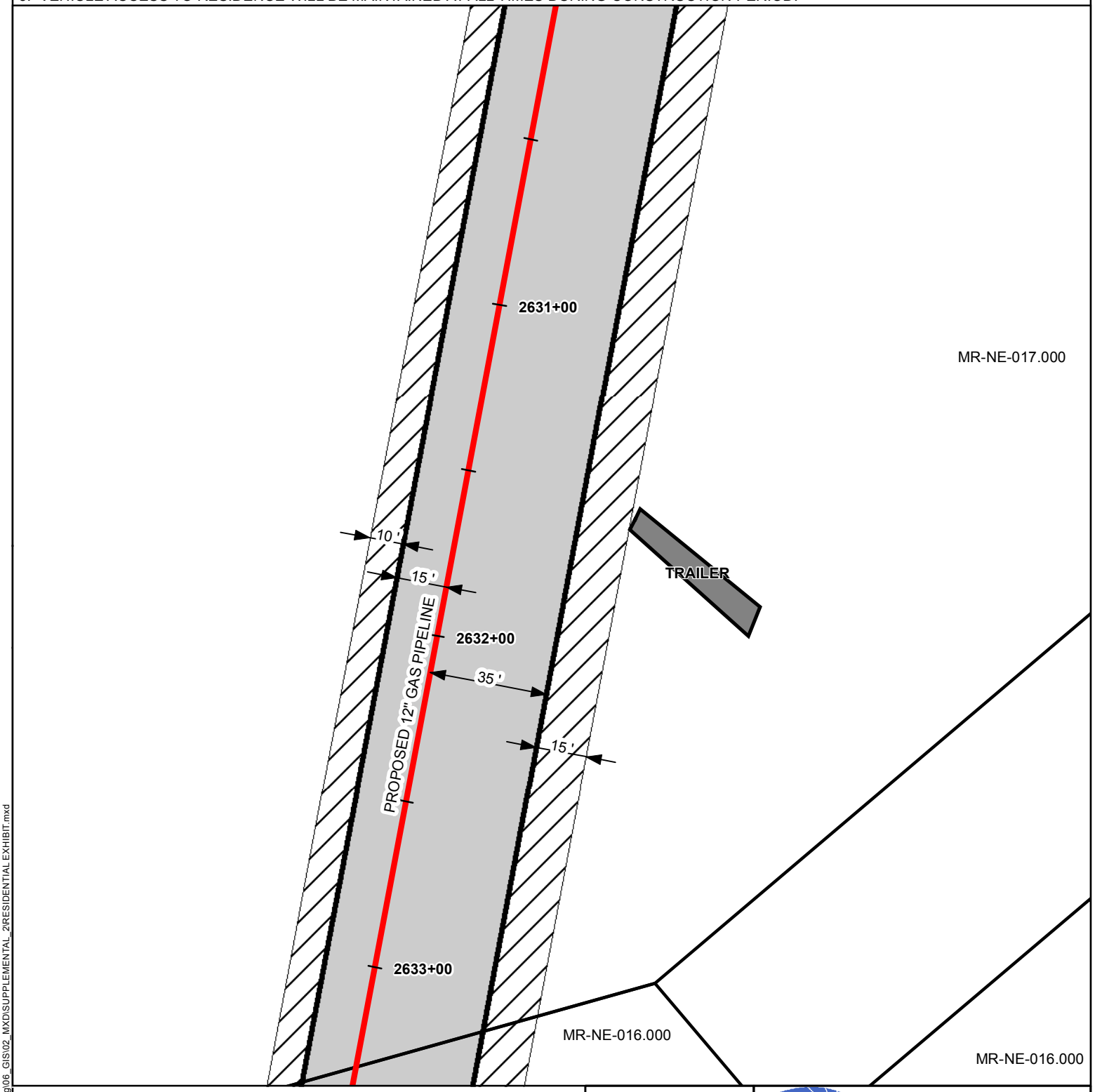

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FIGURE 8-2
RESIDENTIAL CONSTRUCTION TECHNIQUES
NEWBERRY COUNTY, SOUTH CAROLINA

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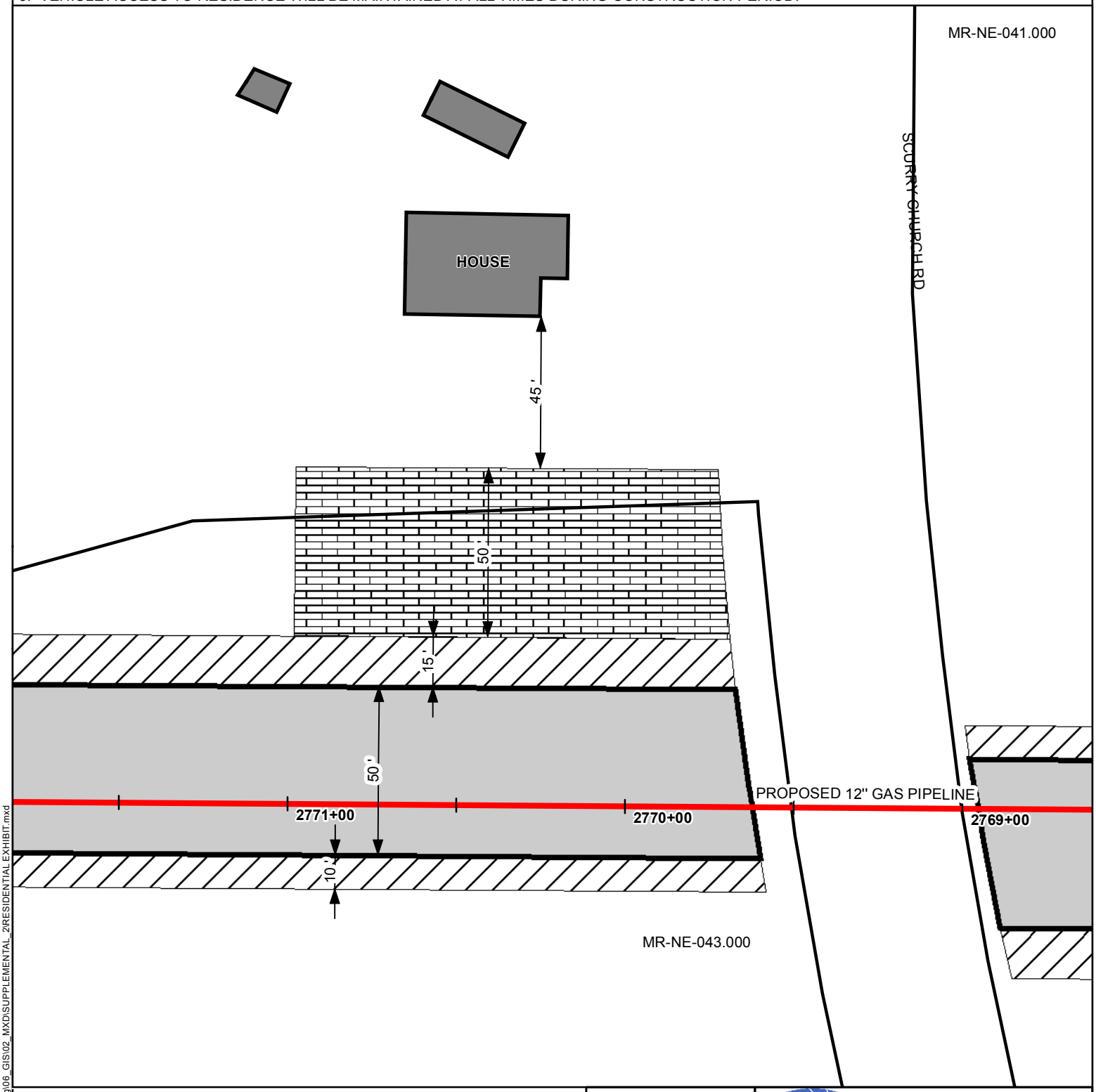

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NEWBERRY COUNTY, SOUTH CAROLINA

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