Federal Energy Regulatory Commission
Office of Energy Projects

January 2016

Columbia Gas Transmission, LLC **Docket No. CP15-150-000**

Line WB2VA Integrity Project

Environmental Assessment

Washington, DC 20426

Cooperating Agencies

U.S. Army Corps of Engineers
West Virginia Department of Natural Resources
West Virginia Department of Environmental Protection

FEDERAL ENERGY REGULATORY COMMISSION
WASHINGTON, D.C. 20426

OFFICE OF ENERGY PROJECTS

In Reply Refer To:
OEP/DG2E/Gas 1
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
Docket No. CP15-150-000

TO THE PARTY ADDRESSED:

The staff of the Federal Energy Regulatory Commission (FERC or Commission) has prepared an environmental assessment (EA) for the Line WB2VA Integrity Project, proposed by Columbia Gas Transmission, LLC (Columbia) in the above-referenced docket. The Line WB2VA Integrity Project would include modifications to Columbia's existing facilities at 17 sites in Hardy County, West Virginia, and Shenandoah, Page, Rockingham, and Greene Counties, Virginia. Proposed modifications include installation of pig launchers and receivers[1]; replacement of short sections of existing pipeline, mainline valves, and other appurtenant facilities; and abandonment of two existing 20-inch-diameter pipelines beneath the South Fork of the Shenandoah River that would be replaced with a new 24-inch-diameter pipeline. The purpose of the project is to allow the use of modern inline inspection devices and upgrade pipeline segments in compliance with U.S. Department of Transportation safety standards.

The EA assesses the potential environmental effects of the construction and operation of the Line WB2VA Integrity 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 U.S. Army Corps of Engineers, West Virginia Department of Natural Resources Wildlife Resources Section, and the West Virginia Department of Environmental Protection participated as cooperating agencies in the preparation of the EA. Cooperating agencies have jurisdiction by law or special expertise with respect to resources potentially affected by the proposal and participate in the NEPA analysis.

The FERC staff mailed copies of the EA to federal, state, and local government representatives and agencies; elected officials; environmental and public interest groups; Native American tribes; potentially affected landowners and other interested individuals and groups; and newspapers and libraries in the project area. In addition, the EA is

[1] A "pig" is a tool that the pipeline company inserts into and pushes through the pipeline for cleaning the pipeline, conducting internal inspections, or other purposes.

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 **February 27, 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 (CP15-150-000) 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 (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).[2] 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 that 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., CP15-150). 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 that allows you to keep track of all formal issuances and submittals in specific dockets. This can reduce the amount of time you spend researching proceedings by automatically providing you with notification of these filings, document summaries, and direct links to the documents. Go to www.ferc.gov/docs-filing/esubscription.asp.

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[2] See the previous discussion on the methods for filing comments.

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TECHNICAL ACRONYMS AND ABBREVIATIONS

ACHP	Advisory Council on Historic Preservation
APE	Area of Potential Effect
AQCR	Air Quality Control Region
amsl	above mean sea level
BA	biological assessment
CEQ	Council on Environmental Quality
Certificate	Certificate of Public Convenience and Necessity
CFR	Code of Federal Regulations
CO	carbon monoxide
CO_2	carbon dioxide
CO_2e	carbon dioxide equivalents
Columbia	Columbia Gas Transmission, LLC
Commission	Federal Energy Regulatory Commission
CWA	construction work area
EA	Environmental Assessment
ECS	*Environmental Construction Standards*
EI	Environmental Inspector
EM&CP	*Environmental Management & Construction Plan*
ESA	Endangered Species Act
FERC	Federal Energy Regulatory Commission
FERC Plan	FERC *Upland Erosion Control, Revegetation, and Maintenance Plan*
FERC Procedures	FERC *Wetland and Waterbody Construction and Mitigation Procedures*
g	gravity
HCA	high consequence areas
MLV	mainline valve
MSHCP	Multi-Species Habitat Conservation Plan
NAAQS	National Ambient Air Quality Standards
NEPA	National Environmental Policy Act of 1969
NGA	Natural Gas Act
NHPA	National Historic Preservation Act
NMFS	National Marine Fisheries Service
NPS	National Park Service
NOI	Notice of Intent
NO_x	nitrogen oxides
NRHP	National Register of Historic Places
O_3	ozone
OEP	Office of Energy Projects

PGA	peak ground acceleration
Project	Line WB2VA Integrity Project
PM_{10}	particles with an aerodynamic diameter less than or equal to 10 microns
$PM_{2.5}$	particles with an aerodynamic diameter less than or equal to 2.5 microns
Secretary	Secretary of the Commission
SHPO	state historic preservation office(r)
SO_2	sulfur dioxide
SPCC	*Spill Prevention, Containment, and Control Plan*
USACE	United States Army Corps of Engineers
USDOT	United States Department of Transportation
USEPA	United States Environmental Protection Agency
USFWS	United States Fish and Wildlife Service
USGS	United States Geological Survey
VDCR	Virginia Department of Conservation and Recreation
VDEQ	Virginia Department of Environmental Quality
VDGIF	Virginia Department of Game and Inland Fisheries
VDHR	Virginia Department of Historic Resources
VDOT	Virginia Department of Transportation
VOC	volatile organic compounds
WVDNR	West Virginia Department of Natural Resources
WVDEP	West Virginia Department of Environmental Protection

A. PROPOSED ACTION

1. Introduction

On April 2, 2015, Columbia Gas Transmission, LLC (Columbia) filed an application with the Federal Energy Regulatory Commission (Commission or FERC) in Docket No. CP15-150-000. Columbia seeks a Certificate of Public Convenience and Necessity (Certificate) and authorization under Section 7(b) and 7(c) of the Natural Gas Act (NGA) to abandon, construct, modify, and operate certain facilities in Hardy County, West Virginia and Shenandoah, Rockingham, Page, and Greene Counties, Virginia. Columbia's proposed project, referred to as the Line WB2VA Integrity Project (Project) would include the installation of pig launchers and receivers[3], mainline valves, and other appurtenant facilities, and replacement of short sections of existing pipeline. Also, Columbia would abandon in place two 20-inch-diameter pipelines beneath the South Fork of the Shenandoah River and replace them with a new 24-inch-diameter pipeline. To maintain service during the proposed pipeline replacement activities, Columbia would install temporary fittings and temporary bypass piping. Once the installation of the new segment of pipeline is complete and tied-in to the existing WB2VA pipeline, the temporary bypass piping would be removed.

We[4] prepared this Environmental Assessment (EA) in compliance with the requirements of the National Environmental Policy Act of 1969 (NEPA), the Council on Environmental Quality (CEQ) regulations for implementing NEPA under Title 40 of the Code of Federal Regulations (CFR) Parts 1500 1508 (40 CFR 1500-1508), and the Commission's implementing regulations under 18 CFR 380.

The FERC is the lead federal agency for the preparation of this EA. The U.S. Army Corps of Engineers (USACE), Norfolk District, the West Virginia Department of Natural Resources (WVDNR) Wildlife Resources Section, and the West Virginia Department of Environmental Protection (WVDEP) are cooperating agencies that assisted us in preparing this EA because they have jurisdiction by law or special expertise with respect to environmental impacts associated with Columbia's proposal.

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

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

[3] A "pig" is a tool that the pipeline company inserts into and pushes through the pipeline for cleaning the pipeline, conducting internal inspections, or other purposes.

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

The EA will be used by the Commission in its decision-making process to determine whether to authorize Columbia's proposal. Approval would be granted if, after consideration of both environmental and non-environmental issues, the Commission finds the Project is in the public interest.

2. Purpose and Need

According to Columbia, the purpose of the Project is to increase safety and reliability of the pipeline in compliance with U.S. Department of Transportation (USDOT) minimum safety standards (49 CFR Part 192) while maintaining uninterrupted natural gas service to Columbia's customers. This Project is part of Columbia's multi-year Modernization Program, which is a system-wide plan to address Columbia's aging infrastructure and prioritize portions of Columbia's system needing upgrades for safety and reliability reasons. Columbia's WB2VA pipeline was constructed in the early 1950s, and the mainline valves, as well as the dual 20-inch-diameter pipeline river crossing, were not designed to allow the passage of modern in-line inspection tools known as "smart pigs." Smart pigs travel through the pipeline to measure irregularities that may represent corrosion, cracks, and other defects of the pipe. The proposed modifications would make it possible to run the smart pigs and assess the condition of the pipeline. No new customers are planned, and there would be no change to the existing capacity.

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. Section 7(b) of the NGA specifies that no natural gas company shall abandon any portion of its facilities subject to the Commission's jurisdiction without the Commission first finding that the abandonment will not negatively affect the present or future public convenience and necessity.

3. Public Review and Comment

On April 15, 2015, the Commission issued a *Notice of Application* for the Project under Docket No. CP15-150-000. On May 14, 2015, we issued a *Notice of Intent to Prepare an Environmental Assessment for the Proposed WB2VA Integrity Project and Request for Comments on Environmental Issues* (NOI). The NOI was published in the Federal Register and was mailed to 163 interested parties, including federal, state, and local government representatives and agencies; elected officials; affected landowners; environmental and public interest groups; potentially interested Native American tribes; other interested parties; and local libraries and newspapers.

The Commission received 13 comment letters during the scoping period. Written comments were received from two federal agencies (United States Fish and Wildlife Service [USFWS] and National Park Service Shenandoah National Park [NPS]), seven state agencies (the Virginia Department of Conservation and Recreation [VDCR], VDCR Division of Planning and Recreation Resources; Virginia Department of Environmental Quality [VDEQ], Virginia Department of Historic Resources [VDHR], Virginia Department of Transportation [VDOT],

West Virginia Department of Environmental Protection [WVDEP], West Virginia Division of Natural Resources [WVDNR]), and four comment letters representing four non-governmental organizations (Allegheny Defense Project, Heartwood, Ohio Valley Environmental Coalition, and Wild Virginia). The issues identified in the environmental comments are summarized in table 1 and addressed, as applicable, in relevant sections of this EA.

Table 1
Issues Identified During the Public Scoping Process

Issue	EA Section Addressing Issue
General Project Description	
Columbia's Modernization Program requires a Programmatic EIS	A.3
FERC and Columbia must disclose reasonably foreseeable activities	A.3
Indirect effects of shale extraction	A.3
Geology and Soils	
Steep slopes and slope-prone soils	B.1
Abandoned, active, and reclaimed mine lands	B.1
Karst topography	B.1
Water Resources, Fisheries, and Wetlands	
Impacts on subterranean natural resources	B.2.1
Impacts on Scenic Rivers	B.2.2
Stream, Wetland, and Mitigation Site Avoidance	B.2.3
West Virginia Tier 3 waters	B.2.2
Vegetation	
Introduction of invasive species	B.3.1
Wildlife and Threatened and Endangered Species	
Impacts on wildlife habitat	B.3.3
Federal and state endangered species	B.3.4
Land Use, Visual Resources, and Recreation	
Impacts on public lands	B.4.3
Impacts on recreation and environmental programs, including: Virginia Scenic Rivers; Trails, Greenways, and Blueways; Virginia State Park Master Planning; and State Park Design and Construction	B.4.3
Impacts on National Parks and National Forest Service Land	B.4.3, B.4.4
Impacts on roads	A.5.2, A.7.1
Cultural Resources	
Impacts on historic properties	B.5
Air Quality and Noise	
Air quality	B.6.1
Cumulative Impacts	
Indirect and cumulative effects of shale extraction in the Marcellus and Utica shale formations	A.3, B.8

The combined comments from Allegheny Defense Project, Heartwood, Ohio Valley Environmental Coalition, and Wild Virginia (NGOs) state that FERC should prepare a Programmatic Environmental Impact Statement (EIS) to analyze the impacts of Columbia's Modernization Program. Columbia states that it developed a Modernization Program to address its aging infrastructure, enhance pipeline safety, and increase customer service reliability across its 12,000-mile pipeline system. Other potential Modernization Program projects could span as many as six states, on a variety of different mainlines, and be implemented over a span of 10-15 years. Columbia states that the projects were identified through a risk-based prioritization process and are subject to change in time, scope, and location.

In a 2013 Settlement Order, the Commission approved a capital cost recovery mechanism agreement between Columbia and its customers, allowing Columbia to recover the costs of eligible pipeline safety and reliability upgrades on its system without undertaking a general rate case.[5] In the 2013 Settlement Order, the Commission did not authorize the Modernization Program, nor did it authorize any specific pipeline projects identified as part of the Modernization Program.

Additionally, Columbia's Modernization Program does not constitute a series of "connected," "cumulative," or "similar" actions as these terms are specifically defined by NEPA, 42 U.S.C. 4321-4370h (2012), that would require a Programmatic EIS. Each project in the Modernization Program has independent utility and is being undertaken to address a specific safety, reliability, or efficiency objective, and Columbia would undertake each project regardless of whether the other projects in the program were constructed.

The scope, scale, timing, and ultimate completion of each project planned under the Modernization Program is variable and can change at Columbia's discretion. Given the substantial distances and length of time of the program, and lack of detail needed to assess potential impacts, we conclude that a programmatic review of Columbia's Modernization Program is not required. The Commission previously concluded that a Programmatic EIS also is not warranted.[6]

We also received comments from the NGOs regarding the potential indirect and cumulative effects associated with production of natural gas from shale formations by hydraulic fracturing ("fracking"). Our authority under the NGA relates only to natural gas facilities that are involved in interstate commerce. The permitting of gas extraction, including fracking, is under the jurisdiction of the state agencies where those facilities are located. Thus, the facilities associated with the production of natural gas are not under FERC jurisdiction. CEQ regulations require agencies to consider the indirect impacts of proposed actions. Indirect impacts are "caused by the proposed action" and occur later in time or farther removed in distance than direct project impacts, but are still "reasonably foreseeable."[7] For an agency to include consideration of an impact in its NEPA analysis as an indirect effect, approval of the proposed project and the related secondary effect must be causally related.

[5] *Columbia Gas Transmission, LLC*, 142 FERC ¶ 61,062 (2013) (Settlement Order)
[6] *Columbia Gas Transmission, LLC*, 152 FERC ¶ 61,131 (2015) (Order Denying Rehearing and Stay)
[7] 40 C.F.R. §1508.8(b) (2015).

We find no causal link between natural gas production and the proposed Project. The Project principally involves facility replacements, modifications, and safety upgrades. No new customers are planned, and there would be no change to the existing capacity as a result of the Project. Therefore, natural gas production and hydraulic fracturing are not considered in this EA as an indirect effect of the proposed action.

CEQ defines "cumulative impact" as "the impact on the environment which results from the incremental impact of the action [being studied] when added to other past, present, and reasonably foreseeable future actions . . . ."[8] Consistent with CEQ guidance, in order to determine the scope of a cumulative impacts analysis for each project, Commission staff establishes a "region of influence" in which various resources may be affected by both a proposed project and other past, present, and reasonably foreseeable future actions. As part of our analysis of cumulative impacts in section B.8 of this EA, we did not identify any natural gas production projects within the region of influence for any resource analyzed.

4. Proposed Facilities

The Project would consist of the following facilities:

West Virginia

- **Lost River Compressor Station** (Hardy County) - installation of a bi-directional pig launcher/receiver, two temporary stopple fittings and temporary bypass piping, and replacement of about 300 feet of 24-inch-diameter pipeline;

- **Drip #1** (Hardy County) - removal of an existing underslung drip vessel, installation of two temporary stopple fittings and temporary bypass piping, and replacement of about 20 feet of 24-inch-diameter pipeline;

- **Drip #2** (Hardy County) - removal of an existing underslung drip vessel, installation of two temporary stopple fittings and temporary bypass piping, and replacement of about 20 feet of 24-inch-diameter pipeline.

Virginia

- **Basye Launcher** (Shenandoah County) - installation of a 24-inch-diameter mainline valve setting, and two temporary stopple fittings and temporary bypass piping;

- **Orkney Main Line Valve** (Shenandoah County) - installation of a 24-inch-diameter main line valve;

- **Mt. Jackson Valve Site** (Shenandoah County) - installation of permanent bypass piping and a valve extension;

[8] 40 C.F.R. §1508.7 (2015).

- **Howell Metals Valve Site** (Shenandoah County) - installation of permanent bypass piping and a valve extension;

- **New Market Valve Site** (Shenandoah County) - installation of permanent bypass piping and a valve extension;

- **Harrisonburg Main Line Valve** (Rockingham County) - replacement of the existing 24-inch-diameter plug valve with a 24-inch-diameter full opening ball valve and associated facilities, two temporary stopple fittings and temporary bypass piping;

- **Smith Creek Receiver** (Rockingham County) - installation of a 24-inch-diameter mainline valve setting and associated facilities; and two temporary stopple fittings and temporary bypass piping;

- **Hensley Hollow Receiver** (Rockingham County)- replacement of multiple valves and associated facilities, two temporary stopple fittings and temporary bypass piping;

- **Hensley Hollow Main Line Valve** (Rockingham County) - replacement of a 24-inch-diameter mainline valve setting;

- **South Fork Shenandoah River Crossing** (Page County) - abandonment in place of the existing dual 20-inch-diameter pipeline, installation of a new 24-inch-diameter pipeline beneath the South Fork of the Shenandoah River and continuing south 1,250 feet, installation of four temporary stopple fittings and temporary bypass piping;

- **Grove Hill Launcher** (Page County) - replacement of multiple valves and associated facilities, installation of two temporary stopple fittings and temporary bypass piping;

- **Lydia Launcher** (Greene County) - replacement of multiple valves, two temporary stopple fittings and temporary bypass piping;

- **Swift Run Crossover** (Greene County) - removal of valves and associated facilities; and

- **Bickers Compressor Station** (Greene County) - installation of one 24-inch x 30-inch bi-directional pig launcher/receiver, temporary bypass piping, replacement of approximately 680 feet of 24-inch-diameter pipe.

Figure 1 below shows the general Project location. Detailed location maps are included in appendix A.

5. Land Requirements

Construction of the Project would affect 37.9 acres of land. Construction of the Project would require disturbance within existing facilities, existing permanent rights-of-way, additional temporary workspace, off-site staging areas, and access roads. A small section of new permanent right-of-way would be required at the South Fork Shenandoah River crossing.

Following construction, 11.9 acres would revert to pre-construction conditions and uses. The remaining 26.0 acres would be retained for operation of the Project. In total, the new permanent easement for operation of the Project would be 1.0 acre.

Approximately 6.5 acres of additional temporary workspace and 0.1 acre of temporary access road would be allowed to revert to pre-construction conditions. With the exception of the South Fork Shenandoah River crossing, Columbia would utilize areas within the fenced boundaries of the existing facilities and the existing right-of-way for materials staging and construction activities, or previously disturbed land immediately adjacent to these facilities. The South Fork Shenandoah River crossing would require 6.6 acres for construction. Of the 6.6 acres, 2.5 acres consists of existing right-of-way and 1.0 acre would be retained as new right-of-way. Upon Project completion, the remaining 3.1 acres would be allowed to revert to pre-construction conditions. Land requirements for the Project are summarized in table 2.

Although Columbia has identified areas where additional temporary workspace would be required, additional or alternative areas could be identified in the future due to changes in site-specific construction requirements. Columbia would be required to file information on each of those areas for review and approval prior to use.

Figure 1: Project Overview

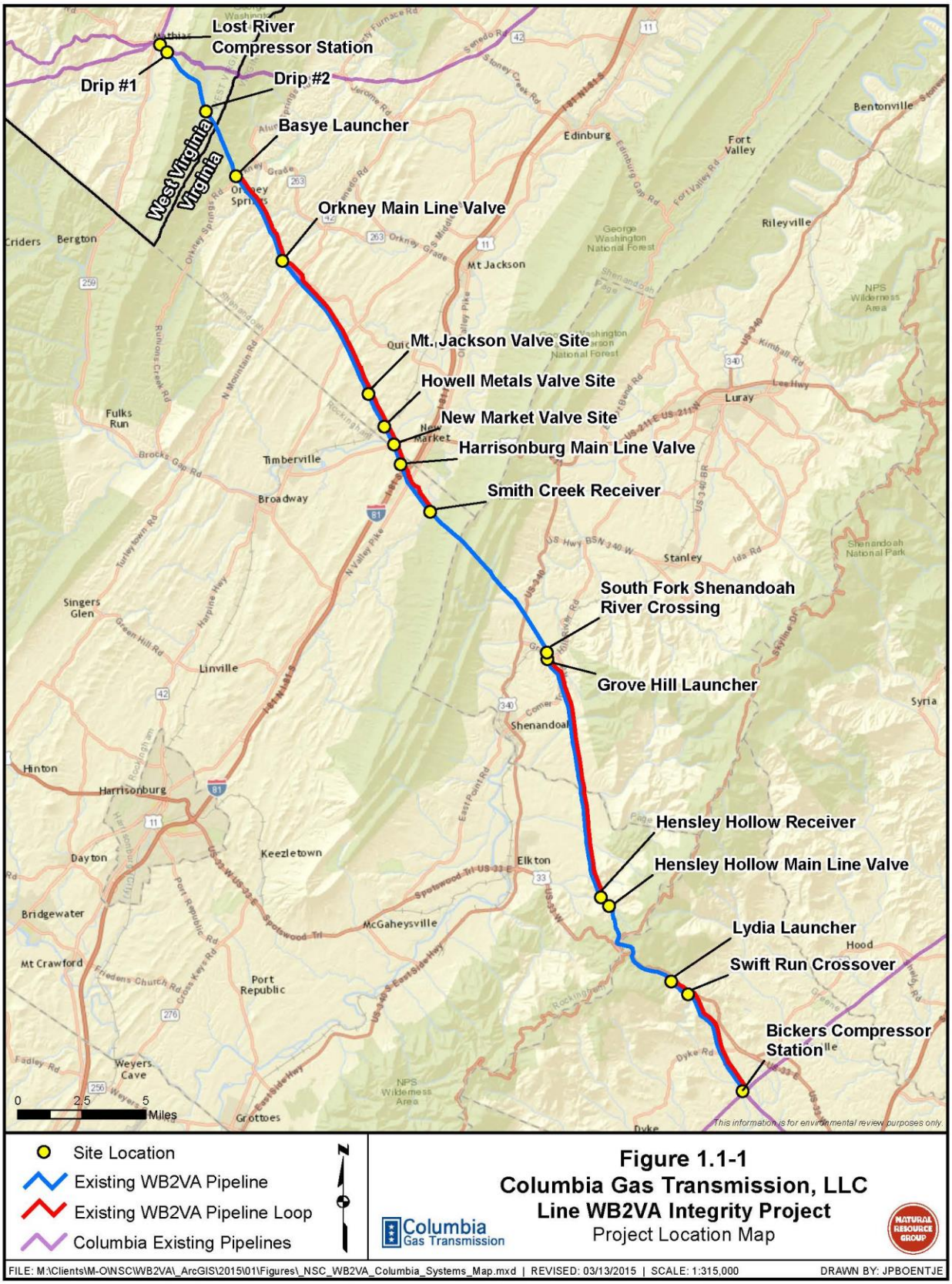


Table 2
Summary of Land Requirements for the Line WB2VA Integrity Project [a]

Facility	Land Affected During Construction (acres)	Land Affected During Operation (acres)[b]	Proposed New Easement for Operation (acres)
Lost River Compressor Station	4.6	4.6	0.0
Drip #1	0.4	0.3	0.0
Drip #2	0.6	0.5	0.0
Basye Launcher	0.6	0.5	0.0
Orkney Main Line Valve	1.2	1.1	0.0
Mt. Jackson Valve Site	0.9	0.8	0.0
Howell Metals Valve Site	0.3	0.2	0.0
New Market Valve Site	1.0	0.6	0.0
Harrisonburg Main Line Valve	1.2	1.1	0.0
Smith Creek Receiver	0.4	0.4	0.0
South Fork Shenandoah River Crossing	6.6	2.5	1.0
Grove Hill Launcher	1.4	1.0	0.0
Hensley Hollow Receiver	0.5	0.4	0.0
Hensley Hollow Main Line Valve	0.5	0.4	0.0
Lydia Launcher	0.6	0.5	0.0
Swift Run Crossover	1.1	1.0	0.0
Bickers Compressor Station	5.3	3.8	0.0
Contractor Yards	4.3	0.0	0.0
Access Roads	6.4	6.3	0.0
Project Total	**37.9**	**26.0**	**1.0**

a The numbers in this table have been rounded for presentation purposes. As a result, the totals may not reflect the exact sum of the addends in all cases. Some totals may be off by 0.1.
b The numbers represent existing rights-of-way, existing fenced facilities, or existing access roads.

5.1 Contractor/Pipeyards

Two off-site contractor/pipeyards would be used for equipment and materials storage. Maps are provided in appendix A and the acreages are included in table 2. Contractor Yard No. 1 is approximately 0.4 acre and located in Hardy County, West Virginia. Contractor Yard No. 2 is approximately 3.9 acres and located in Shenandoah County, Virginia. The proposed lots consist of industrial areas previously disturbed with gravel and/or paved ground surfaces. Both lots would be restored to pre-construction conditions upon Project completion, unless otherwise agreed upon with the landowner and submitted to the Commission for review and approval.

5.2 Access Roads

Columbia would generally use existing public roads or the existing rights-of-way for construction access. Columbia has identified 15 private roads that it currently uses as access roads that may need to be widened or improved in order to use them for construction. In addition, a 125-foot-long segment of new temporary access road would be used at the north side of the South Fork Shenandoah River crossing. After construction has been completed, all access roads would be returned to pre-existing conditions or in accordance with landowner agreements.

5.3 Facility Abandonments

With the exception of the South Fork Shenandoah River crossing, all facilities would be abandoned by removal. At the South Fork Shenandoah River crossing, Columbia would abandon in place the dual 20-inch-diameter pipelines. To abandon them in place, a section of the existing pipeline would be excavated, and the abandoned pipelines would be cleaned, filled with a grout mixture, and capped. Columbia states that abandonment in place would minimize impacts on the river, roadway, and railroad compared with removing the abandoned pipeline. The right-of-way easement for the abandoned pipeline would be retained in accordance with landowner agreements.

6. Construction Schedule and Workforce

Columbia anticipates construction in early 2016, in order to place the proposed facilities in-service in October 2016. The construction schedule and duration would vary per site, based on the scope of construction activities. Construction activities would occur concurrently at multiple facilities:

- Launcher/Receiver Installations - 60 days;
- Mainline Valve Installations - 75 days;
- South Fork Shenandoah River Crossing - 60 days;
- Drip Vessel Removals - 20 days; and
- Crossover Pipe Installation - 14 days.

Columbia would use one contractor for all construction activities. Abandonment and construction of the Project facilities would be performed in a phased sequence with some facility activity occurring concurrently. At any given time, the temporary workforce for construction would range from 90 to 100 individuals. No new permanent employees would be required as a result of the construction, operation, or maintenance of the Project.

7. Construction, Operation, and Maintenance Procedures

The Project would be constructed, operated, and maintained in accordance with applicable requirements defined by USDOT regulations in 49 CFR 192, Transportation of Natural and Other Gas by Pipeline: Minimum Federal Safety Standards; the Commission's Siting and Maintenance Requirements in 18 CFR 380.15; and other applicable federal and state

safety regulations. Columbia would adhere to guidelines set forth in its Environmental Construction Standards (ECS), which incorporates the FERC's *Upland Erosion Control, Revegetation, and Maintenance Plan* (Plan) and *Wetland and Waterbody Construction and Mitigation Procedures* (Procedures) and all applicable permits and approvals as identified in the project-specific Environmental Management & Construction Plans (EM&CP).

Columbia would use typical overland construction techniques. Columbia would begin construction by identifying and marking the construction work area (CWA), followed by clearing, fencing, grading, installing erosion control measures, trenching, stringing, bending, welding, coating, lowering-in, backfilling, testing (hydrostatic), and then cleanup and restoration. The majority of the facility sites would not cross any areas requiring special construction techniques. Site locations requiring these techniques are further discussed in section A.7.1 and A.7.2.

Columbia would clear and grade the work area to remove vegetation, and other obstruction such as large rocks and stumps. Crops and other non-woody vegetation may be mowed, while some vegetation may be left in place to limit potential soil erosion.

Procedures and specific best management practices for handling hazardous materials and equipment maintenance are set forth in Columbia's Spill Prevention, Containment, and Control (SPCC) Plan. Columbia would prohibit construction equipment, vehicles, hazardous materials, chemicals, fuels, lubricating oils, and petroleum products from being parked, refueled, stored, or serviced within a 200-foot-radius of any private water well, within a 400-foot-radius of any public or municipal water well, and within 100 feet of any waterbody, pond, wetland, spring, or seep area. All equipment would be checked for leaks by an inspector prior to being used for construction activities in waterbodies or wetlands.

Hydrostatic testing would be conducted in accordance with the requirements of the USDOT pipeline safety regulations, 49 CFR 192, company testing specification, and applicable state general discharge permits. Prior to hydrostatically testing the facilities, cleaning tools would be used to remove loose debris. Test water would be withdrawn from municipal supplies.

After the testing is completed, water would be discharged in accordance with all applicable state water regulations and federal and state discharge requirements. The hydrostatic test water would typically be discharged into a well vegetated upland area adjacent to the right-of-way, or hauled to an approved and permitted disposal facility. Discharged waters would be dispersed by a splash plate and filtered through hay bales or equivalent to minimize erosion and sedimentation potential. Sodium bisulfite may be used to de-chlorinate the test water, however, no other chemical additives would be used after testing (e.g. to dry the pipe).

7.1 Special Pipeline Construction Procedures

With a few exceptions, standard construction techniques would be used for most Project facilities. Table 3 shows the facilities that require special construction procedures. Columbia has developed ECS Plans for each Project facility, including a site-specific construction plan for the South Fork Shenandoah River crossing, which is provided in appendix B.

Temporary equipment crossings (e.g. mats and travel pads) would be placed across wetlands and waterbodies to allow for construction equipment to cross these features with minimal impact during construction. Additionally, protection would be provided through implementation of Columbia's ECS, and the FERC Procedures, which contains measures to minimize wetland impacts, such as the installation of erosion controls, limiting workspace within 50 feet of wetlands, and storing hazardous fuels at least 100 feet from the edge of a wetland. More detail about wetland construction is provided in Section B.2.3 below.

Three residences are located within 50 feet of proposed construction areas. Columbia has developed site-specific residential construction plans for these residences. These plans were developed to minimize impacts and inconvenience to property owners. These plans are provided in appendix B. More detail about construction near residences is provided in section B.4 of this EA.

Table 3
Specialized Construction Techniques for the Line WB2VA Integrity Project

Facility	Technique
Drip #1	Residential
Drip #2	Waterbody, Residential
Orkney Main Line Valve	Waterbody
Harrisonburg Main Line Valve	Waterbody
South Fork Shenandoah River Crossing	Waterbody, Road and Railroad, Residential
Swift Run Crossover	Wetland

7.2 South Fork Shenandoah River Crossing

The South Fork Shenandoah River crossing, located at Milepost 29.1 on the existing Line WB2VA, would include crossing of the South Fork of the Shenandoah River, Grove Hill River Road, and Norfolk Southern Railroad. Columbia is proposing a dry crossing technique for the waterbody using a cofferdam (temporary diversion structure) during periods of low flow, specifically in August and September of 2016. The cofferdam would not prohibit the flow of the waterbody and would allow environmental resources to pass without restriction. A site-specific waterbody crossing plan is provided in appendix C, and has been developed in accordance with Columbia's ECS, FERC's Plan and Procedures, and other federal and state requirements. Following construction activities, the waterbody banks would be restored to pre-construction contours and stabilized using temporary and permanent devices, such as silt fencing, erosion control blankets, temporary vegetation (fast-emerging annual grasses), and permanent vegetation.

The South Fork Shenandoah River crossing would require installation of a replacement pipeline beneath Grove Hill River Road. Grove Hill River Road is a state road regulated by VDOT. Due to workspace constraints, Columbia is proposing an open cut construction method for crossing this roadway. Essential traffic would be maintained by placing steel plates over the trench, as necessary. Appropriate safety procedures would be implemented to protect workers and the public, including construction warning signs, detour signs, and other traffic control devices required by federal, state, and local permits. Columbia would obtain the necessary

permits and the crossing of the roadway would be completed in accordance with the requirements of the VDOT.

The South Fork Shenandoah River crossing would also require installation of a replacement pipeline beneath the Norfolk Southern Railroad. Columbia is proposing to use a conventional subsurface boring construction method, which would consist of the following: excavating a pit on each side of the railroad; placing boring equipment within the pits; boring a 30-inch-diameter cased bore under the railroad; and pulling a section of 24-inch-diameter pipe through the hole. This section of pipe would then be tied-in to the replacement pipeline. Following installation of the pipe section, boring equipment would be removed and the excavated areas would be backfilled and restored in accordance with the ECS Plan and EM&CP. Columbia would obtain the necessary railroad permits from Norfolk Southern Railway prior to the construction activities required to complete the subsurface bore.

7.3 Environmental Compliance Inspection and Monitoring

Prior to construction, Columbia would conduct environmental training for the company and contractor supervisory personnel. The training program would focus on the requirements of the FERC Plan and Procedures, Certificate conditions, other Project-specific permit conditions, and Project-specific mitigation plans.

Columbia's Project Manager and Natural Resource Permitting Department, consisting of the Environmental Compliance Coordinator, Construction Permitting Specialists, Chief Pipeline Inspector, and Columbia's environmental inspector (EI), would be responsible for the overall Project environmental compliance. Each of these individuals would receive copies of pertinent compliance materials and documents in a project-specific EM&CP. The EI's responsibilities would include:

- monitoring the contractor's compliance with environmental measures required by the Certificate, other environmental permits or approvals, and all other construction, restoration, and mitigation plans;
- taking corrective actions, including issuing stop-activity orders to the contractor;
- documenting compliance with environmental requirements; and
- preparing status reports for submittal to the Commission's environmental staff.

During the performance of work, the contractor would comply with the Minimum Federal Safety Standards adopted by the USDOT under the Natural Gas Pipeline Safety Act of 1968, as well as additional Columbia standards. The contractor would be required to become familiar with all permits and licenses and to comply with all the requirements related to the construction and restoration of areas disturbed by construction activities.

Columbia would conduct post-construction monitoring to document restoration and revegetation of the right-of-way and other disturbed areas, and to address any landowner concerns in accordance with the FERC Plan and Procedures.

7.4 Operations and Maintenance

Operation of the proposed facilities would be performed in accordance with Columbia's procedures and commitments. The type and frequency of pipeline survey and inspection activities, cathodic protection assessments, and other reliability and safety measures associated with the operation of the Project are discussed in section B.7.

Maintenance of the proposed facilities would be performed in accordance with Columbia's ECS and the Plan and Procedures. The right-of-way would be maintained within the existing and proposed 50-foot permanent right-of-way easements.

8. Non-jurisdictional Facilities

Occasionally, projects have associated facilities that are constructed in support of the project, but do not come under the jurisdiction of the FERC. Such non-jurisdictional facilities are often constructed upstream or downstream of the jurisdictional facilities for the purpose of delivering, receiving, or using the proposed gas volumes or may include utilities necessary for aboveground facility operation. Columbia has not identified any non-jurisdictional facilities.

9. Permits and Approvals

Table 4 lists federal and state permits related to construction and operation of the Project. Columbia would provide all relevant permits and approvals to its construction contractor who would be required to be familiar with applicable requirements.

Table 4
Permits, Approvals, and Consultations for the WB2VA Integrity Project [a]

Agency	Permit/Approval/Consultation	Date Approved or Complete/Status
Federal		
FERC	Certificate of Public Convenience and Necessity, NEPA Compliance	Pending
USACE Norfolk District	Department of the Army Permit under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act (Joint Permit Application)	7/21/15
USACE Pittsburgh District	Department of the Army Permit under Section 404 of the Clean Water Act and Section 10 of the Rivers and Harbors Act (Joint Permit Application)	6/2/15
USFWS West Virginia Ecological Field Services Office	Consultation under Section 7 of the Endangered Species Act	Use of MSCHP approved 3/25/15
USFWS Virginia Ecological Field Services Office	Consultation under Section 7 of the Endangered Species Act	Use of MSCHP approved 3/25/15
West Virginia		
WVDEP – Division of Water and Waste Management	Water Quality Certificate under Section 401 of the Clean Water Act	6/2/15

Table 4
Permits, Approvals, and Consultations for the WB2VA Integrity Project [a]

Agency	Permit/Approval/Consultation	Date Approved or Complete/Status
WVDEP – Division of Water and Waste Management	West Virginia Water Pollution Control Permit - Stormwater Associated with Oil and Gas Related Construction Activities – WV0116815	11/3/15
WVDEP – Division of Water and Waste Management	National Pollutant Discharge Elimination System – Water Pollution Control Permit for Hydrostatic Testing Water – WV0113069	11/20/15
West Virginia Division of Culture and History	Consultation under Section 106 of the National Historic Preservation Act	4/3/15
WVDNR – Natural Heritage Program	Natural Heritage/Protected Species Consultation	3/2/15
WVDNR – Office of Land and Streams	Stream Activity Permit (Joint Application with the Public Lands Corporation)	10/26/15
Virginia		
VDEQ – Water Division	Virginia Water Protection Permit (Joint Permit Application) and Water Quality Certificate under Section 401 of the Clean Water Act	5/15/15
Virginia Marine Resources Commission	River and Stream Crossing Permit (Joint Permit Application)	7/20/15
VDEQ – Water Division	Erosion and Sediment Control Plan Approval	N/A[b]
VDEQ – Water Division	General Permit for Discharges from Petroleum Contaminated Sites, Groundwater Remediation, and Hydrostatic Tests (VAG83)	2/26/13
VDCR	Natural Heritage/Protected Species Consultation	12/3/15
Virginia Department of Game and Inland Fisheries	Natural Heritage/Protected Species Consultation	3/18/15
VDHR	Consultation under Section 106 of the National Historic Preservation Act	5/26/15

a Columbia would be responsible for obtaining all permits and approvals required to construct and operate the projects, regardless of whether or not they appear in this table

b VDEQ (formerly VDCR) annually reviews and approves Columbia's Environmental Construction Standards per § 10.1-562 of the Virginia Erosion and Sediment Control Law; therefore a project-specific permit or approval is not required. However, Columbia will be required to develop site-specific Erosion and Sediment Control Plans per the annual specifications and will provide prior notification to VDEQ.

MSHCP = Multi-Species Habitat Conservation Plan

B. ENVIRONMENTAL ANALYSIS

Construction and operation of the Project would have temporary, short-term, long-term, and permanent impacts. As discussed throughout this EA, temporary impacts are defined as occurring only during the construction phase. Short-term impacts are defined as lasting up to three years. Long-term impacts would eventually recover, but require more than three years. Permanent impacts are defined as lasting throughout the life of the Project.

1. Geology and Soils

1.1 Geology

The proposed Project is located within the Valley and Ridge, Blue Ridge, and Piedmont Provinces in northwestern Virginia (Shenandoah, Rockingham, Page, and Greene Counties) and eastern West Virginia (Hardy County). Elevations at these facilities range from 830 feet above mean sea level (amsl) at the South Fork of the Shenandoah River Crossing to 2,100 feet amsl at the Drip # 2 site.

The Valley and Ridge Province is characterized by folded sedimentary bedrock forming parallel and linear ridges and valleys trending northeast-southwest. Ordovician-aged sedimentary rocks characterize the province, comprised of erosion-resistant sandstone and conglomerate bedrock along the ridges and less resistant shale, limestone, and dolostone in the valleys. Twelve of the Project facilities are located within the Middle Section of the Valley and Ridge Province, predominantly within existing Columbia rights-of-way or existing property boundaries.

The Blue Ridge Province is characterized by steep slopes, narrow ridges, and high topographic relief along the eastern edge of the Valley and Ridge Province. The province forms a basement-rock massif with a core consisting of Meso-Proterozoic crystalline bedrock and flanks consisting of Late Neo-Proterozoic to Early Paleozoic bedrock that have been thrust northeast over the Paleozoic rocks of the Valley and Ridge Province. Four of the planned Project facilities are located within the Blue Ridge Province. Elevations at these facilities range from 1,180 feet amsl at the Swift Run Crossing to 1,500 feet amsl at the Hensley Hollow Main Line Valve site.

The Piedmont Province consists of broad rolling hills and moderate slopes that are comprised of crystalline bedrock. Saprolite (clay-rich, highly weathered/decomposed bedrock) blankets the low topographic relief characteristic of the province where bedrock exposure (outcrops) are normally only found within stream valleys where fluvial processes have eroded away the saprolite cover. The Bickers Compressor Station is the only Project facility located within the Piedmont Province.

Mineral Resources

Active mining and extraction of coal and non-petroleum mineral or bedrock (crushed stone) resources are not present within 1,500 feet of the Project. All of the listed mineral claims taken from the Virginia Department of Geology and Mineral Resources, Virginia Department of

Mines, Minerals and Energy and United States Geological Survey (USGS) public data are listed as prospective mineral resources of inactive mines. Historical oil and gas exploration has not occurred in the vicinity of the Project. Although past and/or present oil, gas, and coal production occurs throughout large portions of West Virginia and Virginia, the planned Project facilities are not located within 2,500 feet of these activities. Based upon these factors, we conclude that the Project would not affect mineral resources.

Paleontological Resources

As discussed, the Project facilities occur on previously disturbed areas within existing Columbia rights-of-way or natural gas facilities. Based on this, we conclude there would not be any impact on paleontological resources.

Geologic Hazards

Geologic hazards are naturally occurring physical conditions that are capable of producing property damage and loss of life. Typically, these potential hazards could include seismic related issues such as ground rupture due to faulting, strong ground shaking, liquefaction, subsidence, slope stability and landslides, flash floods, and karst terrain. These conditions are discussed below.

Seismicity and Ground Rupture

Seismic hazard mapping by the USGS (2008) shows that the highest predicted peak ground acceleration (PGA) in the Project area(s) occurs at the existing Bickers Compressor Station which is located about 50 miles northwest of the center of the Central Virginia Seismic Zone 9. The area of the Bickers Compressor Station has a 2 percent probability of experiencing peak ground acceleration of approximately 10 percent of gravity (g) in 50 years (2,500 year return period). PGAs with a 10 percent g are expected to have a moderate to strong perceived ground shaking and very light to light damage. PGAs incrementally decrease north-northwest of the Bickers Compressor Station with the lowest PGA of 4 percent g occurring at the Lost River Compressor Station area.

A review of the USGS Quaternary Faults and Fold database did not identify any recent (Holocene-age) faulting in the area of the Project facilities. The nearest area of evidential recent faulting occurs about 25 miles to the southeast of the Bickers Compressor Station where Holocene-age sand dikes that are indicative of soil liquefaction during prolonged ground shaking have been located within the Central Virginia Seismic Zone.

Given the increasing distance for Project facilities away from the Central Virginia Seismic Zone, the Project would not be considered at risk from active seismicity or surficial ground rupture. As discussed, seismicity in terms of PGA lessens significantly with distance to the northwest away from the Central Virginia Seismic Zone. Given these conditions, we

[9] The Central Virginia Seismic Zone is an area encompassing about 8,000 square kilometers that has experienced recent recorded earthquake activity, the most recent occurring on August 23, 2011 producing a magnitude 5.8 earthquake with an epicenter about 35 miles southeast of the Bickers Compressor Station.

conclude that there is a low potential for damage due to prolonged ground shaking, ground rupture, or soil liquefaction to occur within areas of the Project facilities.

Landslides and Slope Stability

Landslides involve the down-slope movement of earth materials under the force of gravity due to natural or man-made causes such as removal of vegetative cover, triggered by events such as prolonged rainfall saturating soil conditions. Landslide susceptibility mapping by the USGS (USGS 1997) delineates areas that are susceptible to landslides and areas where landslide events (incidence) have occurred. Based on this mapping, 63 percent of the Project facilities are located within areas of high susceptibility and moderate incidence, with the remainder of the Project within areas characterized by moderate susceptibility and low incidence. County soils data show that the Project facilities would be located within areas with slopes ranging from 0 to 65 percent, and will, in locations be susceptible to landslides.

Flooding

Flooding associated with heavy rainfall can occur throughout the majority of the Project area(s). The greatest potential for flash flooding to occur in the Project area is at the South Fork Shenandoah River crossing. Other Project areas within mapped Federal Emergency Management Agency 100-year floodplain include the Orkney Main Line Valve, New Market Valve site, Smith Creek Receiver, Hensley Hollow Receiver, Hollow Main Line Valve and the Bickers Compressor Station all of which are existing facilities. As discussed, the Project facilities would be constructed within or adjacent to existing Columbia rights-of-way or facilities. If flooding would occur during construction, Columbia would maintain a dry and safe working environment by operating stand-by pumps on site during construction activities. Columbia would install the proposed facilities in accordance with the USDOT depth of cover requirements; therefore, we do not anticipate operational impacts due to flooding.

Karst Terrain

Karst terrain and the potential for karst features such as sinkholes, and/or surface collapse can occur within areas underlain by soluble carbonate bedrock and can be problematic during construction. The potential karst hazards in the Project area are:

- ground subsidence or collapse sinkholes;
- pollution of groundwater; and
- sinkhole flooding.

Loose rock or soil (overburden) could obscure possible solution openings in the bedrock surface prior to construction and only become evident during trenching or excavating activities. These overburden materials could be subject to differential subsidence at locations where voids have been created in the bedrock. This results in closed-contour depressions (sinkholes) and/or surficial collapse of the soil column at ground surface. This process can be significant in areas where the water table has been lowered either naturally or through man-induced activities such as groundwater pumping.

Groundwater pollution could occur where sinkholes or karst solution openings are present at or near ground surface. Karst systems have very low self-purification or filtering capabilities which makes karst groundwater highly susceptible to impact from erosion of surface materials and/or surface spills. Erosion of excavated materials at ground surface into karst openings could impact local springs or wells which may be manifested as increased turbidity at these locations and/or increased amounts of bacterial material which could impact groundwater quality. Inadvertent spills from equipment refueling and/or leaks could impact groundwater quality through rapid transport of contaminants to discharge locations such as springs, wells or surface waterbodies. Mitigation for these potential adverse groundwater affects are described below in Section 2.1 Potential Groundwater Affects. Project areas which have the potential for karst to occur include the: Mount Jackson Tap; Howell Metals Tap; New Market Tap; Harrisonburg Valve Setting; Smith Creek Receiver; and Shenandoah River Crossing.

Blasting

Columbia anticipates that blasting would not be necessary during construction since all facilities would occur within existing rights-of-way or existing natural gas facilities previously disturbed by construction activities.

Construction and Operational Impacts and Mitigation

Potential impacts from geologic hazards during construction of the Project could include temporary disturbance of unstable slopes or landslides and from the unanticipated discovery of karst features during excavation activities.

Columbia states that if a significant landslide hazard is identified during construction, they would implement mitigation measures intended to stabilize the area. Columbia has prepared site-specific erosion and sediment control plans and ECS for each Project facility. Slope stabilization/mitigation could include burial of the proposed facility below the potential landslide depth, addition of drainage controls such as interceptor diversions and trench breakers, subsurface drains and culverts, and drainage ditches to divert water away from the CWA. Following construction, topography and associated drainage would be returned to pre-construction contours, and if necessary, permanent erosion controls would be maintained during operation of the facilities.

As discussed above, six of the Project facilities are located within areas where covered karst could potentially exist. The NiSource/Columbia Multi-Species Habitat Conservation Plan requires that karst surveys be conducted within one year of earth-disturbing activities (the conservation plan is further discussed in section 3.4). Each of the aforementioned sites within these karst-prone areas had been initially surveyed in 2009 and follow-up surveys conducted again in 2014. The procedures and methodology for investigating/surveying potential karst features in these areas included a literature review of topographic and geologic maps, aerial photographs, and publications from state and federal sources such as the Virginia Division of Mines and Mineral Resources, and the USGS. This was followed by field surveys conducted by walking the area of interest and noting any surficial karst features such as depressions, sinkholes, or subsidence areas. No karst features were found during either the 2009 or the 2014

surveys. However, geotechnical investigations conducted at the South Fork Shenandoah River crossing, consisting of borehole drilling, and surface geophysical surveys found that the subsurface along the crossing consists of highly fractured limestone and dolostone with several solution-enlarged fractures, which would render the use of horizontal directional drilling for construction of the crossing not feasible due to the potential for significant loss of drilling fluids, and possible borehole instability during drilling. As such, Columbia is proposing to use open-cut (dry-ditch) crossing methods to cross this waterbody. The details of this crossing are discussed in section B.2.2 and appendix C.

1.2 Soils

Columbia would use areas within existing fenced facilities and existing rights-of-way for materials staging and construction activities, or previously disturbed land immediately adjacent to these facilities. Construction activities have the potential to affect soil characteristics adversely, thereby limiting the restoration potential of areas disturbed by land-clearing activities and the movement of heavy equipment. Potential soil impacts include loss of vegetation and subsequent soil erosion, mixing of topsoil and subsoil, and soil compaction. About 15.7 acres of the total disturbance is highly erodible by water, about 0.1 acre is prone to compaction, and about 14.9 acres has a poor revegetation potential. About 4.4 acres of the route has bedrock within 60 inches of the ground surface and 17.1 acres crosses areas with high rock content within the soil. And, about 7.6 acres of the soils that would be impacted by the proposed construction are considered prime farmland.

To minimize erosion during construction, Columbia would implement the measures in its ECS, such as the use of waterbars, sediment filters, erosion control fabric, trench breakers, and mulch. Topsoil would be segregated and reestablished in agricultural lands and residential areas and in other areas as requested by landowners. Erosion control devices would be maintained during construction and until disturbed areas are restored, seeded, and stabilized. Columbia would conduct post-construction monitoring to verify that revegetation is successful.

Stabilization of disturbed areas would commence within 7 days of construction completion in an area, as weather permits, and restoration is expected upon Project completion in accordance with the ECS.

After construction is completed, the CWAs would be protected by temporary and permanent erosion control measures. These measures include, but are not limited to, site-specific contouring, permanent diversions, mulching, and reseeding or sodding with soil-holding grasses. Non-cropland would be re-vegetated in accordance with Columbia's ECS, or as requested by the landowner.

Columbia would remove excess rock from at least the top 12 inches of soils to the extent practicable in cultivated and rotated croplands, hayfields, pastures, and residential areas as well as any other areas and the landowner's or land managing agency's request. Columbia would remove excess rock from surface soils disturbed by construction such that the size, density, and distribution of rock on the construction right-of-way is similar to adjacent non right-of-way areas.

No conversion of farmland to non-agricultural uses would occur as a result of the proposed Project and no areas greater than 5 acres would be a new permanent aboveground facility. Therefore, no significant impact on prime farmland is anticipated.

The implementation of the measures in Columbia's ECS would minimize erosion during construction and ensure restoration of the areas disturbed by Project construction. Therefore, potential impacts on soils would be minor and not significant.

2. Water Resources and Wetlands

2.1 Groundwater

Most of the Project is underlain by the Valley and Ridge Aquifer with minor pipeline and aboveground facilities proposed in the Piedmont and Blue Ridge Aquifer. Circulation of groundwater through conduits in the Valley and Ridge Aquifer exceeds depths of 2,000 feet. Most wells are finished less than 300 feet below ground surface and yield between 1-150 gallons per minute (USGS, 2012). No public groundwater systems or surface water protection areas would be crossed (USEPA, 2007).

No Comprehensive Environmental Response, Compensation, and Liability Act sites; Assessment, Cleanup, and Redevelopment Exchange System sites; Leaking Underground Storage Tank sites; petroleum releases; or solid waste facilities were identified within 1 mile of the Project (WVDEP, 2015 and VDEQ, 2014a). Columbia identified four contamination sites within 0.25 mile of Howell Metals Valve Site, Bickers Compressor Station, and Lost River Compressor Station. However, ground excavation at these sites would be minimal and Columbia would implement its SPCC Plan to prevent additional contamination from construction activities. Further, should contaminated groundwater be identified during construction, Columbia would contact the WVDEP or the VDEQ to discuss avoidance and impact mitigation measures.

Columbia identified five wells and a spring within 150 feet of construction workspaces (see table 5).

Table 5
Wells and Springs within 150 Feet of Construction

Name[1]	County, State	Nearest Project Site	Distance to Construction (feet)
Unnamed Well 1	Hardy, WV	Drip #1	126
Unnamed Well 2	Hardy, WV	Drip #1	63
Unnamed Well 3	Hardy, WV	Drip #2	68
Wolverton Well	Page, VA	South Fork Shenandoah River Crossing	91
Unnamed Well 4	Greene, VA	Swift Run Crossover	215 (18 to access road)
Spring SWR-Sp1	Greene, VA	Swift Run Crossover	3

[1] Well data based on Columbia's discussions with property owners

Three Project sites (Howell Metals Valve Site, New Market Valve Site, and Harrisonburg Main Line Valve) would be within the Town of New Market's Wellhead Protection Area. Columbia has agreed to conduct testing of water yield and quality (with landowner permission) where drilling or blasting has a potential to impact wells; however, no blasting is anticipated during construction of the Project. If a water well were damaged as a result of construction, Columbia would provide a temporary source of water and/or compensate the owner. All fuel storage would be at least 400 feet from municipal water wells and 150 feet from private wells. Fuel storage areas would not be within a designated municipal watershed area (except those designated by an appropriate government authority), spill kits would be kept at all fluid storage locations, and Columbia would implement its SPCC Plan to prevent contamination of groundwater from construction activities. Therefore, we conclude that impacts on groundwater wells and springs in the Project area would be minimized and not significant.

Columbia would use a maximum of about 330,000 gallons of water to hydrostatically test all of its pipeline and aboveground facilities and would acquire the water from municipal sources. Columbia may reuse some of the water from test sections to minimize water usage. No chemicals would be added prior to discharge (with the possible exception of sodium bisulfate to de-chlorinate the water). Discharge would be either back to the municipal sources or to well vegetated upland areas in accordance with local permit requirements and its ECS, which includes the Procedures.

2.2 Surface Water Resources

Columbia would impact or be immediately adjacent to a total of six streams (three perennial, two intermittent, and one ephemeral) and one spring during construction. Routing of the workspace was altered to avoid direct impacts on the spring. Only one of these streams (South Fork Shenandoah River) would actually be crossed by the pipeline. The remaining five waterbodies would be crossed by construction vehicles traveling on equipment pads or existing bridges. If construction activities could temporarily disrupt the flow of these five waterbodies, a flume or dam-and-pump would be used to create dry conditions in the stream and maintain downstream flow. A flume involves the construction of an upstream dam to channel the water through a pipe (or flume), a downstream dam, and discharging the water over an energy dissipation device. A dam-and-pump involves construction of an upstream and downstream dam, then pumping water from above the upstream dam, and discharging water below the downstream dam over an energy dissipating device. Both methods isolate stream flow and minimize siltation/sedimentation impacts between the dams during construction.

No sensitive surface waters, including federally designated Wild and Scenic Rivers, would be impacted by the Project. No downstream water withdrawals are within three miles of the proposed Project.

Columbia proposes to cross the South Fork Shenandoah River using a dry crossing technique and it has develop a site-specific plan for this crossing included in appendix C. Columbia would construct a portadam from one shore to just beyond halfway across the river to divert water flow to the opposite side. Water within the portadam would be pumped from a floating intake to an energy dissipating device within the river until sediment starts to enter the

pump. Columbia would continuously monitor the intake and discharge to ensure turbid water does not enter the river. Columbia would then trench through the dry section of the stream bed, install its pipeline, then backfill. This would limit the sedimentation and siltation of the river during construction to the installation and demolition of the portadam structure. After the pipeline is backfilled, Columbia would remove the portadam structure and construct it again from the opposite bank to complete the crossing. Temporary workspace within 50 feet of this waterbody would be necessary to construct this crossing, which is an alternative measure from our Procedures. Additionally, Columbia would install construction warning signs and lighted buoys to minimize impacts on recreational users. A site-specific diagram of this crossing is included in appendix C of this EA. Columbia anticipates construction of this crossing to take about 60 days and would conduct the crossing during the drier time of year (August or September). We have reviewed the site-specific crossing plan for the South Fork of the Shenandoah River and find it appropriate for this crossing. Prior to implementing this crossing plan, Columbia would obtain approval from both the USACE and VDEQ for its proposed crossing of the Shenandoah River.

To further minimize impacts on waterbodies during construction and operation of the Project, Columbia would implement its ECS. This includes the installation of erosion controls, sediment berms, trench breakers, and restoration and revegetation measures. With implementation of Columbia's ECS and its proposed dry crossing of the South Fork Shenandoah River, we conclude that impacts on surface waters would be minimized to the extent practicable and would not be significant.

2.3 Wetlands

Wetlands are areas that are inundated or saturated by surface or groundwater at a frequency and duration sufficient to support, and under normal circumstances do support, a prevalence of wetland vegetation adapted for life in saturated soil conditions, commonly known as hydrophytic vegetation (Environmental Laboratory, 1987). Wetlands can be a source of substantial biodiversity and serve a variety of functions that include providing wildlife habitat, recreational opportunities, flood control, and naturally improving water quality.

During Columbia's wetland delineations, it identified about 0.04 acre of emergent wetland that would be impacted during construction of its Project to access the Swift Run Crossover. No other wetlands would be impacted by construction or operation. Columbia would install timber mats through the area during construction to minimize impacts associated with mixing of topsoil and subsoil or compaction. Additionally, Columbia would implement its ECS, which contains measures to minimize wetland impacts, such as the installation of erosion controls, limiting workspace within 50 feet of wetlands, and storing hazardous fuels at least 100 feet from the edge of a wetland. With implementation of Columbia's ECS, we conclude that impacts on wetland would be minimized to the extent practicable and would not be significant.

3. Vegetation, Fisheries, and Wildlife

3.1 Vegetation

The Project would impact forested, agricultural, open, and wetland vegetation types during construction and operation. Forest species include deciduous, coniferous, and mixed forest types. Agricultural land consists of cultivated corn fields. Open land includes undeveloped, non-forested land, pastures, and existing rights-of-way. Wetlands within the proposed right-of-way are palustrine emergent. No sensitive vegetation communities or protected plan species were identified during Columbia's biological field surveys. Table 6 below lists the vegetation that would be affected by each facility.

Table 6
Vegetation Affected by the Project (acres)

Facilities	County, State	Upland Forest		Agricultural		Open		Wetland	
		Oper.	Const.	Oper.	Const.	Oper.	Const.	Oper.	Const.
Lost River CS	Hardy, WV	0	0	0	0	0.3	0.3	0	0
Drip #1	Hardy, WV	0	0	0	0	0.3	0.3	0	0
Drip #2	Hardy, WV	0	0	0	0	0.4	0.4	0	0
Basye Launcher	Shenandoah, VA	0	0	0	0	0.5	0.5	0	0
Orkney MLV	Shenandoah, VA	0	0	0	0	1.0	1.1	0	0
Mt. Jackson Valve	Shenandoah, VA	0	0	0	0	0.7	0.8	0	0
Howell Metals Valve	Shenandoah, VA	0	0	0	0.1	0.2	0.2	0	0
New Market Valve	Shenandoah, VA	0	0	0	0	0.5	0.7	0	0
Harrisonburg MLV	Rockingham, VA	0	0	0	0	0.7	0.8	0	0
Smith Creek Receiver	Rockingham, VA	0	0	0	0	0.3	0.3	0	0
South Fork Shenandoah River Crossing	Page, VA	0.8	2.1	0	0	2.0	3.2	0	0
Grove Hill Launcher	Page, VA	0	0.2	0	0	1.0	1.2	0	0
Hensley Hollow Receiver	Rockingham, VA	0	0	0	0	0.4	0.5	0	0
Hensley Hollow MLV	Rockingham, VA	0	0	0	0	0.4	0.5	0	0
Lydia Launcher	Greene, VA	0	0	0	0	0.4	0.5	0	0
Swift Run Crossover	Greene, VA	0	<0.1	0	0	1.0	1.1	<0.1	<0.1
Bickers CS	Greene, VA	0	0	0	0	1.5	2.8	0	0
Access Roads		0	0.1	0	0	5.6	5.6	0	0
Totals		**0.8**	**2.4**	**0.0**	**0.1**	**17.2**	**20.9**	**<0.1**	**<0.1**

Const = the total construction work area that would be impacted during construction.
Oper = the permanent right-of-way.
MLV = main line valve
Forested impacts at the Grove Hill Launcher and Swift Run Crossover refer to selective limb trimming along access roads.

The primary impact on vegetation from construction of the Project would be the cutting, clearing, and/or removal of existing vegetation within the construction work areas. In the Project area, forested vegetation within the temporary CWA would be expected to take 5 to 15 years to regenerate to pre-construction conditions, while the remaining vegetation types would be expected to reestablish within one to two growing seasons. Cutting of forested vegetation can result in small, isolated, or remnant patches of forest that are physically separated from a larger forested tract, often referred to as forest fragmentation. Approximately 2.4 acres of forest would be affected during construction and 0.8 acre during operation of the Project. Columbia has committed to replanting native woody shrubs and trees within the temporary workspace and within the existing right-of-way of the dual pipelines that would be abandoned at the South Fork Shenandoah River crossing (and replanting as necessary). Additionally, Columbia would use its existing rights-of-way to the extent practicable to minimize impacts on clearing of vegetation.

We received a comment from the WVDNR that requested Columbia use the West Virginia Restoration Planting Community Prediction Tool, Version 1.0 for guidance in determination of appropriate species for restoration/reclamation and additionally, they requested that Columbia provide a species list of proposed trees and shrubs and composition of seed mixes for review.

To ensure appropriate agency consultation regarding revegetation**, we recommend that:**

- **<u>Prior to construction in Hardy County, West Virginia</u>, Columbia should use the West Virginia Restoration Planting Community Prediction Tool, Version 1.0 for guidance in determining the appropriate species for restoration/reclamation, provide the WVDNR a species list of proposed trees and shrubs and composition of seed mixes for review, and file with the Secretary of the Commission (Secretary) the final species/seed mixes and WVDNR comments.**

One new temporary access road would be constructed on the north side of the South Fork Shenandoah River crossing for use during construction of the Project. However, it would be restored to pre-construction use during operation. All other access roads proposed for use during this Project are existing, but may require tree trimming.

Noxious and Invasive Weeds

Tree of heaven, was identified at the Grove Hill Launcher site, Japanese stiltgrass was identified at the proposed Drip #2 site, and tall fescue grass was documented at most facilities. Columbia would minimize impacts from noxious and invasive species along the Project by cleaning all construction equipment prior to it arriving at the Project site. This would consist of removing visible dirt from the equipment and blowing loose material using compressed air. If noxious weed infestations are identified within construction workspaces, Columbia would scrape and use compressed air on equipment prior to leaving that site. Additionally, Columbia would use herbicides to treat the area. To prevent new infestations, Columbia would adhere to the seed application rates, mixtures, and soil supplements, as specified in the annually approved ECS for West Virginia and Virginia. In addition, the recommended condition above would provide further guidance and agency input regarding seed mixtures. After construction,

Columbia would monitor the right-of-way and mow or apply herbicides (by a trained professional) if density and cover of noxious weeds is higher on right-of-way than off. With implementation of these measures, we conclude that construction and operation of the Project would not spread noxious or invasive weeds.

3.2 Fisheries

The only waterbody that would be crossed by the pipeline is the South Fork Shenandoah River which is designated by Virginia Department of Game and Inland Fisheries (VDGIF) as a warm water fishery. Representative species include catfish, sunfish, gar, striped bass, and yellow perch. No protected fish species or commercial fisheries are known to occur in the waterbodies within the Project area. However, the South Fork Shenandoah River is designated as impaired and not considered suitable for fish consumption. VDGIF restricts in-stream construction from April 15 through July 15 to minimize impacts on spawning fish. Columbia's proposed construction schedule adheres to this timeframe.

Turbidity and sedimentation from construction of the Project should be limited to installation and removal of the portadam structure in the Shenandoah River. This structure would allow fish passage during installation of the pipeline and would minimize sedimentation over a standard open-cut wet crossing method. Individual fish would likely relocate upstream or downstream of the crossing during construction. Impacts on fish and macro invertebrates associated with installation of the portadam would be localized and limited to individual fish in the immediate vicinity of the dam installation. Less mobile or immobile organisms, such as macro invertebrates, may incur direct mortality, but populations would be expected to regenerate during the next annual cycle. Columbia has agreed to several mitigation measures to minimize impacts on fisheries. These include:

- conducting the crossing during low flow periods (likely August or September);
- minimizing disturbance to riparian areas by restricting overnight parking, maintenance, and refueling of equipment at least 100 feet from the river;
- screening the dewatering intake hose to minimize entrainment and impingement of fish;
- handle/manage/collect river wildlife as required by permits during dewatering activities;
- staging the dewatering intake at least one foot from the river bottom to minimize sediment collection;
- discharging river water back to the river through an energy dissipating device to prevent stream scour;
- discharging sediment laden water through a dewatering device in a well-vegetated upland;
- restoring the river bottom and banks to pre-construction contours; and
- stabilizing the river banks using erosion control blankets, seed, and mulch.

Columbia's implementation of the measures listed above, its dry crossing method of the South Fork Shenandoah River, its ECS, and replanting native woody shrubs and trees within the riparian areas along temporary workspaces and within the existing right-of-way of the dual lines

to be abandoned in coordination with agency recommendations and landowner consent would minimize impacts on fisheries. No blasting or withdrawal or discharge of hydrostatic test water would occur within surface waterbodies. Therefore, we conclude that impacts on fisheries would be minimized to the extent practicable and would not be significant.

3.3 Wildlife

Wildlife species inhabiting the Project area are characteristic of the vegetative habitats that occur in the vicinity of the Project. The majority of the Project involves open land construction consisting of maintained and unmaintained rights-of-way. Clearing of the temporary construction right-of-way would reduce cover, nesting, and foraging habitat for some species and may result in direct mortality for less mobile forms of wildlife, such as small rodents and reptiles. Larger or more mobile wildlife, such as birds and large mammals, would vacate the right-of-way as construction activities approach. Most species would relocate into similar habitats in the vicinity of the Project. However, if a lack of adequate territorial space exists, some individuals could be forced into suboptimal habitats. This could increase inter- and intra-specific competition and lower reproductive success and survival. These effects would cease after completion of construction and wildlife could return to the newly disturbed areas and adjacent, undisturbed habitats after restoration is complete. Species that use early successional communities may benefit from the clearing and revegetation process, as additional habitat of this type would be created by construction of the Project. Additionally, non-woody, early successional vegetation may provide seeds and foliage as food for small mammals and birds, as well as habitat for ground-nesting species.

In forested areas adjacent to existing right-of-way, construction of the Project would relocate the edge habitat, and the frequency of tree blowdowns may increase due to the exposure of trees to windier conditions than they are acclimated to. Many species are adapted to this habitat shift and could take advantage of these areas, such as predatory species. Although impacts may be advantageous for some species, construction and operation of the Project would widen existing cleared right-of-way. Species that use tree cavities for either roosting or nesting may suffer direct mortality during right-of-way clearing. Additionally, nesting success may be denied or diminished for one annual breeding cycle for adult birds that normally breed in the area but would avoid it during construction activities. However, abundant similar habitats are available for wildlife adjacent to the proposed Project. Further, with the exception of the South Fork Shenandoah River crossing, proposed work at Project sites would not change the existing conditions at these sites or vegetative buffers beneficial for wildlife. Additionally, Columbia's active planting of saplings and shrubs, along with native seed mixes, would limit impacts on wildlife. With the limited area of impact, we conclude that impacts on wildlife would be minimized to the extent practicable and would not be significant.

Migratory Birds

Migratory birds are protected under the Migratory Bird Treaty Act (MBTA) and Executive Order 13186, including bald and golden eagles, which are also protected under the Bald and Golden Eagle Protection Act. The executive order was enacted, in part, to ensure that environmental analyses of federal actions evaluate the impacts of actions and agency plans on migratory birds. It also states that emphasis should be placed on species of concern, priority

habitats, and key risk factors, and it prohibits the take of any migratory bird without authorization from the USFWS. The destruction or disturbance of a migratory bird nest that results in the loss of eggs or young is also a violation of the MBTA. Numerous migratory bird species, including colonial nesting waterbirds, waterfowl, and neotropical songbirds, could potentially occupy areas of the Project facilities.

Migratory birds follow broad routes called flyways between breeding grounds in Canada and the United States and wintering grounds in Central and South America and the Caribbean. Additionally, several species migrate from breeding areas in the north to winter along the Gulf Coast and remain throughout the non-breeding season.

Priority bird species that could occur in the Project area include the Cerulean warbler, golden-winged warbler, Henslow's sparrow, red-cockaded woodpecker, Bachman's sparrow, brown-headed nuthatch, and migrating waterfowl. Additionally, the Hensley Hollow Main Line Valve, Lydia Launcher, and Swift Run Crossover sites are within the Upper Blue Ridge Mountains Important Bird and Biodiversity Area. All tree clearing activities in association with the Project would occur at the South Fork of the Shenandoah River crossing. No tree clearing is proposed between June 1 and August, thereby limiting nesting impacts on migratory birds. Further, routine vegetation mowing or clearing along the entire width of the permanent right-of-way would not occur more frequently than every 3 years and would not be conducted between April 15 and August 1 to minimize impacts on nesting species. Therefore, we conclude that impacts on migratory birds would be minimal and not significant.

To further minimize impacts on bald eagles, Columbia conducted surveys of the Project route and contacted the WVDNR, VDCR, and VDGIF. None of the surveys or agency consultations identified any bald eagles or nests within one mile of the Project area. To further minimize the likelihood of impacts on bald eagles, Columbia has agreed to implement the National Guidelines and VDGIF's "Management of Bald Eagle Nests, Concentration Areas, and Communal Roosts in Virginia: A Guide for Landowners" should a bald eagle or nest be identified within the construction work area. Given the lack of bald eagles in the Project area, Columbia's proposed construction season, and its commitment to adopt the bald eagle guidelines should an eagle or nest be identified, we conclude impacts on bald eagles from construction and operation of the Project would be avoided.

3.4 Special Status Species

Special Status species are those species for which state or federal agencies afford an additional level of protection by law, regulation, or policy. Included in this category are federally listed and federally proposed species that are protected under the Endangered Species Act, as amended (ESA), or are considered candidates for such listing by the USFWS or National Marine Fisheries Service (NMFS), and those species that are state-listed as threatened, endangered, or other special status species.

Federal agencies, in consultation with the USFWS and/or NMFS, are required by Section 7(a)(2) of the ESA to ensure that any action authorized, funded, or carried out by the agency would not jeopardize the continued existence of a federally listed threatened or endangered species or critical habitat of a federally listed species. As the lead federal agency,

the FERC is responsible for the Section 7 consultation process. The lead agency is required to consult with the USFWS and/or NMFS to determine whether any federally listed endangered or threatened species or any of their designated critical habitats are in the vicinity of the Project, and to determine the proposed action's potential effects on those species or critical habitats.

For actions involving major construction activities with the potential to affect listed species or critical habitats, the federal agency must prepare a biological assessment (BA) for those species that may be affected. As lead, the FERC must submit its BA to the USFWS and/or NMFS and, if it determined that the action may adversely affect a federally listed species, the FERC must submit a request for formal consultation to comply with Section 7 of the ESA. In response, the USFWS and NMFS would issue a Biological Opinion as to whether the federal action would likely adversely affect or jeopardize the continued existence of a listed species, or result in the destruction or adverse modification of designated critical habitat.

After consultation with the USFWS, the NPS, the U.S. Forest Service, and the Commission, Columbia formulated a Multi-Species Habitat Conservation Plan (MSHCP) (USFWS 2014), executed in September 2013 to mitigate impacts caused by Columbia's projects. Additionally, the USFWS issued an Incidental Take Permit for the capture or and impacts on species across "covered lands" during field surveys. On March 25, 2015 the USFWS (both field offices) responded to Columbia's request for consultation indicating that all species within the Project area would be included in the MSHCP. Based on Columbia's implementation of the MSHCP, we conclude that section 7 consultations are complete.

Federally Listed Species

No suitable habitat for the Virginia big-eared bat, shale barren rock cress, swamp pink, or James spinymussel exists within the Project area. Therefore, the Project would have no effect on these species.

Indiana Bat

The Project is within the range of the federally endangered Indiana bat (Myotis sodalist) and northern long-eared bat (Myotis septentrionalis).

Indiana bats hibernate in caves and abandoned mines during the winter months. Population declines have been primarily due to the loss and degradation of suitable hibernacula, human disturbance during hibernation, and loss and degradation of forested habitat (USFWS, 2015). More recently, white-nose syndrome, a fungal pathogen, has caused serious declines in bat populations, including Indiana bats. Indiana bats roost in dead or live trees and snags with peeling or exfoliating bark, split trunks, or cavities and in live trees with exfoliating bark that are 5 inches in diameter. Only select limb removal would be required at the Grove Hill Launcher and Swift Run Crossover. Columbia would implement the MSHCP at these locations; therefore, no further consultation is required in West Virginia. There is a known hibernacula within 2 miles of the Mt. Jackson, Howell Metals, and New Market Valve sites. VDGIF recommended tree clearing not be conducted between April 15 and November 15 of any year to avoid impacts on Indiana bats. However, no tree clearing is proposed at any of these sites; therefore, impacts on this species at these sites would be avoided. Indiana bats use stream

corridors, riparian areas, and upland woodlots for roosting, foraging, and travel corridors. The South Fork Shenandoah River is the only location where tree clearing would be conducted. Because potential suitable summer habitat was identified during Columbia's pedestrian surveys of the Project site, it would implement the avoidance and minimization measures required in the MSHCP for the Indiana bat. Some examples of these minimization methods include:

- no clearing of suitable summer habitat from June 1 to August 1;
- educating operators, employees, and contractors on the biology of the Indiana bat, activities that may affect bat behavior, and ways to avoid and minimize these effects;
- strictly controlling contaminants, including but not limited to oils, solvents, and smoke from brush piles, so the quality, quantity, and timing of prey resources are not affected;
- implementing its ECS;
- servicing and maintaining equipment at least 300 feet from streambeds, sinkholes, fissures, or areas draining into sinkholes, fissures, or other karst features;
- eliminate clearing of suitable summer habitat more than 10 miles from a Priority 1, 2, 3 and 4 hibernacula within the covered lands of the MSHCP from August 2 to October 15 to avoid direct effects to post-lactating females and volant juveniles and minimize direct effects to Indiana bats in summer habitat;
- not applying aerial herbicide on rights-of-way from April 15 to August 15 to protect maternity colonies in summer habitat; and
- avoiding conducting construction activities after sunset in known or suitable summer habitat to avoid harassment of foraging Indiana bats.

With Columbia's commitment to abide by the MSHCP, including the measures listed above, we conclude that the Project is not likely to adversely affect the Indiana bat.

Northern Long-eared Bat

Northern long-eared bats overwinter in large caves and abandoned mines with stable temperatures and high humidity. During the summer, the northern long-eared bat is associated with forested habitat in proximity to wetlands and roost alone or in colonies. Dramatic population declines have occurred as a result of white-nose syndrome on this species. As with the Indiana bat, the only habitat for the northern long-eared bat that would be impacted by the Project would come from the South Fork of the Shenandoah River crossing. Implementation of the mitigation measures listed above for the Indiana bat would also reduce impacts on the northern long-eared bat. Therefore, we conclude that the Project is not likely to adversely affect the northern long-eared bat.

Madison Cave Isopod

The Madison cave isopod is a federally threatened freshwater crustacean that exists in Shenandoah County. Columbia conducted karst terrain surveys on September 3 and 16, October 9, and November 24, 2014 at the Project sites identified as potentially containing

habitat. No surface karst features were observed during these surveys, and Columbia's database analysis did not reveal the presence of any new karst features since the 2009 karst terrain surveys conducted by Columbia and described in its MSHCP. However, Columbia has agreed to conduct additional karst surveys within 1 year of the proposed construction activities to further ensure no impacts occur on the Madison cave isopod. The USFWS recommended not crossing the South Fork of the Shenandoah River using the horizontal directional drill because of the potential presence of this very sensitive species. With the lack of identified suitable habitat, Columbia's proposed additional surveys, and Columbia's proposed crossing method of the South Fork of the Shenandoah River, we conclude that the Project would have no effect on the Madison cave isopod.

State-Listed Species

In a letter dated March 2, 2015, the WVDNR confirmed that no rare, threatened, or endangered species occurrences are known within the Project area.

Virginia identified the state threatened wood turtle, state endangered brook floater, and state threatened loggerhead shrike as potentially occurring in the Project area.

Wood Turtle

The wood turtle is often found in fields, floodplains, farmland, and wet meadows near waterbodies and has become threatened due to loss of wetlands, urbanization, and fragmentation of wooded habitats. VDCR identified the Orkney Main Line Valve and Basye Launcher sites as potentially containing habitat for this species. However, the Basye Launcher would be greater than 1 mile from the nearest waterbody, the Barb Run-Stoney Creek. Therefore, this facility is not likely to cause a federal trend in listing of this species. In a letter dated March 18, 2015, the VDGIF agreed.

The Orkney Main Line Valve workspace runs parallel and about 50 feet from Mill Creek. Additionally, the permanent facility would be 150 feet from Mill Creek. Construction activities at this location would occur during the time of year when turtles are active (April 1-September 30). To minimize impacts on the wood turtle, Columbia would implement its ECS and these additional measures:

- educate work crews of the potential presence of this species (including appearance, status, and life history;
- install silt fence prior to the turtle-nesting season (April 1) as a boundary to exclude turtles from nesting within the Project area;
- conduct pre-construction surveys and each day prior to work beginning by a biologist familiar with wood turtles and nesting habitat features; and
- relocate any turtles into suitable habitat outside of the work area.

If any wood turtles are identified during construction, Columbia has agreed to contact the VDGIF Region I Terrestrial Biologist (J.D. Kleopfer). With these measures, we conclude that impacts on wood turtles would be minimized to the extent practicable and the Project would not cause a trend in federal listing of this species.

Brook Floater

The brook floater is a mussel found in constantly flowing water from small tributaries to large rivers. Smith Creek is the only waterbody within 2 miles of the Project that contains this species. However, no in-stream work would occur in Smith Creek. The closest Project facility would be the Smith Creek Receiver (40 feet). However, there is a paved road between the creek and the proposed receiver. No other facilities would be within 1 mile of Smith Creek. Therefore, with implementation of Columbia's ECS, we conclude the Project would not affect the brook floater.

Loggerhead Shrike

The loggerhead shrike is a predatory bird that uses short grass with isolated trees or shrubs and pastureland. Population declines may include habitat loss, winter mortality, pesticides, and collisions with motor vehicles. VDGIF identified this species as potentially occurring at the Mt. Jackson Valve Site, Swift Run Crossover, and Lydia Launcher. VDGIF recommends a time of year restriction on tree and ground clearing between April 1 and July 31 for these facilities. All tree clearing activities in association with the Project would occur at the South Fork of the Shenandoah River crossing, which is proposed to occur in August and September. Should any ground clearing occur within VDGIF's time of year restriction to minimize impacts on this species, Columbia has agreed to contact the VDGIF to minimize potential impacts on this species. Therefore, we conclude that impacts on this species would be minimized and the Project would not likely cause a trend in federal listing.

4. Land Use, Recreation, and Visual Resources

4.1 Land Use

Columbia's proposed modifications at 17 locations along the existing Line WB2VA pipeline would affect a total of 37.9 acres of land during construction. About 27.0 acres would be retained for permanent operation activities. Of this, 26 acres is currently existing rights-of-way, fenced facilities, and access roads, and about 1.0 acre would be new permanent easement. The remaining acreage would be returned to pre-construction uses or per landowner agreement. Existing land use is listed as follows, and potential land use impacts are described in the following subsections.

- Agricultural Land – actively cultivated land used for row crops;
- Industrial Land – existing natural gas fenced facilities;
- Open Land – undeveloped, non-forested land, and existing rights-of-way;
- Open Water – surface waters, such as lakes and rivers;
- Residential – generally mowed areas with nearby residential housing;
- Upland/Forested – coniferous dominated forests and woodlands, and deciduous dominated forests and woodlands; and
- Wetland – palustrine emergent wetlands

Agricultural Land

The Project would affect about 0.1 acre of agricultural land during construction. Potential impacts on agricultural land associated with construction would include the temporary reduction in agricultural production for land that is cultivated. Following construction, no agricultural land would be retained as permanent right-of-way. All agricultural land disturbed by construction of the Project would be restored to its current use once construction is completed. Columbia would follow the requirements of its ECS for to minimize impacts on agricultural land.

Forest Land

About 2.4 acres of upland/forest land would be impacted by the Project. Following construction, 1.6 acres would be allowed to revert to pre-construction conditions and the remaining 0.8 acre would be converted to maintained right-of-way. Impacts on upland forest lands would be long-term, as it would take 20 years or more for mature trees to re-establish. However, the small amount of acreage cleared would not constitute a significant impact on forest land.

Open Land

Approximately 20.9 acres of open land would be affected by the Project during construction. Open land includes all non-forested lands, non-residential cleared lands, and existing rights-of-way. Following construction, approximately 17.2 acres would continue to be used as permanent rights-of-way. The remaining 3.7 acres would be restored and returned to pre-construction conditions and use.

Wetlands

Approximately 0.1 acre of wetland would be temporarily impacted by the Project. This wetland is located within the existing right-of-way at the Swift Run Crossover site. No installations or modifications are proposed at the wetland, but construction vehicles would be required to travel across the wetland to access the facility. Following construction, the wetland would revert to pre-construction use and conditions. Additional information on wetland impacts, mitigation, and restoration is provided in section B.2.3.

Open Water

About 1.4 acres of open water, including the South Fork Shenandoah River, would be temporarily impacted during construction of the Project. Open water would return to pre-construction conditions and use following construction activity. Section B.2.2 and B.3.2. discusses the impacts and mitigation associated with the proposed waterbody crossing.

Industrial Land

About 7.5 acres of industrial land consisting of existing natural gas facilities would be affected by the Project. Following construction, all industrial lands would continue to be used for operational activities. Approximately 4.3 acres of industrial land at the off-site contractor

yards would also be used during construction. These areas would be restored to pre-construction conditions and use.

Residential Land

About 0.9 acre of residential land would be affected by the Project. Following construction, Columbia would restore the residential land to pre-construction conditions.

Columbia designed the CWA to minimize impacts on property owners and has developed site-specific residential plans for residences located within 50 feet of the CWA. These plans are provided in appendix B. We have reviewed the plans and find them acceptable; however, we encourage the owners of each of these residences to review the plans and provide us comments on the plan for their individual property.

Temporary impacts on residential areas may include disturbance of lawns, removal of fences, mailboxes, and other minor residential accessory structures; removal of ornamental shrubs; loss of shade trees; disturbance of streets and driveways; disruption of household utilities; altered traffic patterns; and the noise and minor and temporary impacts of construction activities.

Columbia would abide by the ECS to minimize impacts on nearby residents. Additional steps taken by Columbia to reduce potential impacts in residential areas would include:

- communicate directly with landowners on the proposed construction activities and anticipated schedules;
- ensure driveway access is not blocked by construction activities and inadvertent disruption of utilities is promptly remedied;
- install safety fence/exclusion fence extending 100 feet on either side of the CWA;
- secure trenches with safety fencing each day as construction activities come to a close within residential areas;
- construct generally from Monday through Saturday during daylight hours (in extraordinary circumstances where work has been delayed due to weather or other unexpected events, Columbia may elect to work past 5:00 p.m. and/or on a Sunday in order to shorten the duration of disturbance in residential areas);
- implement dust mitigation measures as necessary;
- restore disturbed areas within the permanent rights-of-way and residential areas to pre-construction conditions after construction; and
- adhere to the traffic plan per the VDOT permit at Grove Hill River Road.

Given the measures outlined above, in conjunction with the site-specific plans, overall impacts on residences from construction of the Project would generally be short-term. Depending on the specific vegetation impacted and its ability to be restored to pre-construction conditions, some residences would experience long-term impacts associated with the visual changes in the landscape. Compensation would be negotiated between individual landowners and Columbia during the easement process.

4.2 Planned Development

We identified no planned residential, industrial, or commercial developments within 0.25 mile of the Project and zoning districts indicate a lack of large-scale development designations near the proposed Project facilities.

4.3 Public Land, Conservation Land, Recreation, and Special Interest Areas

Public or Conservation Land

The Project does not cross any public or conservation land, however, there are two conservation areas located within 0.25 mile of the Project area: George Washington and Jefferson National Forest (0.25 mile from the Basye Launcher) and Shenandoah National Park (200 feet from the Lydia Launcher site). Columbia indicated that its Project is not anticipated to have an effect on the identified public lands. Through consultation with the NPS, we concur that the Project would not have an effect on public lands. A discussion of the consultation with the NPS is provided in section 5.4 below. No conservation easements were identified for the Project in Virginia or West Virginia.

We received comments from the WVDNR and the NGOs regarding the impacts of the Project on the George Washington National Forest including the Wardensville Wildlife Management Area. Columbia has since provided the WVDNR with better mapping that made it clear the Project would not affect public lands.

Natural, Recreational, or Scenic Areas

The Project area does not cross any designated natural, recreational, or scenic areas. The Basye Launcher is in close proximity to State Route 263, which is listed in Virginia Department of Transportation Scenic Roads as a Virginia Byways and the America's Byways in Virginia under (VDOT, 2013). While the Project does not cross the roadway, the access road to the Basye Launcher is connected to the public roadway. Columbia's implementation of its ECS, which includes measures to keep public roads clean from dirt, mud, and other construction debris, would minimize potential impacts on this roadway.

The South Fork Shenandoah River is used for recreation activities such as canoeing. The Grove Hill public access and boat launching area is located on the south bank of the river, approximately 305 feet upstream of the construction workspace. Columbia would construct within half of the river at a time, allowing the river to flow at all times during construction. Appropriate safety procedures, such as construction warning signs and lighted buoys, would also be used to protect workers, recreational users, and aid in navigation for watercraft traffic. Based on Columbia's construction techniques, and through the use of safety measures, we conclude that impacts on recreational use would be minor and temporary.

4.4 Visual Resources

The Project could alter existing visual resources in three ways: (1) construction activity and equipment may temporarily alter the viewshed; (2) clearing along the right-of-way during

construction would alter existing vegetation patterns; and (3) aboveground facilities would create permanent alterations to the viewshed.

The Project would have limited and/or temporary impacts on visual and scenic resources. Sixteen of the Project sites contain existing aboveground facilities, and the South Fork Shenandoah River crossing would be within and immediately adjacent to the existing right-of-way. There would be temporary impacts associated with construction at all the facilities. Once construction is complete, the above-ground facilities would be altered, but the degree of alteration would be minimal.

We received a comment from the VDCR that recommended we coordinate with the NPS in order to assess impacts on Skyline Drive at Shenandoah National Park. Because the Shenandoah National Park is a highly sensitive area that is located within one mile of three of the Project facilities (Swift Run Crossover, Hensley Hollow Mainline Valve, and Lydia Launcher), we requested that Columbia consult with the NPS to determine whether the Project could impact visual resources at the park. In a letter dated September 14, 2015, the NPS determined that two of the Project facilities (Swift Run Crossover and Lydia Launcher) would not affect the viewshed of the park. They did determine that the Hensley Hollow project area would have an effect on the viewshed. The NPS concurred that the impacts would be minimal and limited to the timeframe of construction, and they concluded that as long as there was no tree removal and the work remained within the existing right-of-way, there would be no long term impacts on visual resources of the Shenandoah Nation Park. We agree with this conclusion.

The Project does not cross any America's Byways, or state-designated scenic area roads or rivers. As discussed above, the, access road to the Basye Launcher connects to a federally-designated scenic road. However, visual impacts would be temporary or extremely minimal since the Basye Launcher is an existing facility and there would be no tree clearing.

No federally designated Wild and Scenic Rivers would be crossed by the Project. Although the South Fork Shenandoah River is proposed for both inclusion as a Virginia Water Trail for navigable recreation and considered "worthy" of designation as a Virginia Scenic River, it is not officially listed as either (Buchanan, 2013). The approximate 1,250 foot replacement segment of pipeline proposed at the South Fork Shenandoah River crossing would occur within and adjacent to existing rights-of-way (at approximate existing milepost 29.1 on Line WB2VA). Approximately 1.0 acre of new permanent right-of-way would be required for operation of the Project at this location. However, Columbia would replant native woody shrubs and trees within riparian areas along temporary workspaces and within the existing right-of-way of the dual lines to be abandoned in place in coordination with agency recommendations and landowner consent. Therefore, visual impacts resulting from operation of the Project would be minimized.

The majority of visual impacts associated with the Project would be limited to the period of active construction, resulting from the presence of construction equipment and personnel at Project sites, with minimal permanent impacts. We conclude that the Project would not have a significant impact on visual resources.

4.5 Hazardous Waste Sites

Columbia reviewed the publically available federal (USEPA, 2015) and state (VDEQ, 2014) databases for potentially hazardous or contaminated sites within the Project area. The databases provide information about facilities, sites, or places subject to environmental regulation or of environmental interest. These include sites that use and/or store hazardous materials, waste producing facilities operating under permits from the U.S. Environmental Protection Agency (USEPA) or other regulatory authorities, superfund sites, storage of petroleum, petroleum release sites, and solid waste sites. The identification of a site in the databases does not necessarily mean that there is contaminated soil or groundwater at the site.

The Project does not cross any hazardous or contaminated sites listed in the federal or state databases. However, Columbia performed a search within 0.25 mile of each facility, and identified four sites listed in the USEPA database. The four sites are listed below:

- Howell Metal Company (ID# 110000341425): a copper manufacturing company, located 0.15 mile east of the Howell Metals Valve Site, just across New Market Depot Road. The facility is listed under the Resource Conservation and Recovery Act (RCRA) database as a large hazardous material quantity generator.

- Kennametal Inc. (ID# 110005256800): a cutting tool and machine tool accessory manufacturing company, located 0.23 mile southeast of the Howell Metals Valve Site, just across New Market Depot Road. The facility is listed under the RCRA database as a large quantity hazardous material generator.

- Bickers Compressor Station (ID# 110006458190): a natural gas compressor station, the same location as the Bickers Compressor Station site on Celt Road. The facility is listed under the RCRA database as a small quantity hazardous material generator.

- Lost River Compressor Station (ID# 110006857240): a natural gas compressor station, the same location as the Lost River Compressor Station Site on Upper Cove Road. The facility is listed under the RCRA database as a larger quantity hazardous material generator.

Columbia also compared the locations of county landfills to the Project sites. The nearest landfill to the Project is the Greene County Landfill, located 2 miles east of Bickers Compressor Station (Greene County, 2015).

If unexpected contaminated media is encountered, Columbia would address the contamination using best management practices developed in coordination with the WVDEP or the VDEQ. At a minimum, waste would be collected and removed from the work site promptly and would be disposed in a proper manner or recycled, as appropriate. We conclude these measures are appropriate.

5. Cultural Resources

Section 106 of the National Historic Preservation Act, as amended, requires that the FERC take into account the effects of its undertakings on properties on or eligible for listing in the National Register of Historic Places (NRHP) and afford the Advisory Council on Historic Preservation an opportunity to comment on its undertakings. Columbia, as a non-federal party, is assisting the Commission in meeting these obligations under Section 106 and the implementing regulations at 36 CFR 800 by preparing the necessary information, analyses, and recommendations, as authorized by 36 CFR Part 800.2(a)(3).

5.1 Cultural Resource Investigations

West Virginia

The Project facilities in West Virginia include the Lost River Compressor Station, Drip #1 and Drip #2 in Hardy County. All of the work is at existing above-ground facilities. Columbia has a current (2015) Blanket Agreement with the West Virginia State Historic Preservation Office (SHPO) that exempts certain activities at existing facilities from additional cultural resources survey. Columbia provided Project information to the West Virginia SHPO in order to determine if any additional survey was needed. In a letter dated April 3, 2015, the West Virginia SHPO concurred that no additional survey was needed and the Project would have no effect on historic properties.

Virginia

Columbia conducted Phase I cultural resources survey of the proposed Project areas in Virginia including pipeline right-of-way, aboveground facilities, extra workspace, and access roads. No survey was conducted at three Project locations that were either previously disturbed or have been previously surveyed (Orkney Main Line Valve, Smith Creek Receiver, Hensley Hollow Receiver). Phase I cultural resources survey was conducted at the portions of the other 11 facilities that have not been previously surveyed. The total acreage of the Project in Virginia, including access roads, is approximately 27.3 acres. Portions of 5 locations (2.9 acres) had been previously surveyed and the remaining 22.1 acres were surveyed for this Project.

Background research identified three previously recorded sites within or adjacent to the Project; however, none of these sites were re-identified during survey. Two previously recorded historic resources (039-5027 and 039-5028) are located adjacent to the Bickers Compressor Station and were re-visited as part of the survey. Both of these properties were recommended as not eligible for listing on the NRHP. The cultural resources survey resulted in the identification of one newly recorded pre-contact archaeological site, one isolated find, two aboveground resources, and two cemeteries located within or adjacent to the Project areas. The aboveground resources include a house and associated structures (039-5039) and a railroad culvert (069-5296). The archaeological site (44PA0299), isolated find, and the residence do not appear to meet the criteria of eligibility for listing on the NRHP. The railroad culvert has been recommended as eligible for listing in the NRHP. Currently a road goes through the railroad culvert, and Columbia intends to use that road to access the Project. However, no modifications

to the road or culvert are anticipated, and Columbia recommended that there would be no effect on the historic property.

The two unnamed cemeteries were noted near the Project, but outside the area of potential effects. The first is located approximately 75 feet south of a proposed access road leading to the northern portion of the Shenandoah River Crossing, and its boundaries are clearly recognizable. The second is on the south side of the Shenandoah River Crossing. It is located between the pipeline right-of-way and the adjacent electrical transmission line right-of-way. This small, fenced cemetery occupies approximately 0.1 acre and is actively maintained.

Columbia provided the survey reports to the Virginia SHPO and the FERC. In a letter dated May 26, 2015, the Virginia SHPO concurred with the recommendations that the pre-contact site, isolated find, and residence were not eligible for listing on the NRHP, and stated that the railroad culvert is unlikely to be adversely affected by this project. We concur as well.

5.2 Native American Consultation

Columbia sent Project information, including a Project description and location maps, to the following 11 tribes: Absentee-Shawnee Tribe of Oklahoma; Catawba Indian Nation; Cherokee Nation; Delaware Nation; Delaware Tribe of Indians; Eastern Band of the Cherokee Indians; Eastern Shawnee Tribe of Oklahoma; Oneida Indian Nation; Shawnee Tribe; Tuscarora Nation; and United Keetoowah Band of Cherokee Indians.

The letters requested input from each of the tribes regarding the potential of the Project to affect archaeological sites, burials, and traditional cultural properties of concern to each tribe. The Delaware Nation stated that the Project would not endanger cultural or religious sites of interest to the tribe; however, the tribe asked that in the event of an unanticipated find during construction, activities be suspended in the vicinity of the find and that the tribe be notified. The Delaware Nation's request has been incorporated into the Unanticipated Discovery Plans for the Project. The United Keetoowah Band of Cherokee Indians indicated they have no comments or objections to the Project and asked that the tribe be notified if any human remains are discovered. To date, no other responses have been received. We sent our NOI to the tribes listed above. To date, we have received no response.

Columbia developed Unanticipated Discovery Plans for Virginia and West Virginia, to be implemented in the event that previously unreported archaeological sites or human remains are encountered during the Project. The plans provide for the notification of interested parties, including Native American tribes, in the event of any discovery. We find these plans acceptable.

Based on the results of the cultural resources survey, and through consultation with the Virginia and West Virginia SHPOs and Native American tribes, we believe that the Project would have no effect on historic properties.

6. Air Quality and Noise

6.1 Air Quality

Air quality impacts resulting from the Project would include emissions from fossil-fueled construction equipment and fugitive dust; however, no significant operational or permanent air quality impacts would be experienced. Furthermore, the Project would not add or modify any compressor units and would, therefore, have no significant impact on operational emissions.

Table 7 presents the predicted fugitive dust, equipment, and vehicle emissions during construction of the Project. Construction activities along the pipeline right-of-way and at the aboveground facilities (including abandonment work areas) would result in emissions of fugitive dust from vehicular traffic and soil disturbance, and combustion emissions from diesel and gasoline fired construction equipment. Such air quality impacts, however, would generally be temporary and localized, and are not expected to cause or significantly contribute to an exceedance of the National Ambient Air Quality Standards (NAAQS). Large earth-moving equipment and other mobile sources are sources of combustion-related emissions, including criteria pollutants (*i.e.*, nitrogen oxides (NO_x), carbon monoxide (CO), volatile organic compounds (VOCs), sulfur dioxide (SO_2), particulate matter less than 10 microns in aerodynamic diameter (PM_{10}), and small amounts of hazardous air pollutants. Emissions from equipment would be short-term and localized in any given area as equipment and activities move along the route. Construction equipment would be operated on an as-needed basis, mainly during daylight hours. Further, Columbia would maintain fossil-fueled construction equipment in accordance with manufacturer's recommendations to minimize construction-related emissions.

Table 7
Construction Emissions Summary for the Project

	Criteria Pollutants (tpy)							
Emissions Type	**NO_x**	**CO**	**VOC**	**PM_{10}**	**$PM_{2.5}$**	**SO_2**	**CO_2e**	**HAPs**
Pipeline Non-Road Emissions	2.97	1.15	0.34	0.45	0.45	0.20	1,180	0.04
On- Road Emissions	4.74	13.20	0.79	0.18	0.18	0.02	2,193	0.21
Construction Fugitive Dust	-	-	-	4.09	0.61	-	-	-
Roadway Fugitive Dust	-	-	-	4.20	0.42			
Total Construction Emissions	**7.71**	**14.35**	**1.13**	**8.92**	**1.66**	**0.22**	**3,373**	**0.25**

tpy = tons per year
NO_x = oxides of nitrogen.
VOC = volatile organic compound.
CO = carbon monoxide.
SO_2 = sulfur dioxide.
PM_{10} = particulate matter with an aerodynamic diameter of 10 microns or less.
$PM_{2.5}$ = particulate matter with an aerodynamic diameter of 2.5 microns or less.
CO2e = carbon dioxide equivalent.
HAPs = hazardous air pollutants.

The majority of air emissions produced during construction activities would be PM_{10} and particulate matter less than 2.5 microns in aerodynamic diameter ($PM_{2.5}$) in the form of fugitive dust. Fugitive dust would result from land clearing, grading, excavation, backfilling, concrete work, and vehicle traffic on paved and unpaved roads. The amount of fugitive dust generated would be a function of construction activity, soil type, soil moisture content, wind speed, precipitation, vehicle traffic, vehicle types, and roadway characteristics. Emissions would be greater during dry periods and in areas of fine-textured soils subject to surface activity. Fugitive particulate emissions generated during construction would be mitigated, if necessary through the implementation of several measures. These procedures would include spraying disturbed areas of dirt/gravel roads with water; covering areas susceptible to fugitive dust with mulch or tackifier; installing fencing in areas susceptible to dust to reduce wind speeds; modifying the speed of truck and equipment traffic in disturbed areas or on dirt/gravel roads; and/or removing dirt tracked onto paved roads by construction equipment. In addition, construction equipment would be operated only on an as-needed basis and areas disturbed by construction would be stabilized in accordance with the ECS.

Currently, all counties affected by the Project are designated by the USEPA as in attainment with the NAAQS for all criteria pollutants; therefore, a comparison of the construction-related emissions to the General Conformity Thresholds is not required.

The proposed Project does not involve the construction or modification of compressor units at the existing compression facilities. The addition of the pig launchers/receivers at the Lost River Compressor Station and Bickers Compressor Station would result in minimal emissions when operated approximately every seven years. Therefore, there would be no significant impacts on air quality during operation.

In conclusion, the estimated air emissions from construction of the Project would be minor and transient in nature, with negligible impact on populated areas or regional air quality. We therefore conclude that emissions from construction-related activities for the Project would not have a significant impact on local or regional air quality.

6.2 Noise

Construction of the proposed Project would affect the local noise environment, but operation of the Project would not result in any significant change from current noise levels. Only temporary and periodic increases in operational noise would occur at the Lost River Compressor Station and Bickers Compressor Station during operation of the pig launcher/receivers which would occur infrequently, about once every seven years. Furthermore, we do not expect such operations to exceed FERC's noise criteria of 55 decibels on the A-weighted scale.

Construction of the proposed Project would range from 14 to 75 days, depending on the site, and noise from equipment would occur during that time. Construction noise would be highly variable, as the types of equipment in use at each construction site would change with the construction phase and the type of activities. Noise generated during construction from the use of heavy construction equipment would be temporary in nature and typically limited to daytime

hours between 7:00 am to 6:00 pm. Because noise from construction activities would be temporary, no adverse or long-term impacts are anticipated.

7. Reliability And Safety

The transportation of natural gas by pipeline involves some risk to the public in the event of an accident and subsequent release of gas. The greatest hazard is a fire or explosion following a 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. Methane has an auto-ignition temperature of 1,000^{o}F 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 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.

The facilities associated with the proposed Project must be designed, constructed, operated, and maintained in accordance with the USDOT Minimum Federal Safety Standards in 49 CFR Part 192. The regulations are intended to ensure adequate protection for the public and to prevent natural gas facility accidents and failures. The USDOT pipeline standards are published in Parts 190, 191, 192, and 199 of Title 49 of the CFR. For example, Part 192 of 49 CFR specifically addresses natural gas pipeline safety issues, prescribes the minimum standards for operating and maintaining pipeline facilities, and incorporates compressor station design, including emergency shutdowns and safety equipment (Sections 192.163-192.173). Part 192 also requires a pipeline operator to establish a written emergency plan that includes procedures to minimize the hazards in a natural gas pipeline emergency.

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. Pipe wall thickness and pipeline design pressures; hydrostatic test pressures; maximum allowable operating pressure; inspection and testing of welds; and frequency of pipeline patrols and leak surveys must also conform to higher standards in more populated areas.

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. Columbia did not identify any HCAs for the proposed Project facilities.

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.

Columbia's proposed Project would allow the running of smart pigs, permitting Columbia to obtain more complete and thorough information concerning the integrity and condition of the WB2VA pipeline. We conclude that this capability would increase the overall safety and reliability of the pipeline. Furthermore, facilities associated with the proposed Project must be designed, constructed, operated, and maintained in accordance with USDOT standards, including the provisions for written emergency plans and emergency shutdowns. Construction, and operation of Columbia's proposed facilities would not increase the risk to the public and we conclude that, with implementation of the above safety requirements during construction and operation of Columbia's facilities, they would be constructed and operated safely.

8. Cumulative Impacts

In accordance with NEPA and FERC policy, we evaluated the potential for cumulative effects of the Project in the context of the proposed action when added to other past, present, and reasonably foreseeable future activities. Cumulative impacts represent the incremental effects of a proposed action when added to other past, present, or reasonably foreseeable future actions, regardless of the agency or party undertaking such other actions. Cumulative impacts can result from individually minor, but collectively significant actions, taking place over a period of time.

This cumulative effects analysis generally follows the methodology set forth in relevant guidance (CEQ, 1997, 2005; USEPA, 1999) and focuses on potential impacts from the proposed Project on resource areas or issues where their incremental contribution would be potentially significant when added to the potential impacts of other actions. To avoid unnecessary

discussions of insignificant impacts and projects and to adequately address and accomplish the purposes of this analysis, an action must first meet the following three criteria to be included in the cumulative analysis:

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

Information regarding present and future planned developments was obtained through Columbia's research as well as our own. Columbia consulted sources including federal, state, and local agency and municipality websites; reports and direct communications; permit applications with various agencies; and paid and free-access database searches.

Potential cumulative impacts associated with current, proposed, or reasonably foreseeable future projects or activities in the region of influence were identified and are listed in appendix D. Past projects are considered in the baseline environmental analysis discussed in section B of this EA; therefore, this cumulative analysis is focused on the projects listed. For this analysis we included publicly known or recorded significant current or reasonably foreseeable future projects that are in the defined geographic range and timeframe. In total, 14 projects were identified: 3 natural gas projects, 3 transmission line projects, and 8 transportation projects. The geographical range includes:

- five projects within 5 miles;
- three projects within 5 to 15 miles; and
- six projects within 15 to 50 miles.

The region of influence varies for each resource. The resource discussions below state the region of influence for each resource, and discuss the projects that fall within that region. Potential impacts likely to be cumulative with the Project's impacts are related to geology and soils, water resources and wetlands, vegetation and wildlife, land use and visual resources, air quality and noise, and cultural resources. The proposed pipeline facilities could contribute to these cumulative impacts; however, Columbia would minimize adverse Project impacts by implementing appropriate measures as described in section B of this EA.

8.1 Geology and Soils

Geology

The general region of influence for geological resources is considered to be the counties in which the Project would occur. Ten other projects occur in the same counties as the Project (see table 8). The Project would largely occur within previously disturbed areas and Columbia does not anticipate the need for any blasting to take place. Because the Project involve modifications on surface structures, impacts on geologic resources at each discrete project location are either not expected, or would be minimal, thus any cumulative impacts on geologic resources in the affected counties would be less than significant.

Table 8 Cumulative Effects – Projects by County	
Proposed Project/Project Facility	**Project Timeframe**
Page County, VA	
South Fork Shenandoah River Crossing[a]	Early 2016 – October 2016
Grove Hill Launcher	Early 2016 – October 2016
VDOT - Route 211 Westbound Bridge over South Fork Shenandoah River	Early 2016
VDOT - Route 616	Fall 2017 – Summer 2018
VDOT - Route 340 Cub Run Bridge	Late 2016 – Unknown
Greene County, VA	
Swift Run Crossover	Early 2016 – October 2016
Lydia Launcher	Early 2016 – October 2016
Bickers Compressor Station	Early 2016 – October 2016
VDOT - U.S. 29 Improvement Projects	2016 – Unknown
Shenandoah County, VA	
Basye Launcher	Early 2016 – October 2016
Orkney Main Line Valve	Early 2016 – October 2016
Mt. Jackson Valve Site	Early 2016 – October 2016
New Market Valve Site Howell	Early 2016 – October 2016
Metals Valve Site	Early 2016 – October 2016
VDOT - Passage Creek Bridge Replacement	2015 – Spring 2016
WB XPress	2017 – 2018
VDOT - Route 600 North Fork Bridge	Spring 2017 – Fall 2017
VDOT - I-81 Northbound Pavement Rehabilitation	2013 – Oct 2015
Rockingham County, VA	
Harrisonburg Main Line Valve	Early 2016 – October 2016
Smith Creek Receiver	Early 2016 – October 2016
Hensley Hollow Receiver	Early 2016 – October 2016
Hensley Hollow Main Line Valve	Early 2016 – October 2016
Rt. 340 North Stuart Ave.	Early 2015 – September 2016
Circuit Harrisonburg-Endless Caverns 230k Double Line	Fall 2013 – June 2015
Hardy County, WV	
Lost River Compressor Station	Early 2016 – October 2016
Drip #1	Early 2016 – October 2016
Drip #2	Early 2016 – October 2016
WB XPress	2017 – 2018
[a] Use of Italics denotes Project facilities	

All of the Project facilities are located in landslide-susceptible areas. Although cumulative impacts on geological resources are assessed at a county-wide basis in general,

landslides are site-specific. Because no other projects are planned for the same ridge or steeply sloped parcels of land, potential cumulative impacts on landslide-susceptible areas are unlikely.

Seven of the Project facilities are located in areas where covered karst landforms potentially exist. The Project is designed to disturb only limited areas of surface soil and shallow bedrock. Because impacts on karst are minimal, no cumulative impacts on karst features are anticipated.

Portions of West Virginia and Virginia are known as oil, gas, and coal production areas. The proposed Project sites are not located within these portions of the states, and no natural gas wells, oil wells, or coal mines are planned within the same counties as the Project sites; therefore, no significant cumulative impacts related to these activities would occur.

The Project involves minimal ground disturbance during construction. Additionally, no other projects would occur in close enough proximity to similarly disturb geological resources. Therefore, we conclude that cumulative impacts on geological resources from the Project in consideration with other projects would be minor.

Soils

Impacts from the Project on soils are limited primarily to the project footprint during the period of construction. Cumulative impacts on soils would only occur if other projects are constructed at the same time and place as the proposed facilities. Therefore, the region of influence for cumulative impacts on soils is the footprint of the proposed Project. The WB XPress Project would include work at Columbia's Lost River Compressor Station in Hardy County, WV. The two projects are not expected to overlap in time, which would eliminate cumulative impacts. If the project would overlap, Columbia would minimize incremental impacts on soils through implementation of its ECS for both projects. Therefore, we conclude that cumulative impacts on soils from the Project in consideration with other projects would be minor.

8.2 Groundwater, Surface Water, and Wetlands

The region of influence considered for cumulative impacts on groundwater, surface water, and wetlands are the watersheds for the Project sites: Lost River (0207000305), Stoney Creek (0207000604), Linville Creek- North Fork Shenandoah River (0207000603), Smith Creek (0207000602), Hawksbill Creek- South Fork Shenandoah River (0207000509), Naked Creek-South Fork Shenandoah River (0207000508), and North Fork Rivanna River (0208000403). Eight projects were identified within the various watersheds for the Project, and are included in appendix D.

Groundwater

Construction activities for the Project would not require the withdrawal or use of groundwater; therefore, we do not anticipate Project construction or operations would affect groundwater quality or supply. Localized impacts may occur due to trenching and dewatering; however, these impacts would be short-term during construction only and minimized through

the use of best management practices. Given this, we do not expect the Project's minor additive impacts on groundwater would contribute to any cumulative impacts associated with groundwater quality, or withdrawal and depletion.

Surface Water

Construction of the Project would result in temporary impacts on the South Fork Shenandoah River. Potential increases of sedimentation and turbidity during construction are possible; however, Columbia has designed site-specific plans and measures to minimize potential impacts on waterbodies in proximity to the Project and at the crossing. Potential impacts are expected to be temporary in nature and mitigated through measures such as erosion control devices, cofferdams, and turbidity curtains.

There is a bridge replacement project planned by VDOT for the Route 340 Cub Run Bridge approximately 2 miles northwest of the South Fork Shenandoah River crossing. Cub Run is a tributary to South Fork Shenandoah River approximately 3 miles downstream of the crossing location. The bridge project would likely occur no earlier than 2016. The Route 211 Westbound Bridge Project over the South Fork Shenandoah River is also planned by the VDOT, and is scheduled for construction starting in 2016. The bridge construction is proposed 13 miles downstream of Columbia's proposed pipeline replacement at South Fork Shenandoah River. The Harrisonburg-Endless Caverns 230kV Double Circuit Line, Route 616, Route 340, I-81 Northbound Pavement Rehabilitation, and U.S. 29 Improvement Projects are also located within the same watershed as Columbia's proposed Project. Columbia also has plans to upgrade the Lost River Compressor Station as part of the WB XPress Project in 2017, as a separate project filed with FERC in Docket CP16-38-000.

Potential cumulative impacts from the Route 340 Cub Run Bridge Project include an increase in sedimentation, turbidity, foreign objects, removal of riparian vegetation, and increase in water temperature to South Fork Shenandoah River. The Harrisonburg-Endless Caverns 230kV Double Circuit Line, Passage Creek Bridge Replacement, Route 616, Route 600 North Fork Bridge, Route 340, I-81 Northbound Pavement Rehabilitation, and U.S. 29 Improvement Projects are not likely to impact the South Fork Shenandoah River, where the majority of potential impacts from Columbia's Project could occur. Potential cumulative impacts resulting from Columbia's Project, the Route 340 Cub Run Bridge Project, and the Route 211 Westbound Bridge Project, such as increased sedimentation, foreign objects, and fisheries and aquatic vegetation disturbance, are not likely to be significant due to the distance between Columbia's Project and the Route 211 Westbound Bridge Project and Columbia's proposed implementation of mitigation measures. No direct or indirect impacts on surface waters or wetland resources are anticipated at the Lost River Compressor Station as part of the WB XPress Project.

To compensate for the temporary and permanent loss of riparian vegetation at the South Fork Shenandoah River, which could contribute to minor increases in water temperature, Columbia would replant native woody shrubs and trees within riparian areas along temporary workspaces and within the existing right-of-way of the dual lines to be abandoned in place at the South Fork Shenandoah River crossing in coordination with agency recommendations and landowner consent.

As described in section B.2.2, effects from the construction and operation of the proposed pipeline facilities would be temporary, relatively minor, and would be further minimized by implementation of Columbia's ECS and the FERC Plan and Procedures. Therefore, we conclude that the Project's additive impacts on waterbodies would not contribute to significant cumulative impacts on water resources within the affected watersheds.

Wetlands

Construction of the Project would result in temporary impacts on 0.04 acre of wetlands at the Swift Run Crossover, and would not contribute to a permanent loss of any wetlands. The only other proposed project in the watershed is the U.S. 29 Improvement Project. That project would be required to apply for permits with the USACE if wetlands would be affected, leading to potential mitigation for impacts. As described in section B.2, effects from the construction and operation of the proposed Project facilities would be minor and minimized by implementation of Columbia's ECS, and the FERC Plan and Procedures. Therefore, we conclude that the Project's minor impacts on wetlands would not contribute to significant cumulative impacts on wetlands.

8.3 Vegetation, Wildlife, and Threatened, Endangered, and Special Status Species

Vegetation

The region of influence for cumulative impacts on vegetation was considered to be the area within 1 mile of Project sites due to the localized nature of the impacts. The Harrisonburg-Endless Caverns 230kV Double Circuit Line electric transmission project is planned to occur within 1 mile of the Harrisonburg Main Line Valve and Smith Creek Receiver Project sites and the WB Xpress Project includes a modification at the Lost River Compressor Station site. The Harrisonburg-Endless Caverns transmission project is scheduled to be completed by June 2015. The project would utilize 20 miles of an existing right-of-way and also requires acquisition of 6.8 acres of land. Because the acquired land is mostly agricultural and open land, permanent impacts on vegetative cover would be minimal, and thus no significant impacts on vegetative cover are expected when combined with impacts from Columbia's proposed Project. Because the land use at Lost River Compressor Station is currently industrial use and neither project (WB Xpress or Line WB2VA Integrity Project) would have permanent land use impacts, no cumulative impacts on vegetation are likely as a result of the projects.

Wildlife

The region of influence for cumulative impacts on wildlife was considered to be the counties in which the proposed Project would occur. Construction of the Project and other current, proposed, or reasonably foreseeable future projects would cause a cumulative impact on wildlife. These cumulative impacts would be most significant if the projects were constructed at or near the same time (including the timeframe for habitat restoration) and within proximity to one another.

The Harrisonburg-Endless Caverns transmission project would utilize an existing right-of-way and also requires acquisition of 6.8 acres of mostly open land for permanent use. Impacts on wildlife utilizing nearby habitat would be mitigated where possible, and thus no

significant impacts on wildlife and habitat are expected when combined with impacts from Columbia's proposed Project. The Route 340 Cub Run Bridge Project would likely involve clearing of up to 0.5 acre of trees. Due to the amount of existing forested areas directly surrounding this project and bordering Cub Run, the project would result in minimal impacts on wildlife. Because each of the other planned projects within the affected counties involve modifying existing structures, no new permanent or cumulative impacts on wildlife are likely as a result of the projects.

8.4 Land Use, Recreation, and Visual Resources

The region of influence that was identified for cumulative impacts on land use, recreation, and visual resources is within the counties in which the Project would occur (See table 9). Construction of the Project would temporarily impact existing agricultural, industrial, open land, open water, wetland, residential and upland forest land cover. Approximately 0.8 acre of forested land at the South Fork Shenandoah River crossing would be permanently converted to open land within the operational right-of-way. All other residential, agricultural, industrial and open lands would be restored to pre-construction conditions and uses. Recreational activities, such as canoeing and fishing, are common in the South Fork Shenandoah River. Since Columbia would perform construction using the cofferdam dry-crossing method, a portion of the river would remain usable by the public during the construction period. Therefore, no significant impacts on recreational uses are expected.

The WB XPress Project would involve construction at the Lost River Compressor Station site; however, changes in existing land cover and land use are not anticipated. Therefore, no cumulative impacts are expected as a result of this and the proposed Project.

The Harrisonburg-Endless Caverns project is scheduled to be complete by June 2015. It requires acquisition of 6.8 acres of land near the Endless Caverns Substation, which includes mostly agricultural land and open land.

Details of the Route 340 Cub Run Bridge Project are still being planned by the VDOT. The project would be 0.3 miles long and involve new construction adjacent to State Route 340, and a new bridge immediately to the west of the existing Cub Run Bridge. The new roadway might be built in space that is currently open land, and the new bridge might require the removal of approximately 0.5 acre of trees. This loss of forested land cover would be marginal when considering the amount of forested land adjacent to the loss. In conjunction with the proposed Project, total forested land loss would be less than 1.5 acres. However, the presence of forested land adjacent to the project sites and within the counties would likely compensate for any loss of ecosystem services. Any impacts from the other planned projects are expected to be negligible because they involve only modifications to existing structures.

Because Columbia would replant native woody shrubs and trees within riparian areas along temporary workspaces and within the existing right-of-way of the dual lines to be abandoned in place at the South Fork Shenandoah River crossing in coordination with agency recommendations and landowner consent, impacts on land cover from the proposed Project would be partially mitigated, and combined impacts on land use and cover from the proposed

Project and the Harrisonburg-Endless Caverns and Route 340 Cub Rub Bridge Projects would likely be less than significant.

Depending on the construction start date for the Route 340 Cub Run Bridge Project, there are potential impacts on traffic patterns and congestion in the area of the South Fork Shenandoah River crossing. These impacts are unlikely given the proposed Project construction plans. The other planned projects within the affected counties involve existing roadways and are not likely to impact significant amounts of new land, thus no cumulative impacts on land use and cover is expected.

Because Columbia's Project is mostly occurring at existing facilities, impacts on visual resources are for the most part short term. There would be an impact on visual resources at the South Fork Shenandoah River crossing due to vegetation clearing, but these would be partially mitigated by the proposed plantings described above. Therefore, we conclude that cumulative impacts on current land use and visual resources would not be significant.

8.5 Cultural Resources

The region of influence for cultural resources is the area of potential effect (APE) for both direct and indirect effects. The only historic property within the APE for the Project is a railroad culvert that has been recommended as eligible for listing in the NRHP. Currently a road goes through the railroad culvert, and Columbia intends to use that road to access the Project. We have determined, through consultation with the Virginia SHPO, that Columbia's Project would have no effect on the culvert, however, if any other project would use the same access road, there would be a slight potential for cumulative effects. The road is in Shenandoah County; however, none of the three other projects that we have identified would use this access road. Therefore, there is no potential for cumulative effects on historic properties.

8.6 Air Quality and Noise

The region of influence for cumulative impacts on air quality was considered to be the area within the same Air Quality Control Regions (AQCR) as the proposed Project, with an extent of 50 miles from a Project site. The Project scope does not propose any new sources of air emissions, and does not anticipate any long-term cumulative impacts on air quality. Potential impacts would be limited to fugitive dust, elevated levels of ambient pollutants, and temporary air emissions from mobile sources and construction equipment limited to daytime hours, during the construction period. Fourteen large projects have been identified within the same AQCR as the Project, which includes Valley of Virginia, Northeastern Virginia, and Allegheny, as well as within 50 miles of a Project site.

The nearest facility with a Title V Operating Permit is the Masco Builder Cabinet Group – Merillat Culpeper Plant in Culpeper County, Virginia, approximately 32 miles northeast of the Bickers Compressor Station Project site. The permit sites the facility as a major source due to potential emissions of VOCs and hazardous air pollutants (VDEQ, 2009). No new construction of Title V Operating Permitted-facilities was identified.

The WB XPress Project would likely involve additional permanent air impacts at Lost River Compressor Station in Hardy County, West Virginia and Strasburg Compressor Station in

Shenandoah County, Virginia. These impacts would abide by air quality and quantity standards. There is potential for cumulative impacts on air resources at the Lost River Compressor Station site because both the proposed and WB XPress Projects are planned for the site. However, air quality impacts from the proposed Project would be temporary. The Leidy Southeast Expansion Project involves construction of new pipeline and compressor stations; however, only modifications to existing facilities occur within the same AQCR as the proposed Project.

While air impacts from each of the 14 listed Projects are not significant independently, there are more impacts on air resources when considered together. These impacts are difficult to quantify given the availability of project plans and project specific environmental data. The cumulative impacts could include increased greenhouse gases as a result of more vehicular traffic after road improvements in Virginia. The proposed Project would not contribute to impacts such as these. Because the anticipated air impacts resulting from the proposed Project would be minimal and limited to the construction period only, they are not expected to combine with the other planned projects to contribute significantly to cumulative impacts in the AQCR.

The Project scope does not propose any new sources of noise, and does not anticipate any long-term cumulative impacts on noise quantity. Potential impacts would be limited to temporary sound emissions from mobile sources and construction equipment limited to daytime hours, during the construction period.

The region of influence for cumulative impact area of noise resources was considered to be the counties in which the Project would occur (see table 8). There is potential for cumulative noise impacts at the Lost River Compressor Station because of modifications planned at the site for both the proposed and WB XPress Projects. Noise from the proposed Project would be temporary; however, based on current project plans, there would likely be only a 6 month period between constructions of the two projects. Thus, impacts that would normally be considered temporary may seem longer to residents living near the site. The WB XPress Project would likely involve additional permanent noise impacts at Lost River Compressor Station. These impacts would abide by noise quantity standards. It is anticipated that the resulting cumulative impacts on noise quality resulting from the proposed Project, when added to the cumulative impacts of other identified projects, would be less than significant.

8.7 Conclusion on Cumulative Impacts

We conclude impacts associated with the Project would be relatively minor, and would be further mitigated by our recommended additional measures to reduce the environmental impacts associated with the Project. A majority of the cumulative impacts identified from other projects or activities in the region of influence would also be temporary and minor. We find that each of these projects would also result in mostly temporary and minor effects during construction and each current or foreseeable future project would also contribute to small impacts on resources in the counties identified as the region of influence for this Project. Consequently, a small, but insignificant cumulative effect is anticipated when the impacts of the Project are added to other projects in the regions of influence.

9. Alternatives

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

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

The proposed Project would include the installation and replacement of various valves, piping, and associated facilities at 17 locations within or adjacent to existing rights-of-way and operating facilities. These modifications are to accommodate the passage of smart pigs, which are devices for the internal inspection of pipeline. These proposed modifications and replacements are necessary in order to create a common diameter pipeline, allowing unimpeded passage of in-line inspection devices between the Lost River Compressor Station and the Bickers Compressor Station. The purpose of the Project is to meet the need for increased safety and reliability of the WB2VA pipeline system while maintaining uninterrupted natural gas service to Columbia's customers.

The Project does not propose to increase the existing capacity of natural gas delivery, and no new customers are planned; therefore system alternatives, alternative energy sources, and energy conservation are not viable options, and were not evaluated further.

Minor alignment shifts may be required prior to and during construction to accommodate currently unforeseeable site-specific constraints related to construction, safety, engineering, landowner, and/or environmental concerns. All such alignment shifts would be subject to review and approval by FERC prior to construction, with the exception of minor field realignments per landowner needs and requirements which do not affect other landowners or sensitive environmental areas such as wetlands.

9.1 No Action Alternative

Under the No-Action Alternative, Columbia would not construct the Project as described. If the Project is not constructed, temporary and permanent impacts identified in the project-specific resource evaluations would not occur.

If the No-Action Alternative is selected, the benefits of increased safety and reliability of the WB2VA pipeline system are not achieved, and the purpose and need of the Project is not met. Furthermore, federal law requires pipeline systems to be capable of internal inspection devices to provide early indications of pipeline integrity issues. Under the No-Action Alternative, performing these inspections to verify the integrity of the pipeline system would be hindered. This could result in disruptions of natural gas service to existing customers during unplanned outages and repairs to the existing pipeline system, and these could occur at inopportune times. The impact of unplanned service disruptions, for undetermined periods of

time, would have a significant economic impact to existing customers. And, if emergency repairs became necessary within the South Fork of the Shenandoah River, the potential for environmental and public impacts could be increased. Therefore, the No-Action Alternative is not preferable to the proposed Project.

9.2 Route Alternatives, Route Variations, and Construction Alternatives

A route alternative deviates from a proposed pipeline alignment for a substantial length and distance in an effort to reduce overall environmental impacts. Due to the short length of the proposed pipeline segments affected by this Project, we did not consider any route alternatives. Route variations are generally short and in proximity to the proposed route. For the South Fork of the Shenandoah River Crossing, Columbia evaluated several construction alternatives and route variations for the potential to minimize potential environmental impacts. These alternatives are described in its application and can be viewed on the Commission's eLibrary under Docket No. CP15-150-000. No comments were received during scoping which requested that we consider alternatives to the proposed route, route variations, or construction alternatives for the Project. Our review of the proposed Project found no significant environmental impacts that would drive an evaluation of additional alternatives.

Therefore, we conclude that the proposed Project is the preferred alternative to meet the Project objectives.

C. CONCLUSIONS AND RECOMMENDATIONS

We conclude that approval of the Line WB2VA Integrity Project would not constitute a major federal action significantly affecting the quality of the human environment. This finding is based on the above environmental analysis, Columbia's application and supplements, and implementation of Columbia's ECS and other plans (including the FERC Plan and Procedures), and our recommended mitigation measures. We recommend that the Commission Order contain a finding of no significant impact and that the following mitigation measures be included as conditions of any Certificate the Commission may issue.

1. Columbia 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. Columbia 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,** Columbia 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 EIs' authority and have been or will be trained on the implementation of the environmental mitigation measures appropriate to their jobs **before** becoming involved with construction and restoration activities.

4. The authorized facility locations shall be as shown in the EA, as supplemented by filed alignment sheets. **As soon as they are available, and before the start of construction,** Columbia 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.

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

5. Columbia shall file with the Secretary detailed alignment maps/sheets and aerial photographs at a scale not smaller than 1:6,000 identifying all route realignments or facility relocations, and staging areas, warehouse/storage yards, new access roads, and other areas that would be used or disturbed and have not been previously identified in filings with the Secretary. Approval for each of these areas must be explicitly requested in writing. For each area, the request must include a description of the existing land use/cover type, documentation of landowner approval, whether any cultural resources or federally listed threatened or endangered species would be affected, and whether any other environmentally sensitive areas are within or abutting the area. All areas shall be clearly identified on the maps/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 our 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, Columbia shall file an Implementation Plan with the Secretary for review and written approval by the Director of OEP. Columbia must file revisions to the plan as schedules change. The plan shall identify:

   a. how Columbia 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 Columbia 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 Columbia will give to all personnel involved with construction and restoration (initial and refresher training as the Project progresses and personnel change);

f. the company personnel and specific portion of Columbia's organization having responsibility for compliance;

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

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

(1) the completion of all required surveys and reports;

(2) the environmental compliance training of onsite personnel;

(3) the start of construction; and

(4) the start and completion of restoration.

7. Beginning with the filing of its Implementation Plan, Columbia shall file updated status reports with the Secretary on a **bi-weekly basis until all construction, abandonment, 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 Columbia'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 Columbia from other federal, state, or local permitting agencies concerning instances of noncompliance, and Columbia's response.

8. **Prior to receiving written authorization from the Director of OEP to commence construction or abandonment of any Project facilities**, Columbia shall file with the Secretary documentation that it has received all applicable authorizations required under federal law (or evidence of waiver thereof).

9. Columbia 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.

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

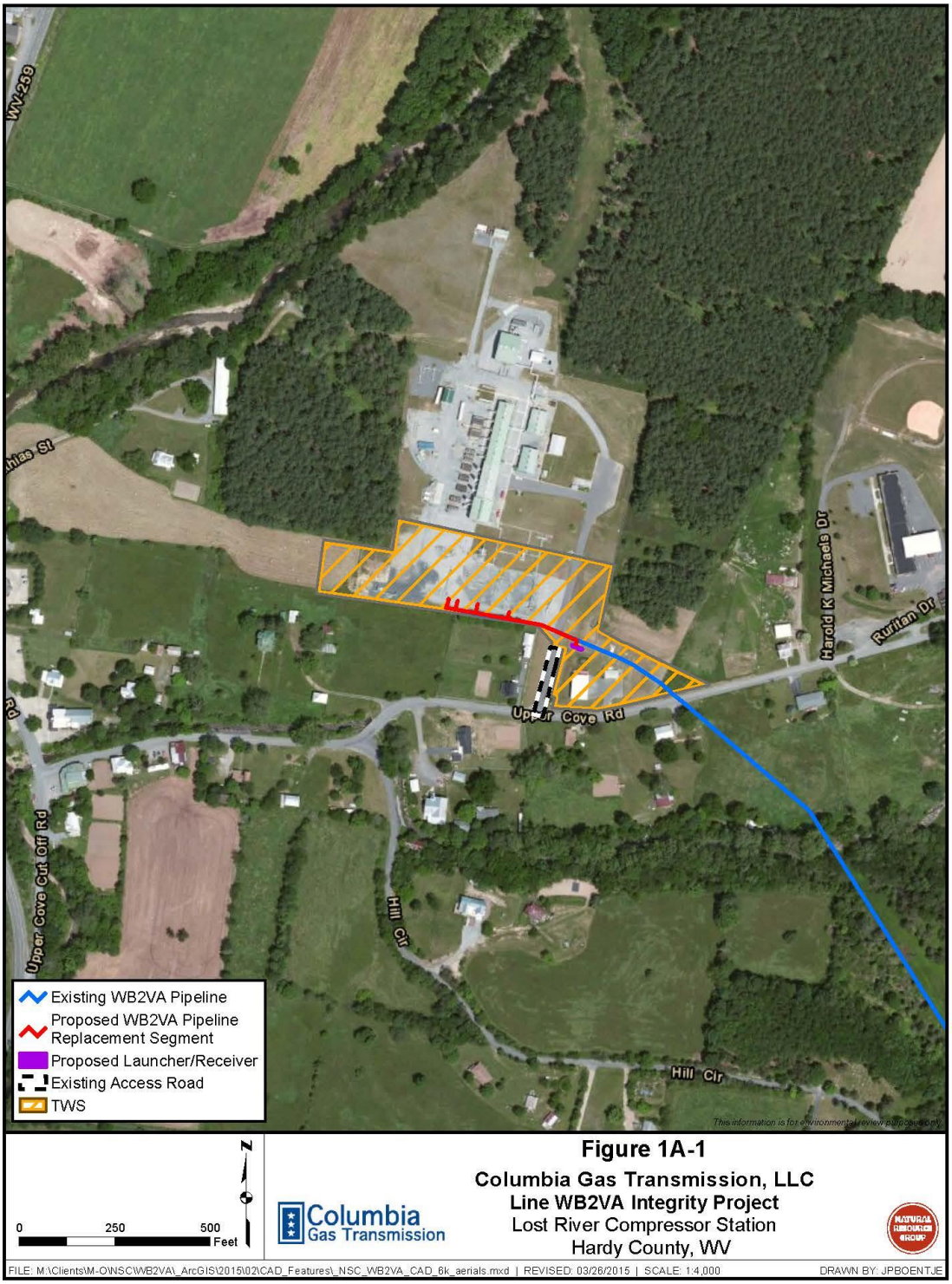
    a. that the facilities have been constructed and installed in compliance with all applicable conditions, and that continuing activities will be consistent with all applicable conditions; or

    b. identifying which of the Order conditions Columbia 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.

11. **Prior to construction in Hardy County, West Virginia,** Columbia shall use the West Virginia Restoration Planting Community Prediction Tool, Version 1.0 for guidance in determining the appropriate species for restoration/reclamation, provide the WVDNR a species list of proposed trees and shrubs and composition of seed mixes for review, and file with the Secretary the final species/seed mixes and WVDNR comments.

Appendix A

Maps of the Pipeline Route and Facilities for the WB2VA Integrity Project


WV-259
Harold K Michaels Dr
Ruritan Dr
Upper Cove Rd
Upper Cove Cut Off Rd
Hill Cir
Hill Cir
Existing WB2VA Pipeline
Proposed WB2VA Pipeline Replacement Segment
Proposed Launcher/Receiver
Existing Access Road
TWS
This information is for environmental review purposes only
0
250
500
Feet
Columbia Gas Transmission
Figure 1A-1
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
Lost River Compressor Station
Hardy County, WV
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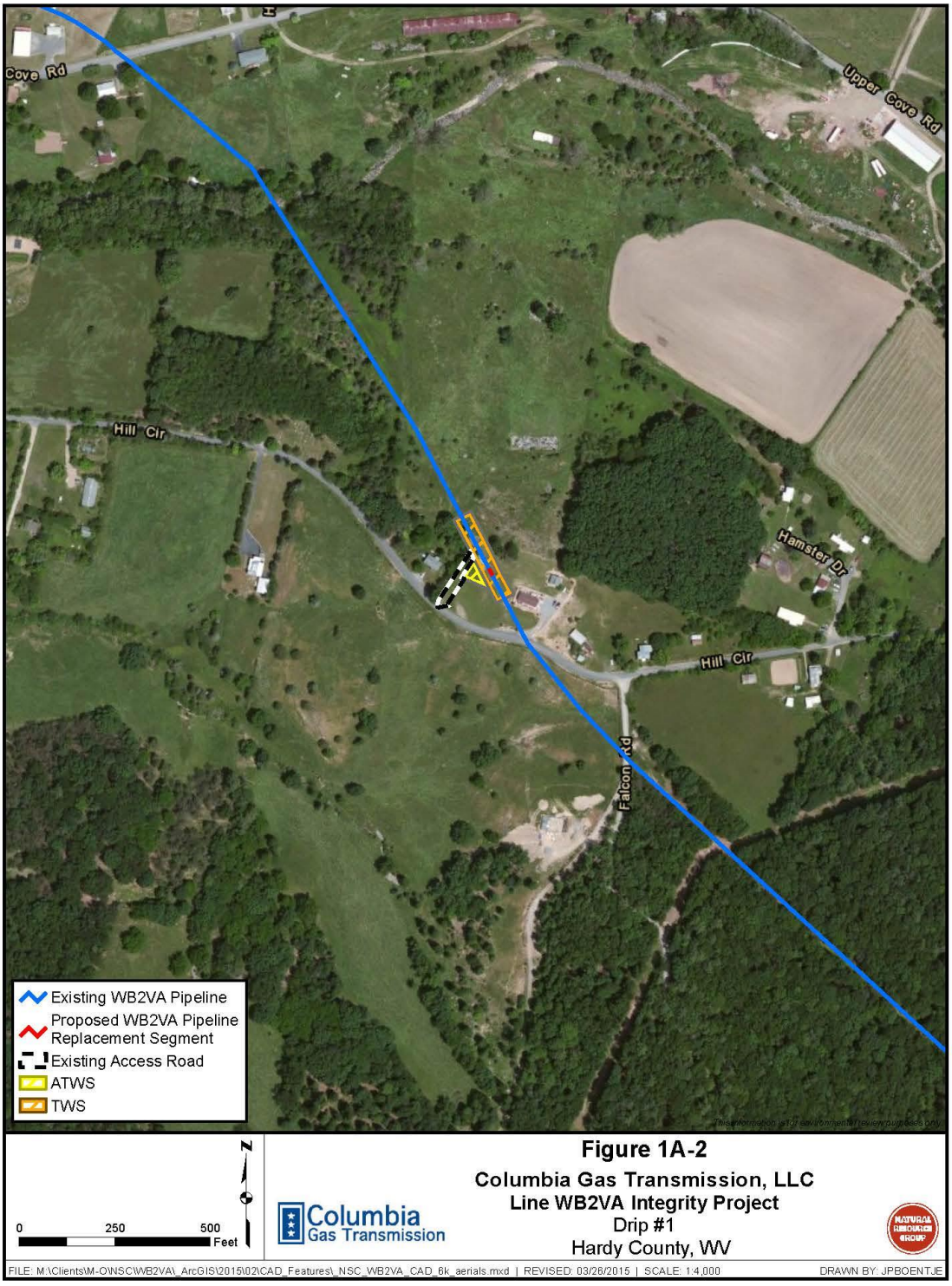
Cove Rd
Upper Cove Rd
Hill Cir
Hamster Dr
Hill Cir
Falcon Rd
Existing WB2VA Pipeline
Proposed WB2VA Pipeline Replacement Segment
Existing Access Road
ATWS
TWS
N
0
250
500
Feet
Columbia Gas Transmission
Figure 1A-2
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
Drip #1
Hardy County, WV
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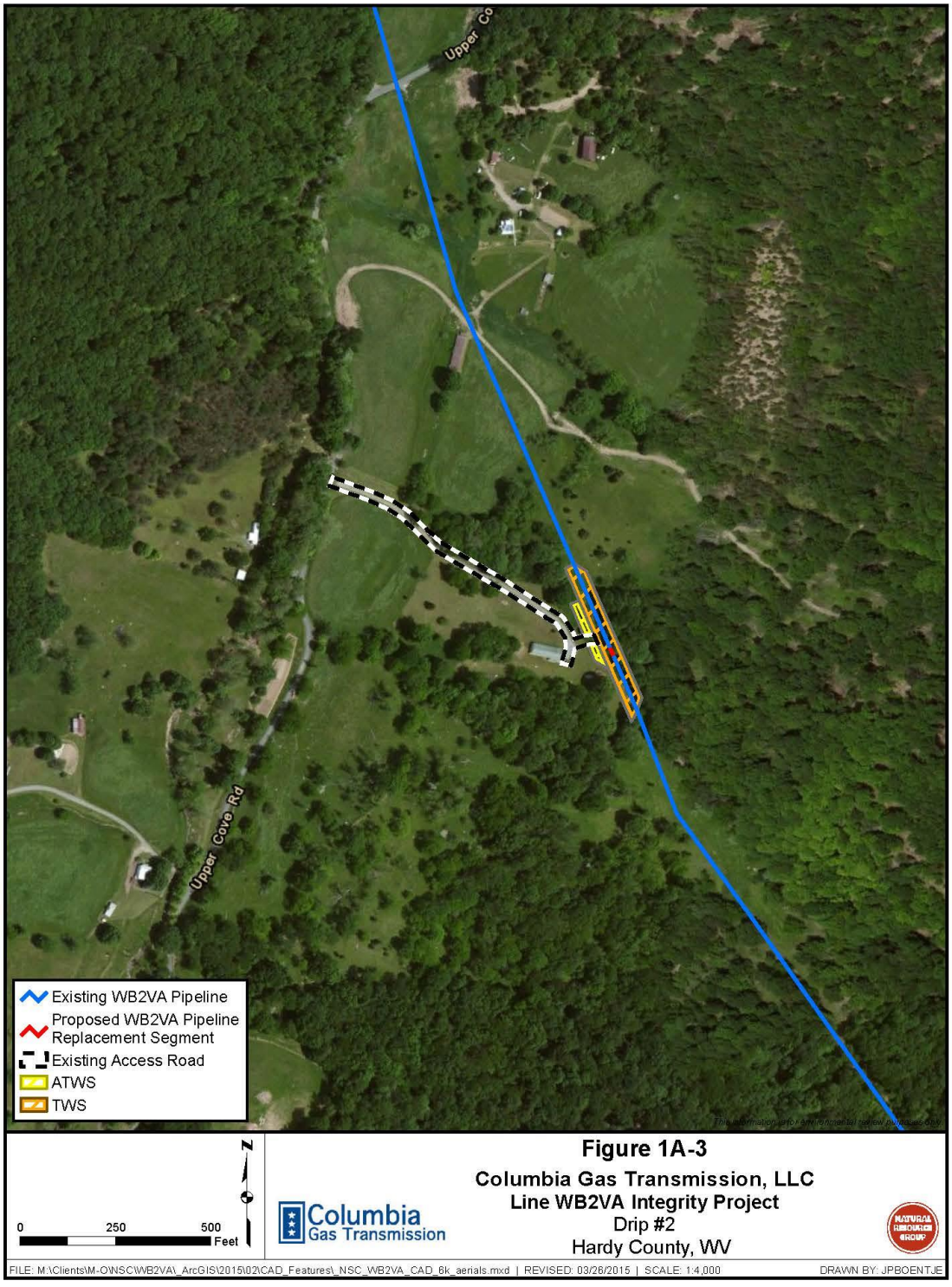
Upper Co
Upper Cove Rd
Existing WB2VA Pipeline
Proposed WB2VA Pipeline Replacement Segment
Existing Access Road
ATWS
TWS
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Feet
Columbia Gas Transmission
Figure 1A-3
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
Drip #2
Hardy County, WV
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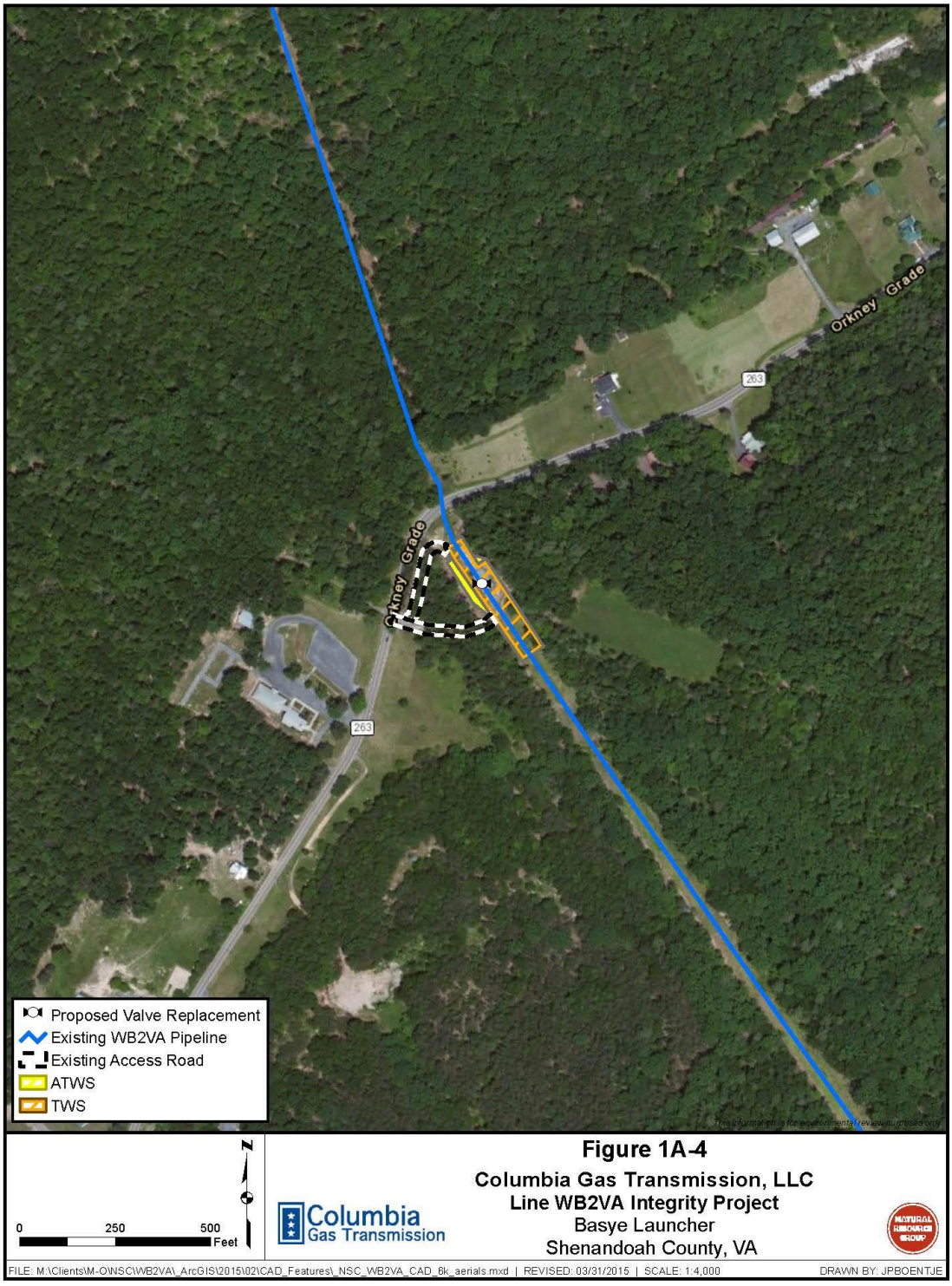
Orkney Grade
263
Orkney Grade
263
Proposed Valve Replacement
Existing WB2VA Pipeline
Existing Access Road
ATWS
TWS
N
0
250
500
Feet
Columbia Gas Transmission
Figure 1A-4
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
Basye Launcher
Shenandoah County, VA
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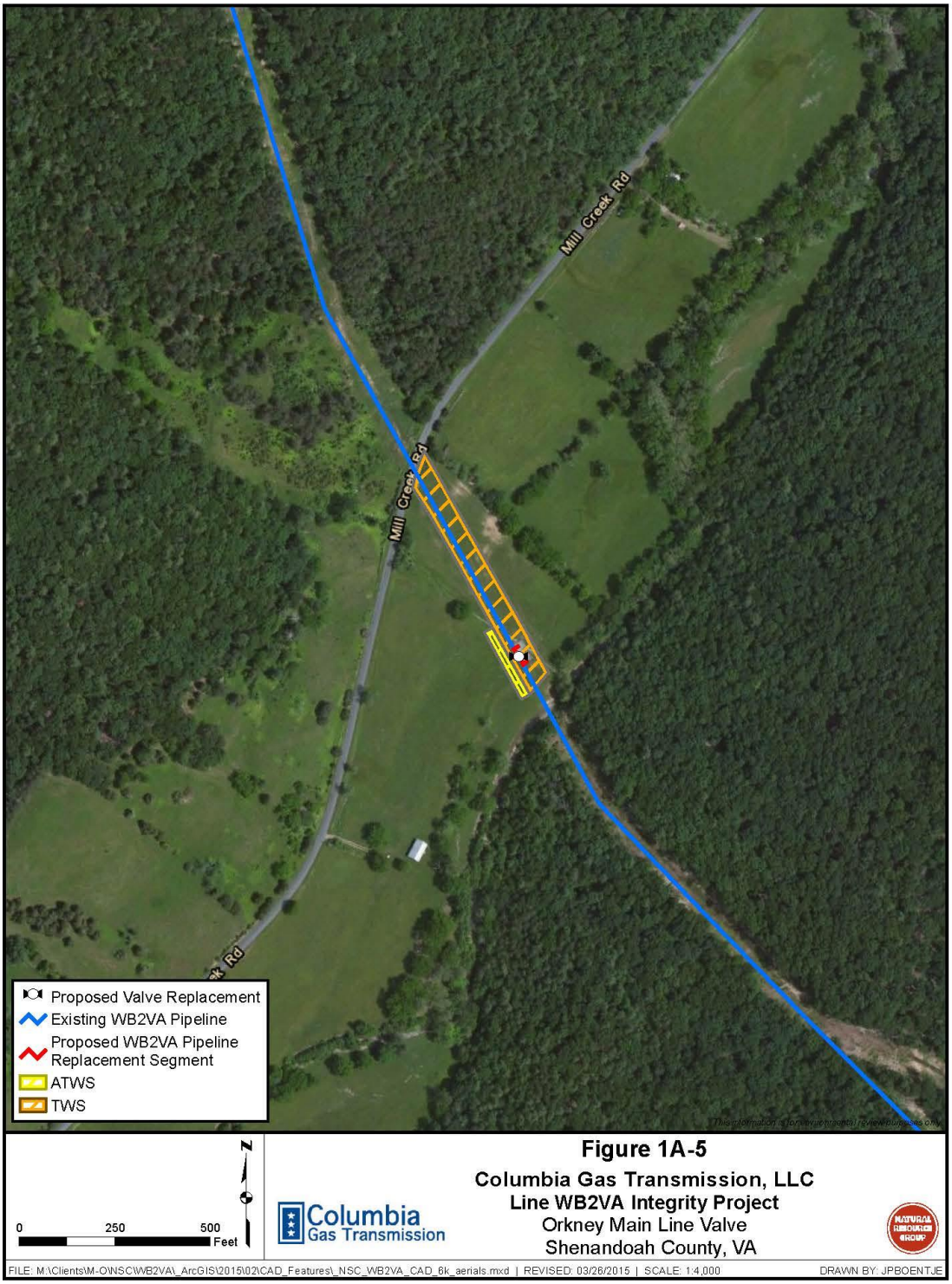
Mill Creek Rd
Mill Creek Rd
Proposed Valve Replacement
Existing WB2VA Pipeline
Proposed WB2VA Pipeline Replacement Segment
ATWS
TWS
N
0
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500
Feet
Columbia Gas Transmission
Figure 1A-5
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
Orkney Main Line Valve
Shenandoah County, VA
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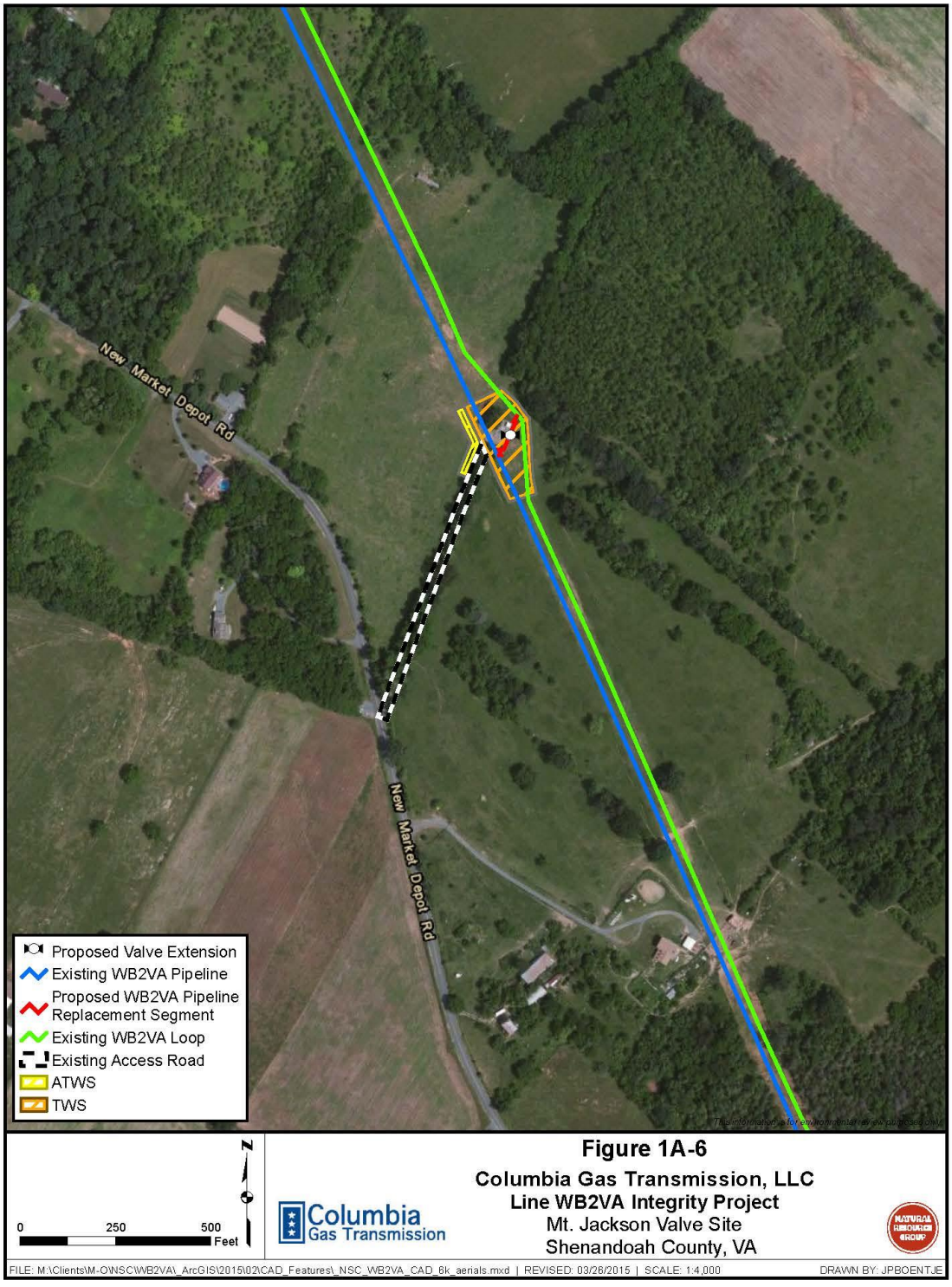
New Market Depot Rd
New Market Depot Rd
Proposed Valve Extension
Existing WB2VA Pipeline
Proposed WB2VA Pipeline Replacement Segment
Existing WB2VA Loop
Existing Access Road
ATWS
TWS
0
250
500
Feet
Columbia Gas Transmission
Figure 1A-6
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
Mt. Jackson Valve Site
Shenandoah County, VA
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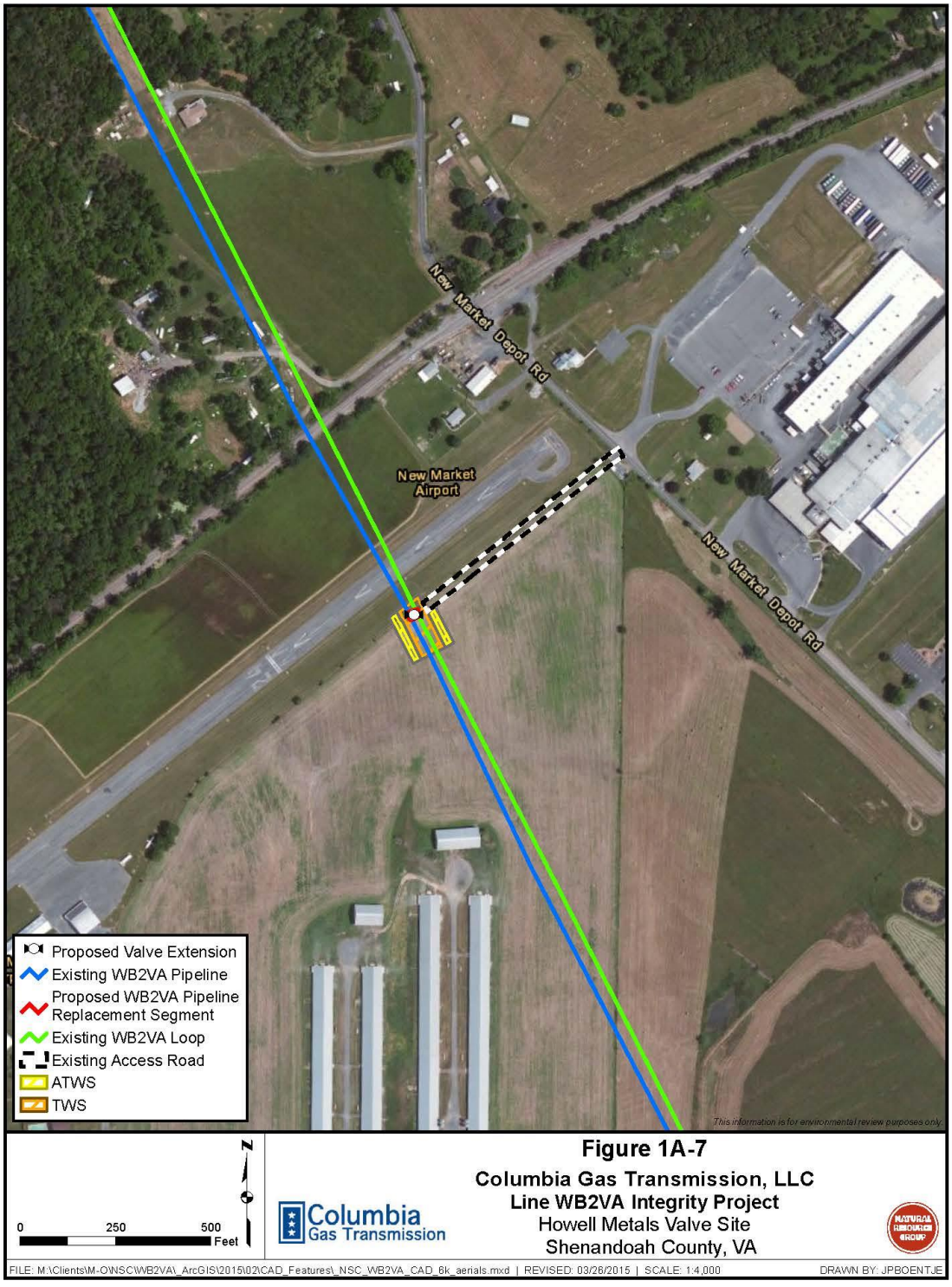
New Market Depot Rd
New Market Airport
New Market Depot Rd
Proposed Valve Extension
Existing WB2VA Pipeline
Proposed WB2VA Pipeline Replacement Segment
Existing WB2VA Loop
Existing Access Road
ATWS
TWS
This information is for environmental review purposes only.
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Columbia Gas Transmission
Figure 1A-7
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
Howell Metals Valve Site
Shenandoah County, VA
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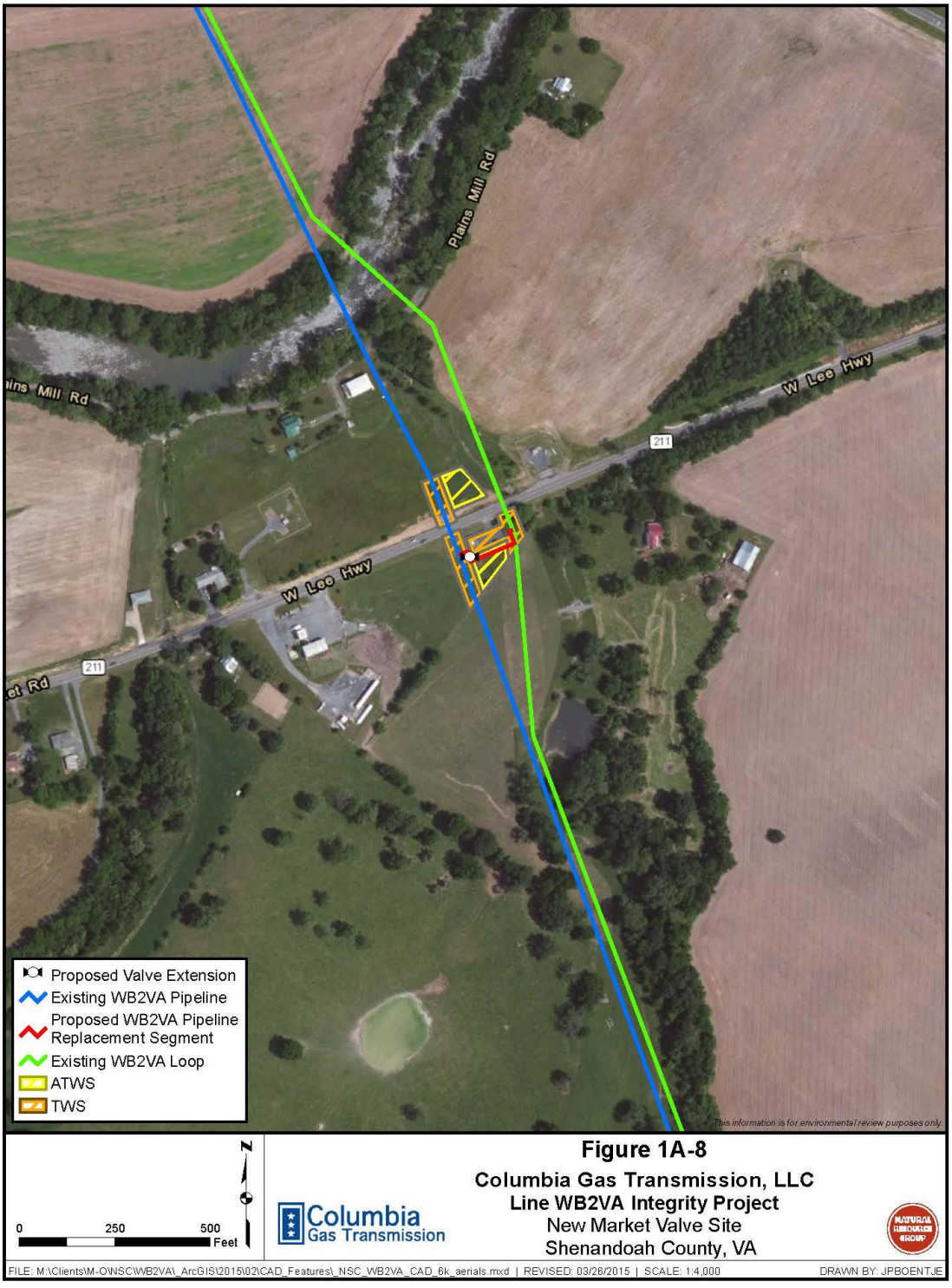
Plains Mill Rd
W Lee Hwy
211
Proposed Valve Extension
Existing WB2VA Pipeline
Proposed WB2VA Pipeline Replacement Segment
Existing WB2VA Loop
ATWS
TWS
This information is for environmental review purposes only.
N
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Feet
Columbia Gas Transmission
Figure 1A-8
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
New Market Valve Site
Shenandoah County, VA
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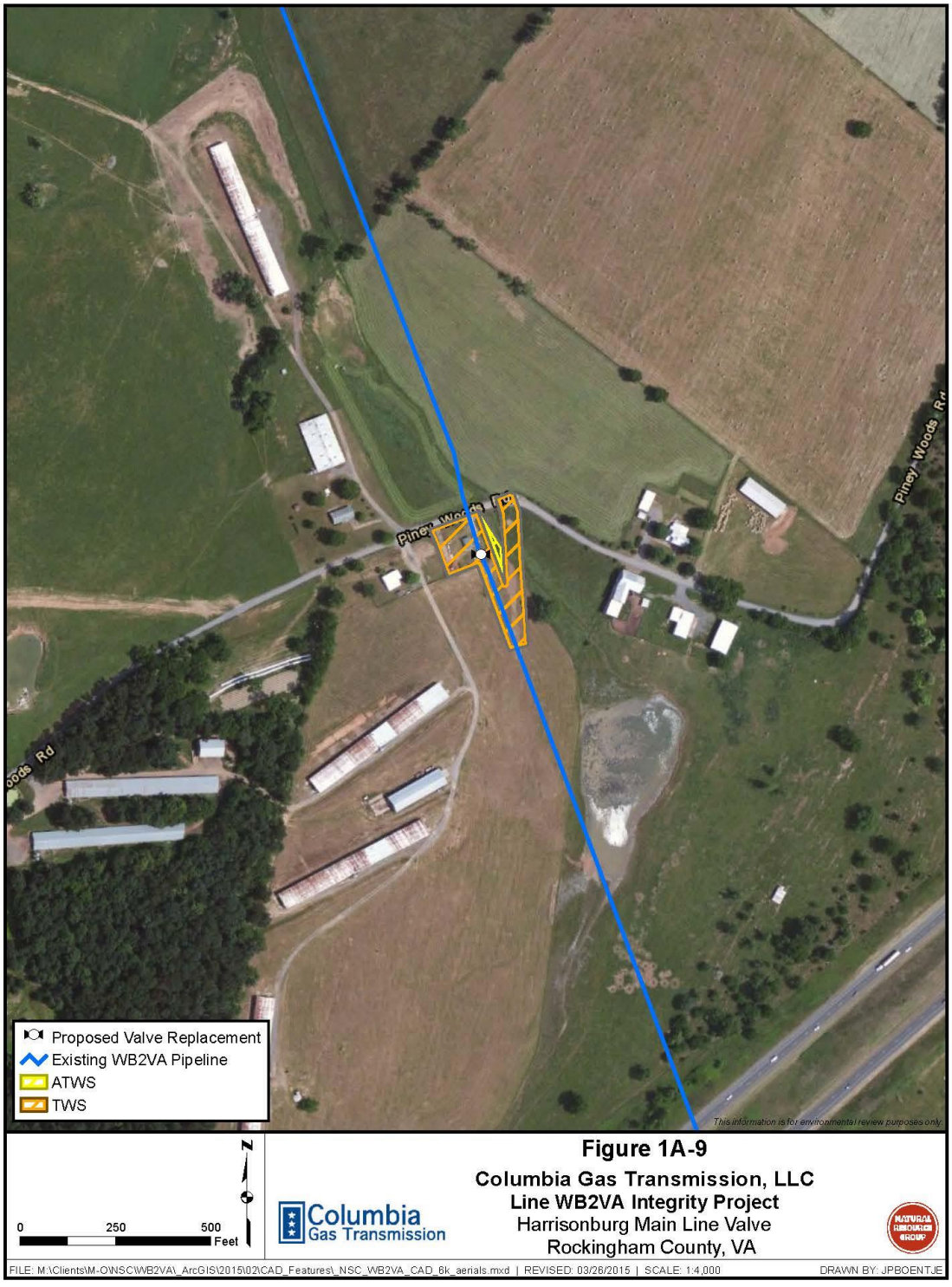
Proposed Valve Replacement
Existing WB2VA Pipeline
ATWS
TWS
Piney Woods Rd
This information is for environmental review purposes only.
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Columbia Gas Transmission
Figure 1A-9
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
Harrisonburg Main Line Valve
Rockingham County, VA
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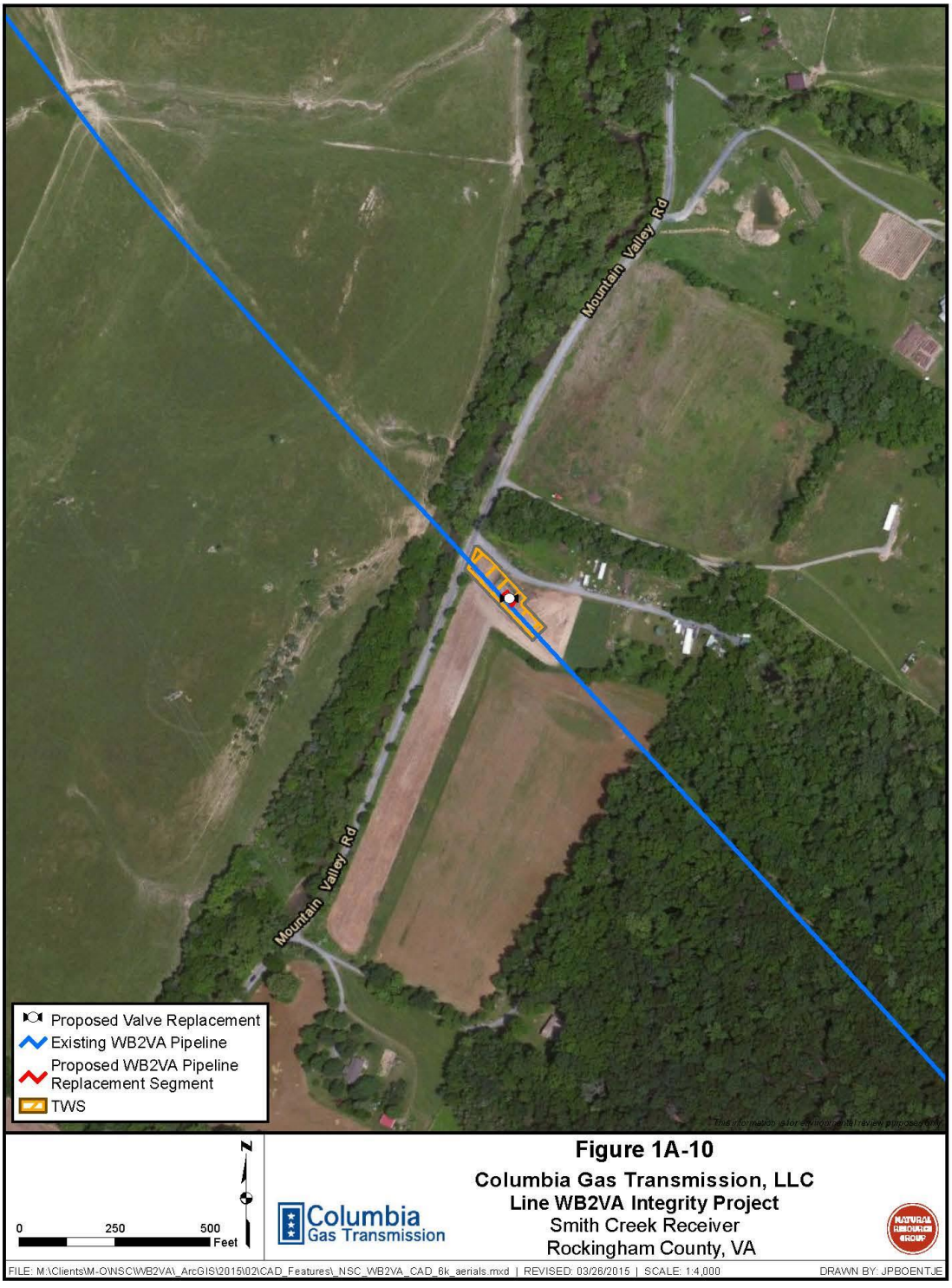
Mountain Valley Rd
Mountain Valley Rd
Proposed Valve Replacement
Existing WB2VA Pipeline
Proposed WB2VA Pipeline Replacement Segment
TWS
N
0
250
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Feet
Columbia Gas Transmission
Figure 1A-10
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
Smith Creek Receiver
Rockingham County, VA
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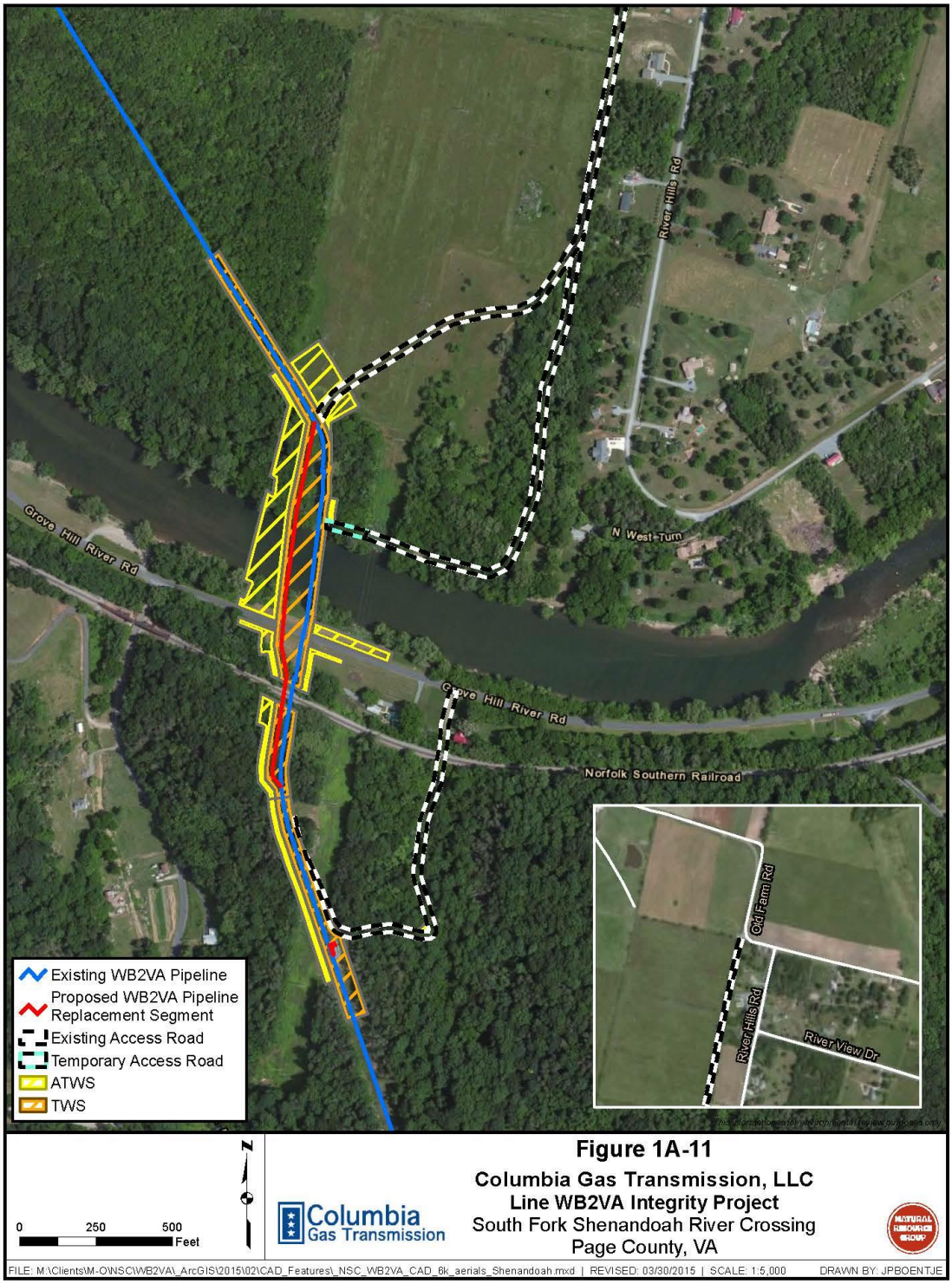
River Hills Rd
Grove Hill River Rd
N West-Turn
Grove Hill River Rd
Norfolk Southern Railroad
Old Farm Rd
River Hills Rd
River View Dr
Existing WB2VA Pipeline
Proposed WB2VA Pipeline Replacement Segment
Existing Access Road
Temporary Access Road
ATWS
TWS
N
0
250
500
Feet
Columbia Gas Transmission
Figure 1A-11
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
South Fork Shenandoah River Crossing
Page County, VA
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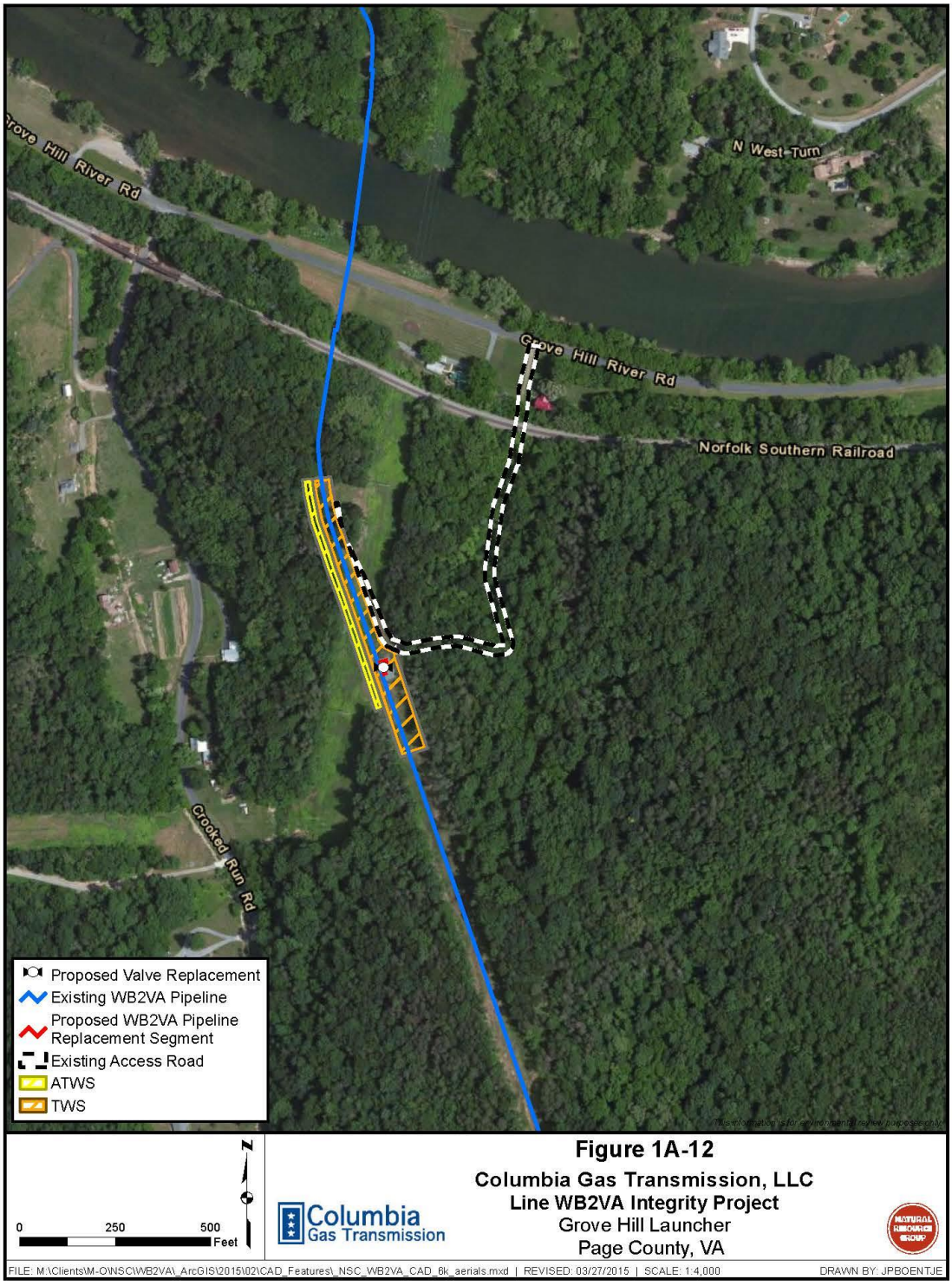
Grove Hill River Rd
N West Turn
Grove Hill River Rd
Norfolk Southern Railroad
Crooked Run Rd
Proposed Valve Replacement
Existing WB2VA Pipeline
Proposed WB2VA Pipeline Replacement Segment
Existing Access Road
ATWS
TWS
N
0
250
500
Feet
Columbia Gas Transmission
Figure 1A-12
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
Grove Hill Launcher
Page County, VA
FILE: M:\Clients\M-O\NSC\WB2VA_ArcGIS\2015\02\CAD_Features_NSC_WB2VA_CAD_8k_aerials.mxd | REVISED: 03/27/2015 | SCALE: 1:4,000
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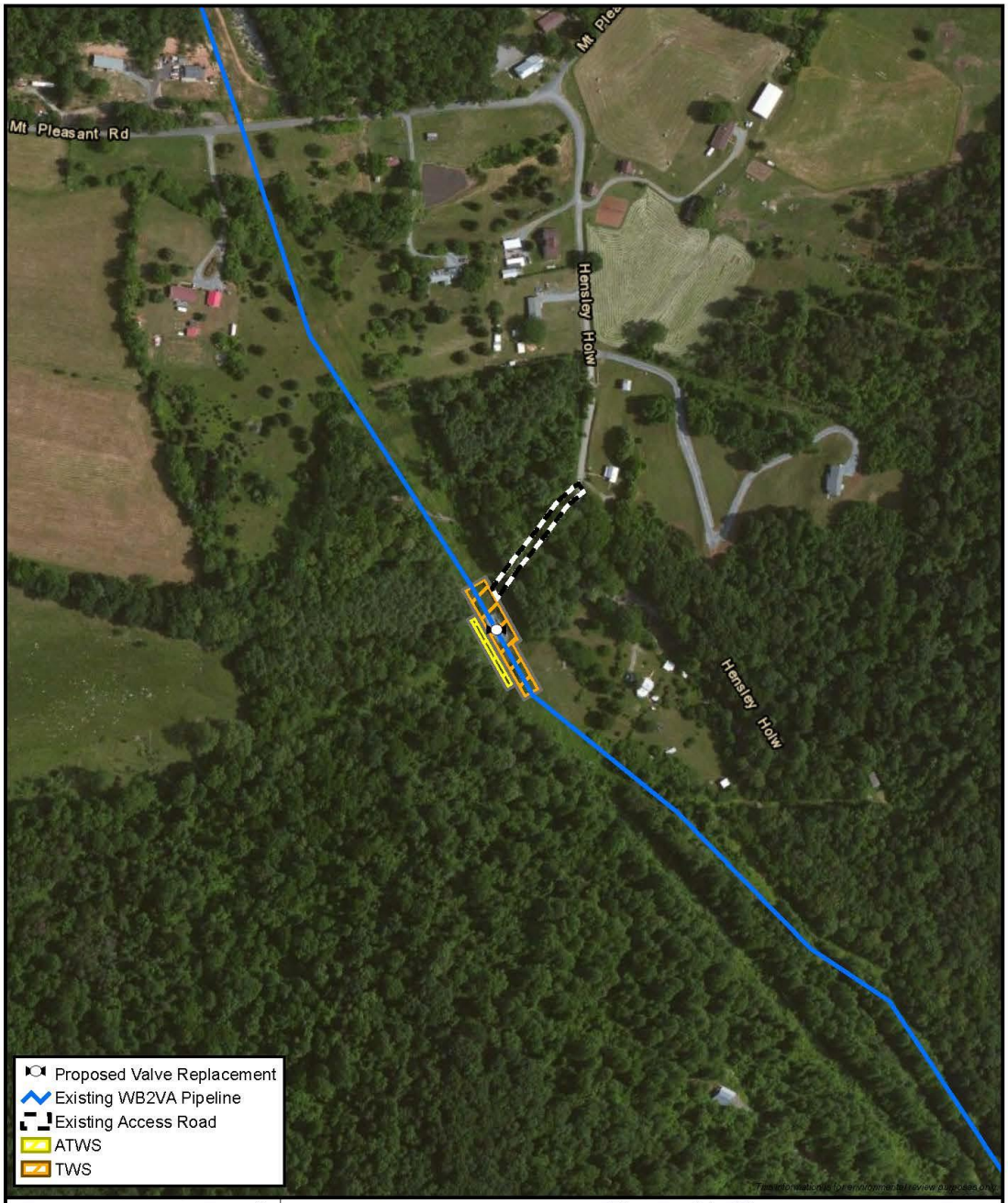
Mt Pleasant Rd
Hensley Holw
Hensley Holw
Proposed Valve Replacement
Existing WB2VA Pipeline
Existing Access Road
ATWS
TWS
0
250
500
Feet
Columbia Gas Transmission
Figure 1A-13
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
Hensley Hollow Receiver
Rockingham County, VA
FILE: M:\Clients\M-O\NSC\WB2VA_ArcGIS\2015\02\CAD_Features_NSC_WB2VA_CAD_8k_aerials.mxd | REVISED: 03/26/2015 | SCALE: 1:4,000
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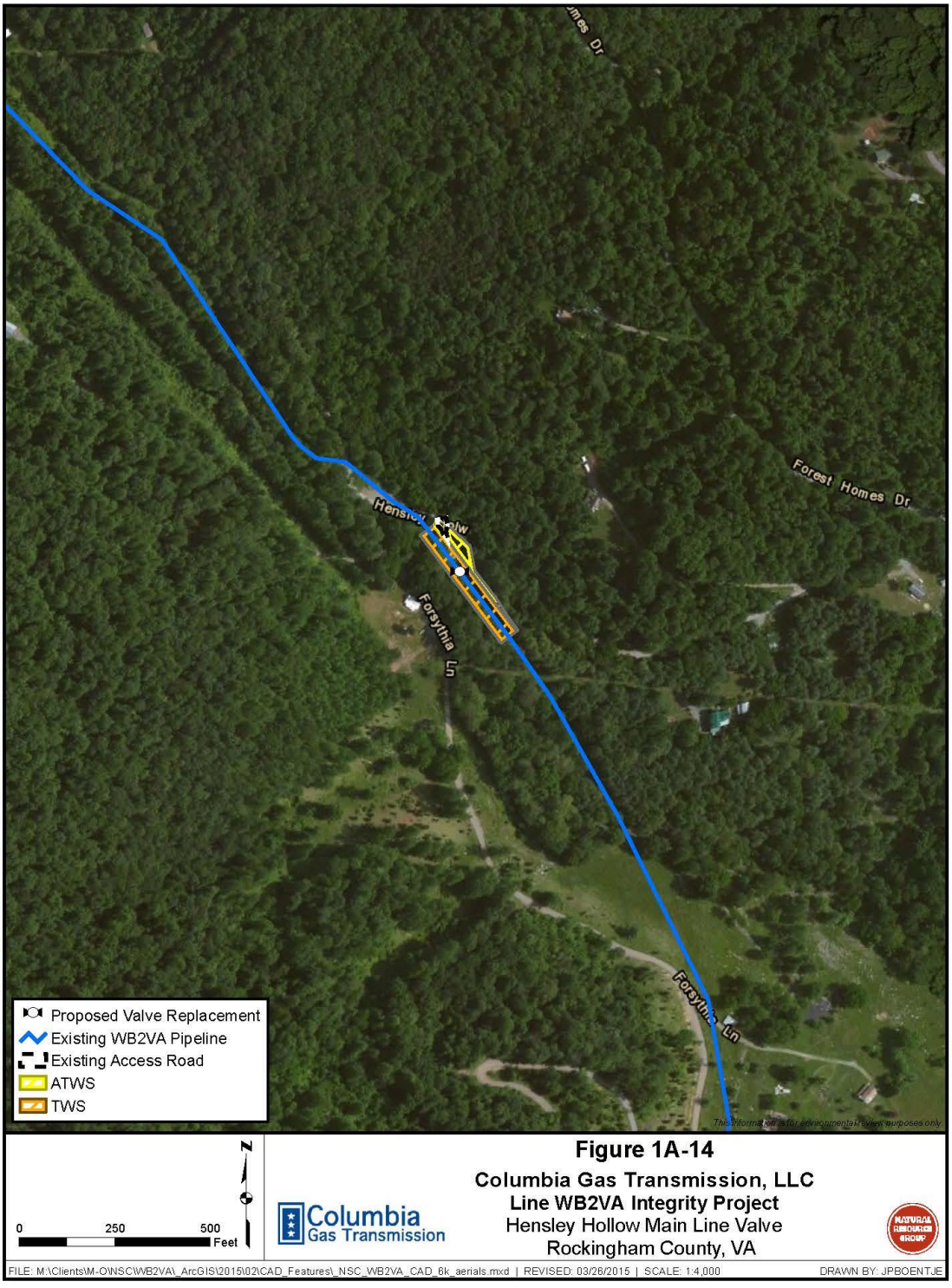
Forest Homes Dr
Forsythia Ln
Proposed Valve Replacement
Existing WB2VA Pipeline
Existing Access Road
ATWS
TWS
0
250
500
Feet
Columbia Gas Transmission
Figure 1A-14
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
Hensley Hollow Main Line Valve
Rockingham County, VA
FILE: M:\Clients\M-O\NSC\WB2VA_ArcGIS\2015\02\CAD_Features_NSC_WB2VA_CAD_8k_aerials.mxd | REVISED: 03/26/2015 | SCALE: 1:4,000
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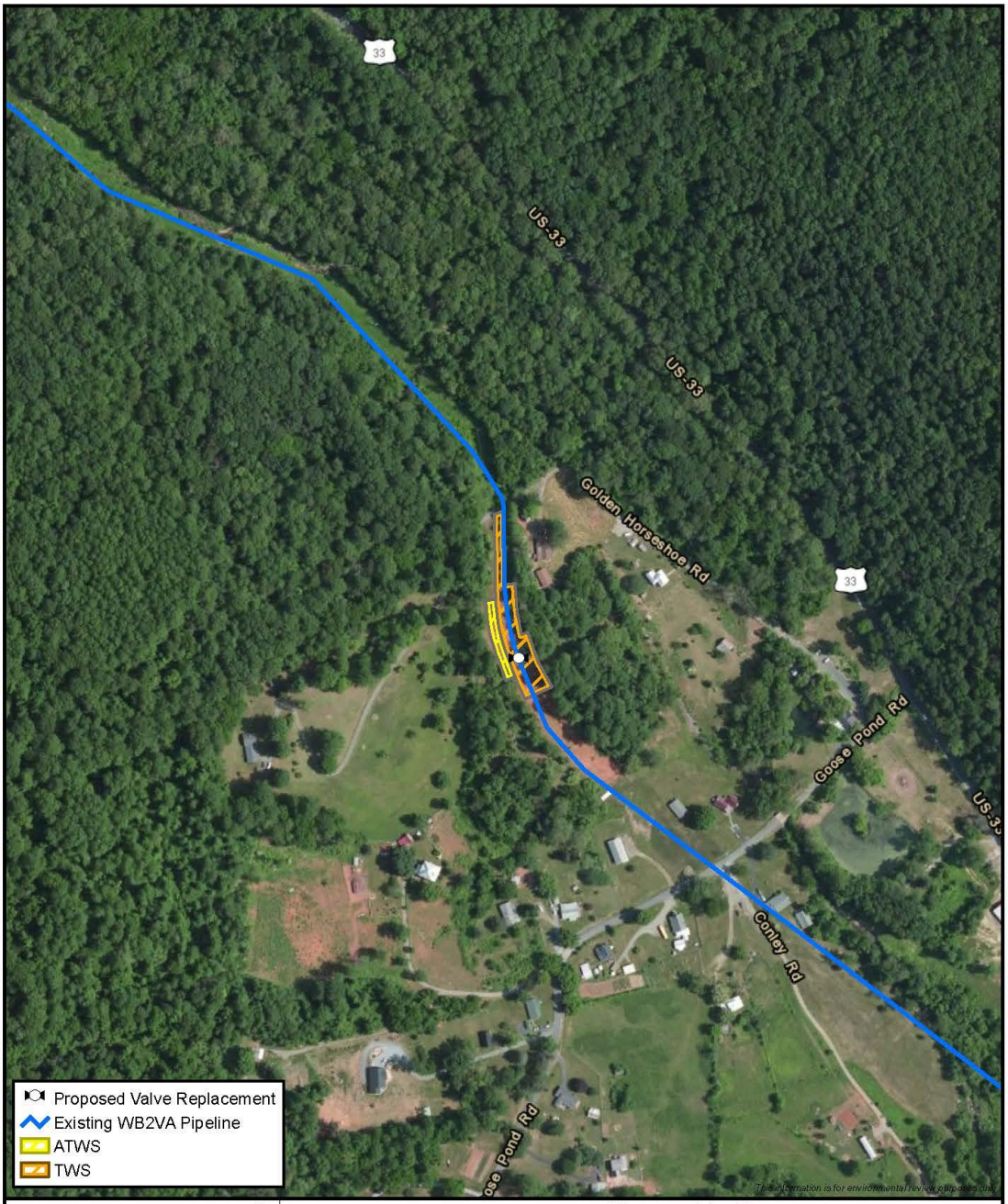
33
US-33
US-33
Golden Horseshoe Rd
33
Goose Pond Rd
US-33
Conley Rd
Goose Pond Rd
Proposed Valve Replacement
Existing WB2VA Pipeline
ATWS
TWS
0
250
500
Feet
Columbia Gas Transmission
Figure 1A-15
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
Lydia Launcher
Greene County, VA
FILE: M:\Clients\M-O\NSC\WB2VA_ArcGIS\2015\02\CAD_Features_NSC_WB2VA_CAD_8k_aerials.mxd | REVISED: 03/26/2015 | SCALE: 1:4,000
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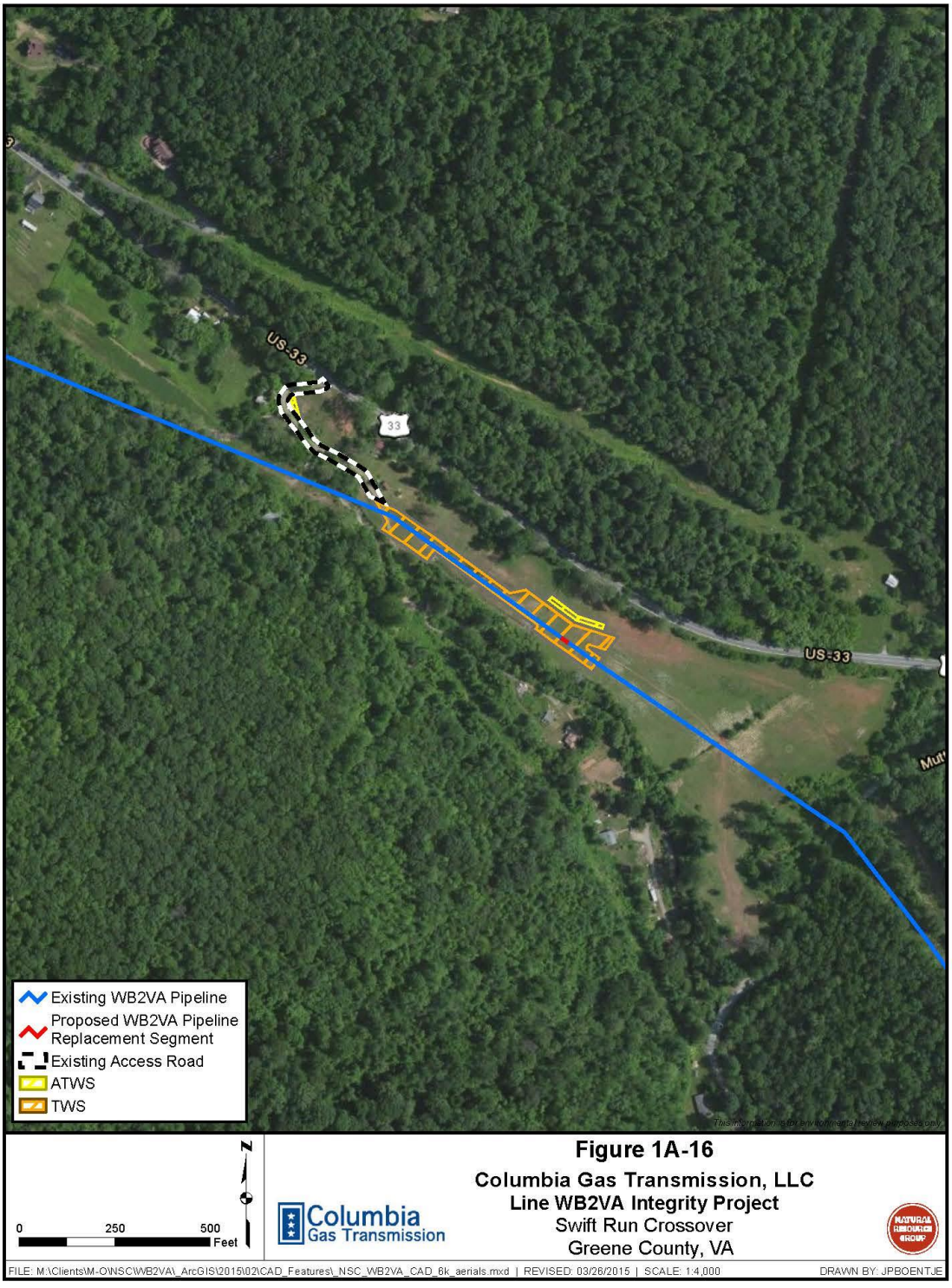
US-33
33
US-33
Existing WB2VA Pipeline
Proposed WB2VA Pipeline Replacement Segment
Existing Access Road
ATWS
TWS
N
0
250
500
Feet
Columbia Gas Transmission
Figure 1A-16
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
Swift Run Crossover
Greene County, VA
FILE: M:\Clients\M-O\NSC\WB2VA_ArcGIS\2015\02\CAD_Features_NSC_WB2VA_CAD_8k_aerials.mxd | REVISED: 03/26/2015 | SCALE: 1:4,000
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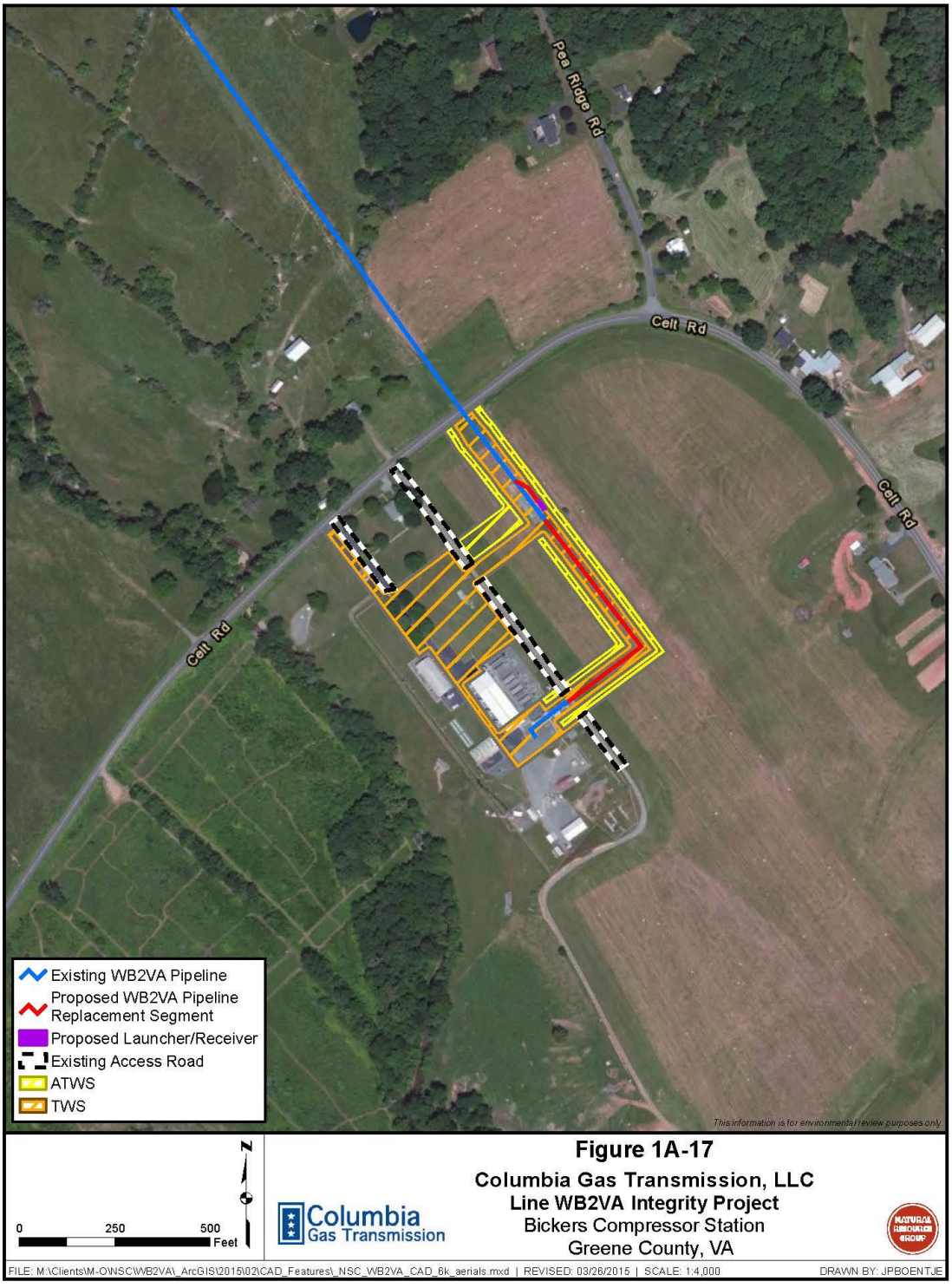
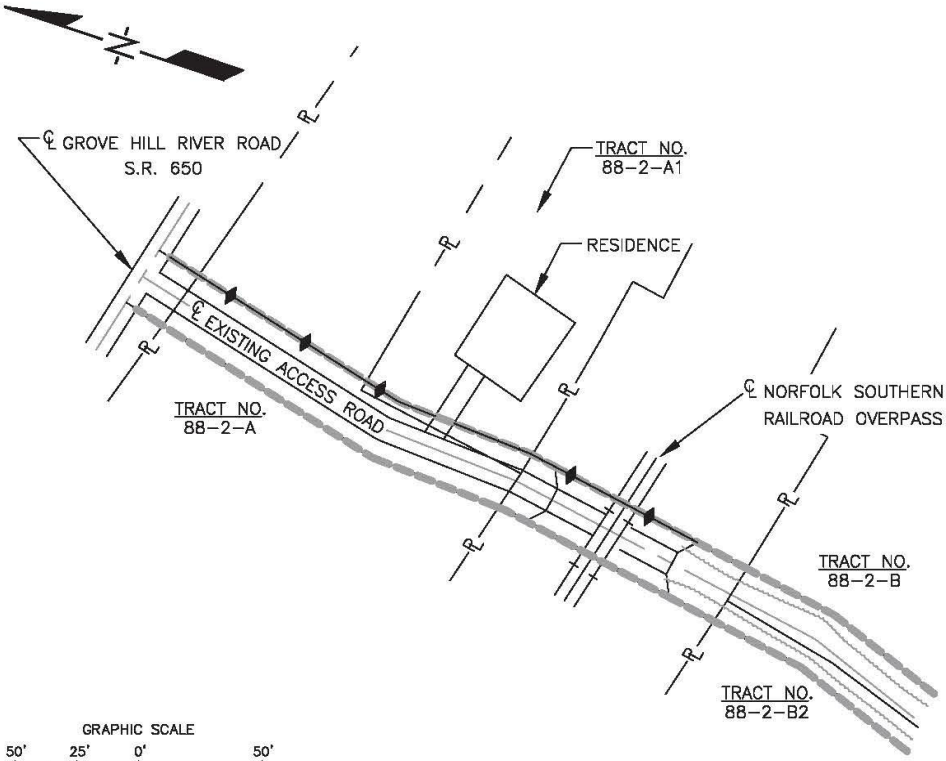

Pea Ridge Rd
Celt Rd
Celt Rd
Celt Rd
Existing WB2VA Pipeline
Proposed WB2VA Pipeline Replacement Segment
Proposed Launcher/Receiver
Existing Access Road
ATWS
TWS
This information is for environmental review purposes only.
N
0
250
500
Feet
Columbia Gas Transmission
Figure 1A-17
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
Bickers Compressor Station
Greene County, VA
FILE: M:\Clients\M-O\NSC\WB2VA_ArcGIS\2015\02\CAD_Features_NSC_WB2VA_CAD_6k_aerials.mxd | REVISED: 03/26/2015 | SCALE: 1:4,000
DRAWN BY: JPBOENTJE


Contractor Yard
This information is for environmental review purposes only.
N
0
250
500
Feet
Columbia
Gas Transmission
Figure 1A-18
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
Contractor Yard No. 1
Hardy County, WV
FILE: M:\Clients\M-O\NSC\WB2VA_ArcGIS\2015\02\CAD_Features_NSC_WB2VA_CAD_8k_aerials_Construction_Yards.mxd | REVISED: 03/13/2015 | SCALE: 1:4,000 DRAWN BY: JPBOENTJE


Contractor Yard
This information is for environmental review purposes only.
N
0
250
500
Feet
Columbia
Gas Transmission
Figure 1A-19
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
Contractor Yard No. 2
Shenandoah County, VA
FILE: M:\Clients\M-O\NSC\WB2VA_ArcGIS\2015\02\CAD_Features_NSC_WB2VA_CAD_8k_aerials_Construction_Yards.mxd | REVISED: 03/13/2015 | SCALE: 1:4,000 DRAWN BY: JPBOENTJE

Appendix B

Site-specific Residential Construction Plans



RESIDENTIAL AREAS–MITIGATION METHOD:

1. MATURE TREES AND LANDSCAPING WILL NOT BE REMOVED FROM WITHIN THE EDGE OF THE CONSTRUCTION WORK AREA UNLESS NECESSARY FOR SAFE OPERATION OF CONSTRUCTION EQUIPMENT OR AS SPECIFIED IN LANDOWNER AGREEMENTS.
2. IMMEDIATELY AFTER BACKFILLING THE TRENCH, ALL LAWN AND LANDSCAPING WILL BE RESTORED TO FINAL RESTORATION, OR TEMPORARY RESTORATION PENDING WEATHER AND SOIL CONDITIONS.
3. THE EDGE OF THE CONSTRUCTION WORK AREA ADJACENT TO THE RESIDENCE WILL BE SAFETY FENCED FOR A DISTANCE OF 100 FEET ON EITHER SIDE OF THE RESIDENCE TO ENSURE THAT EQUIPMENT, MATERIALS AND SPOIL REMAIN WITHIN THE CONSTRUCTION WORK AREA.
4. A MINIMUM OF 25 FEET WILL BE MAINTAINED BETWEEN THE RESIDENCE AND CONSTRUCTION WORK AREA FOR A DISTANCE OF 100 FEET ON EITHER SIDE OF THE RESIDENCE. IF THE FACILITY MUST BE WITHIN 25 FEET OF A RESIDENCE, IT MUST BE INSTALLED SUCH THAT THE TRENCH DOES NOT REMAIN OPEN OVER NIGHT.

NOTES:

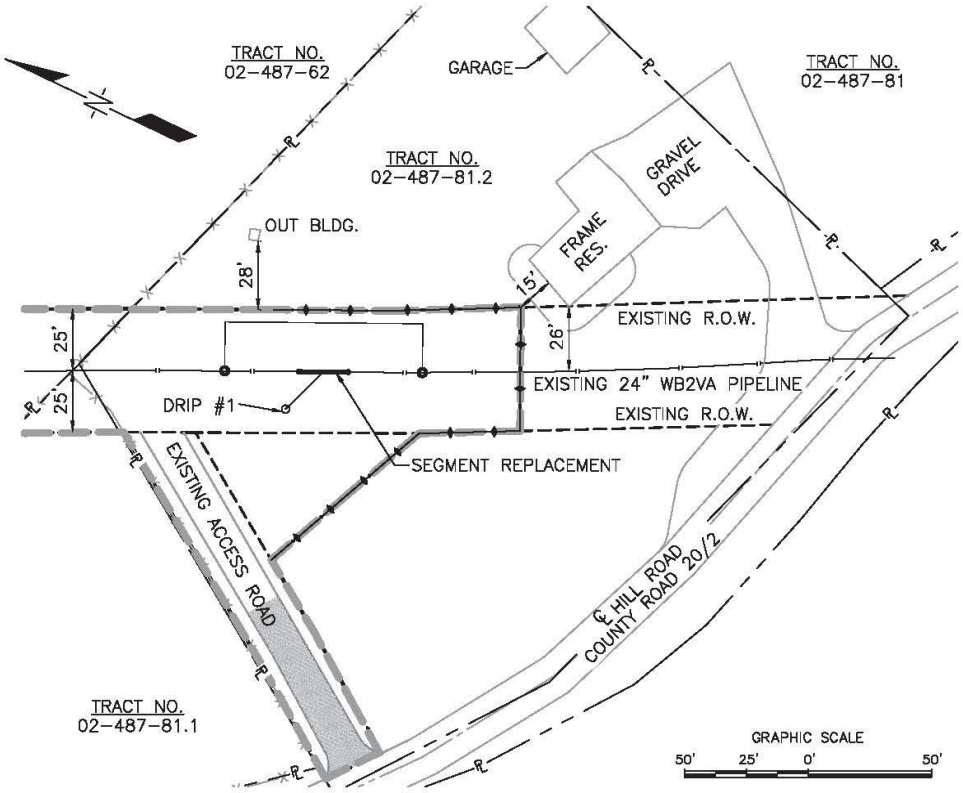
1. STRUCTURES WITHIN THE LIMITS OF CONSTRUCTION WILL BE REMOVED, RELOCATED OR PROTECTED PER LAND OWNER AGREEMENT.
2. ACCESS FOR LANDOWNER WILL BE MAINTAINED.

LEGEND

- PROPOSED PIPELINE
- PROPERTY LINE
- ROADWAY CENTERLINE
- EXISTING PIPELINE
- FENCE
- LIMITS OF CONSTRUCTION
- PROPOSED PERMANENT EASEMENT
- SAFETY FENCE
- SANITARY
- ROCK CONSTRUCTION ENTRANCE

Columbia Gas Transmission

FACILITY	ASSET GROUP
PROJECT: LINE WB2VA–INTEGRITY PROJECT RESIDENTIAL SITE SPECIFIC GROVE HILL	TAX DISTRICT(S)
CONSULTANT / ENGINEER / FIELD BOOK / PAGE	COUNTY(IES): PAGE
SURVEY DATE / REFERENCES	STATE(S): VIRGINIA
MAP DATE: 03/09/15	SHEET NO. 03 OF 03
DRAWN BY: HMM	DRAWING NO. P–PLGT–RES–003
SCALE: 1"=50'	



RESIDENTIAL AREAS–MITIGATION METHOD:

1. MATURE TREES AND LANDSCAPING WILL NOT BE REMOVED FROM WITHIN THE EDGE OF THE CONSTRUCTION WORK AREA UNLESS NECESSARY FOR SAFE OPERATION OF CONSTRUCTION EQUIPMENT OR AS SPECIFIED IN LANDOWNER AGREEMENTS.
2. IMMEDIATELY AFTER BACKFILLING THE TRENCH, ALL LAWN AND LANDSCAPING WILL BE RESTORED TO FINAL RESTORATION, OR TEMPORARY RESTORATION PENDING WEATHER AND SOIL CONDITIONS.
3. THE EDGE OF THE CONSTRUCTION WORK AREA ADJACENT TO THE RESIDENCE WILL BE SAFETY FENCED FOR A DISTANCE OF 100 FEET ON EITHER SIDE OF THE RESIDENCE TO ENSURE THAT EQUIPMENT, MATERIALS AND SPOIL REMAIN WITHIN THE CONSTRUCTION WORK AREA.
4. A MINIMUM OF 25 FEET WILL BE MAINTAINED BETWEEN THE RESIDENCE AND CONSTRUCTION WORK AREA FOR A DISTANCE OF 100 FEET ON EITHER SIDE OF THE RESIDENCE. IF THE FACILITY MUST BE WITHIN 25 FEET OF A RESIDENCE, IT MUST BE INSTALLED SUCH THAT THE TRENCH DOES NOT REMAIN OPEN OVER NIGHT.

NOTES:

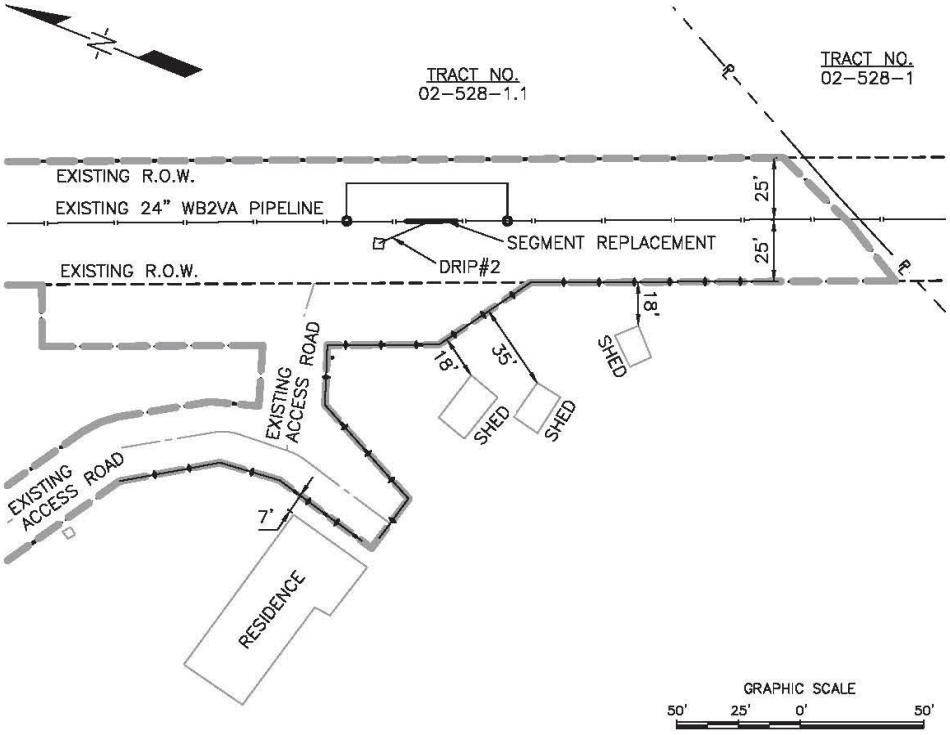
1. STRUCTURES WITHIN THE LIMITS OF CONSTRUCTION WILL BE REMOVED, RELOCATED OR PROTECTED PER LAND OWNER AGREEMENT.

LEGEND

- PROPOSED PIPELINE
- PROPERTY LINE (℄)
- ROADWAY CENTERLINE
- EXISTING PIPELINE
- FENCE
- LIMITS OF CONSTRUCTION
- PROPOSED PERMANENT EASEMENT
- SAFETY FENCE
- SANITARY (S)
- ROCK CONSTRUCTION ENTRANCE

Columbia Gas Transmission

FACILITY	ASSET GROUP
PROJECT: LINE WB2VA–INTEGRITY PROJECT RESIDENTIAL SITE SPECIFIC DRIP #1	TAX DISTRICT(S)
CONSULTANT / ENGINEER / FIELD BOOK ____ PAGE ____	COUNTY(IES): HARDY
SURVEY DATE / REFERENCES	STATE(S): WEST VIRGINIA
MAP DATE: 02/04/14	SHEET NO. 01 OF 03
DRAWN BY: HMM	DRAWING NO. P–PLGT–RES–001
SCALE: 1"=50'	



RESIDENTIAL AREAS–MITIGATION METHOD:

1. MATURE TREES AND LANDSCAPING WILL NOT BE REMOVED FROM WITHIN THE EDGE OF THE CONSTRUCTION WORK AREA UNLESS NECESSARY FOR SAFE OPERATION OF CONSTRUCTION EQUIPMENT OR AS SPECIFIED IN LANDOWNER AGREEMENTS.
2. IMMEDIATELY AFTER BACKFILLING THE TRENCH, ALL LAWN AND LANDSCAPING WILL BE RESTORED TO FINAL RESTORATION, OR TEMPORARY RESTORATION PENDING WEATHER AND SOIL CONDITIONS.
3. THE EDGE OF THE CONSTRUCTION WORK AREA ADJACENT TO THE RESIDENCE WILL BE SAFETY FENCED FOR A DISTANCE OF 100 FEET ON EITHER SIDE OF THE RESIDENCE TO ENSURE THAT EQUIPMENT, MATERIALS AND SPOIL REMAIN WITHIN THE CONSTRUCTION WORK AREA.
4. A MINIMUM OF 25 FEET WILL BE MAINTAINED BETWEEN THE RESIDENCE AND CONSTRUCTION WORK AREA FOR A DISTANCE OF 100 FEET ON EITHER SIDE OF THE RESIDENCE. IF THE FACILITY MUST BE WITHIN 25 FEET OF A RESIDENCE, IT MUST BE INSTALLED SUCH THAT THE TRENCH DOES NOT REMAIN OPEN OVER NIGHT.

NOTES:

1. STRUCTURES WITHIN THE LIMITS OF CONSTRUCTION WILL BE REMOVED, RELOCATED OR PROTECTED PER LAND OWNER AGREEMENT.

LEGEND

- PROPOSED PIPELINE
- PROPERTY LINE (℄)
- ROADWAY CENTERLINE
- EXISTING PIPELINE
- FENCE
- LIMITS OF CONSTRUCTION
- PROPOSED PERMANENT EASEMENT
- SAFETY FENCE
- SANITARY (S)
- ROCK CONSTRUCTION ENTRANCE

Columbia Gas Transmission

FACILITY	ASSET GROUP
PROJECT: LINE WB2VA–INTEGRITY PROJECT RESIDENTIAL SITE SPECIFIC DRIP #2	TAX DISTRICT(S)
CONSULTANT / ENGINEER / FIELD BOOK ____ PAGE ____	COUNTY(IES): HARDY
SURVEY DATE / REFERENCES	STATE(S): WEST VIRGINIA
MAP DATE: 02/04/14	SHEET NO. 02 OF 03
DRAWN BY: HMM	DRAWING NO. P–PLGT–RES–002
SCALE: 1"=50'	

Appendix C

Crossing Plan for the South Fork of the Shenandoah River

South Fork of the Shenandoah River Site Specific Crossing Plan

The installation procedures for the cofferdam would be as follows:

1. steel framework assembly on bank in upland area;

2. steel framework installed manually or by crane;

3. the frame pairs would be lowered into a vertical position, adjusted and then spread at the top to form a "V" shape. Frame spacing can be increased for shallower water or decreased for deeper water. Heavy steel poles may be added both vertically and horizontally to increase stability in soft foundation areas;

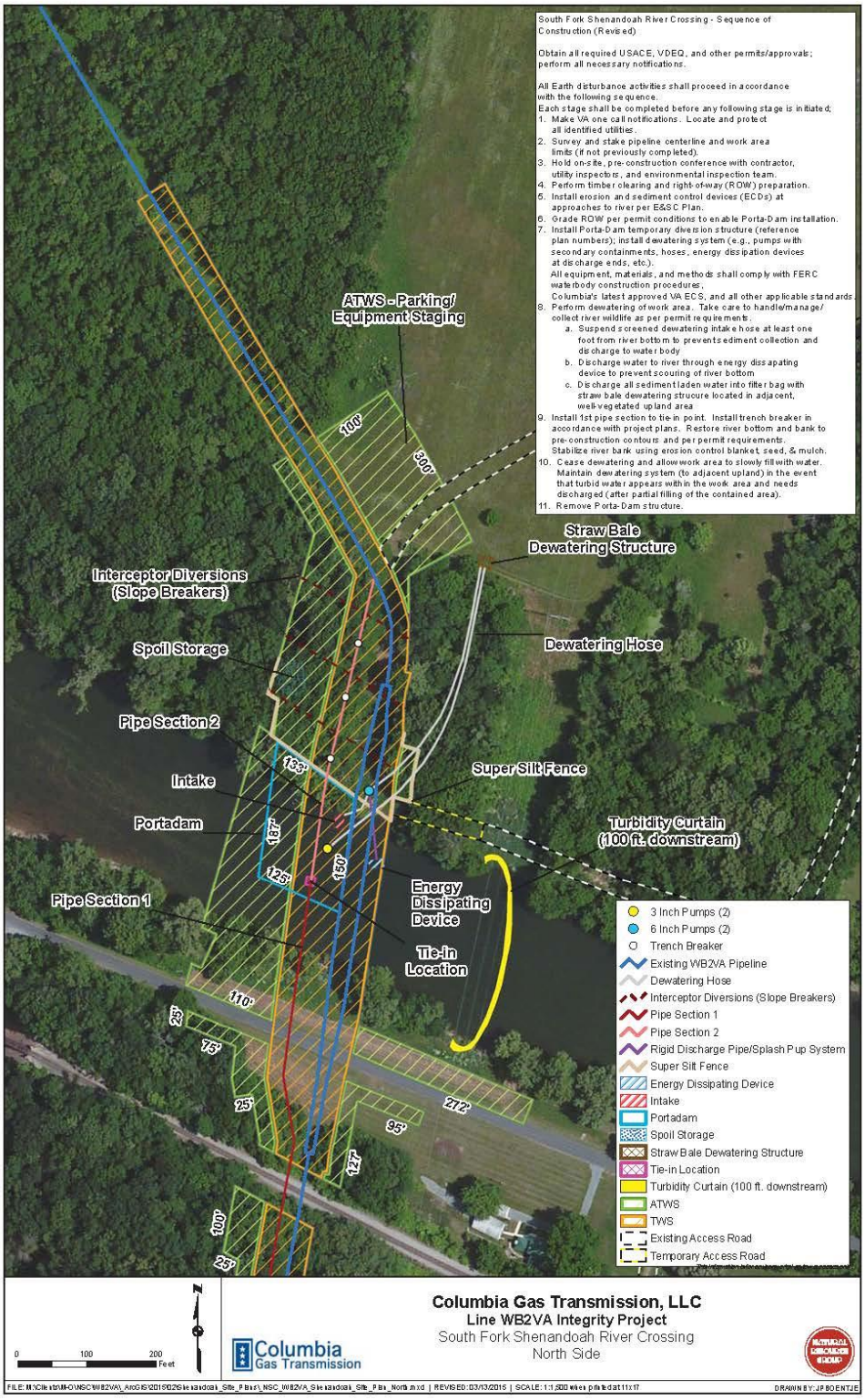
4. preparation of fabric sealing sheets on bank in upland area by laying out individual liner sections (25 and 20 feet horizontal sections) and joining the sections into desired configuration;

5. placement of the entire assembled liner section around the perimeter of the framework and securing it to the top of each frame pair location. Once secured at the top of the frame structure, the liner would be unrolled down and extended out on the existing bed at the toe of the frames. An extension of the liner would be pulled horizontally out away from the toe of the framework to form a "sealing apron". The perimeter can be buried in soft material and is normally sandbagged into place to assist with sealing;

6. pumping equipment is positioned, and one the pumps have started, the water head differential would pull the liner membrane tightly onto the framework and the surrounding bed area. Final liner adjustments are then made and minor leaks under the sealing apron are located and sealed with sandbags;

7. upon completion of pipeline construction activities; the enclosed area is then flooded, followed by the removal of fabric membrane sections and steel framework, then reinstalled from the opposite side of the river, using the same installation methods. The reinstallation would provide sufficient overlap of the two dam structures, ensuring the end of the pipeline from the initial installation is accessible for continuation of the crossing in the rest of the dam; and

8. Divers may be used to check all disturbed bottom areas and confirm all components of the dam structure are accounted for.


South Fork Shenandoah River Crossing - Sequence of Construction (Revised)
Obtain all required USACE, VDEQ, and other permits/approvals; perform all necessary notifications.
All Earth disturbance activities shall proceed in accordance with the following sequence.
Each stage shall be completed before any following stage is initiated;
1. Make VA one call notifications. Locate and protect all identified utilities.
2. Survey and stake pipeline centerline and work area limits (if not previously completed).
3. Hold on-site, pre-construction conference with contractor, utility inspectors, and environmental inspection team.
4. Perform timber clearing and right-of-way (ROW) preparation.
5. Install erosion and sediment control devices (ECDs) at approaches to river per E&SC Plan.
6. Grade ROW per permit conditions to enable Porta-Dam installation.
7. Install Porta-Dam temporary diversion structure (reference plan numbers); install dewatering system (e.g., pumps with secondary containments, hoses, energy dissipation devices at discharge ends, etc.).
All equipment, materials, and methods shall comply with FERC waterbody construction procedures;
Columbia's latest approved VA ECS, and all other applicable standards.
8. Perform dewatering of work area. Take care to handle/manage/collect river wildlife as per permit requirements.
a. Suspend screened dewatering intake hose at least one foot from river bottom to prevents sediment collection and discharge to water body
b. Discharge water to river through energy dissapating device to prevent scouring of river bottom
c. Discharge all sediment laden water into filter bag with straw bale dewatering strucure located in adjacent, well-vegetated upland area
9. Install 1st pipe section to tie-in point. Install trench breaker in accordance with project plans. Restore river bottom and bank to pre-construction contours and per permit requirements. Stabilize river bank using erosion control blanket, seed, & mulch.
10. Cease dewatering and allow work area to slowly fill with water. Maintain dewatering system (to adjacent upland) in the event that turbid water appears within the work area and needs discharged (after partial filling of the contained area).
11. Remove Porta-Dam structure.
ATWS - Parking/ Equipment Staging
100'
300'
Straw Bale Dewatering Structure
Interceptor Diversions (Slope Breakers)
Dewatering Hose
Spoil Storage
Pipe Section 2
133'
Super Silt Fence
Intake
Portadam
187'
Turbidity Curtain (100 ft. downstream)
125'
130'
Energy Dissipating Device
Pipe Section 1
Tie-in Location
110'
23'
75'
25'
272'
95'
127'
100'
25'
3 Inch Pumps (2)
6 Inch Pumps (2)
Trench Breaker
Existing WB2VA Pipeline
Dewatering Hose
Interceptor Diversions (Slope Breakers)
Pipe Section 1
Pipe Section 2
Rigid Discharge Pipe/Splash Pup System
Super Silt Fence
Energy Dissipating Device
Intake
Portadam
Spoil Storage
Straw Bale Dewatering Structure
Tie-in Location
Turbidity Curtain (100 ft. downstream)
ATWS
TWS
Existing Access Road
Temporary Access Road
0
100
200
Feet
Columbia Gas Transmission
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
South Fork Shenandoah River Crossing
North Side
FILE: M:\Client\MI-O\NSC\WB2VA_ArcGIS\2015\02\Shenandoah_Site_Plans_NSC_WB2VA_Shenandoah_Site_Plan_North.mxd | REVISED: 03/13/2015 | SCALE: 1:1,500 when printed at 11x17
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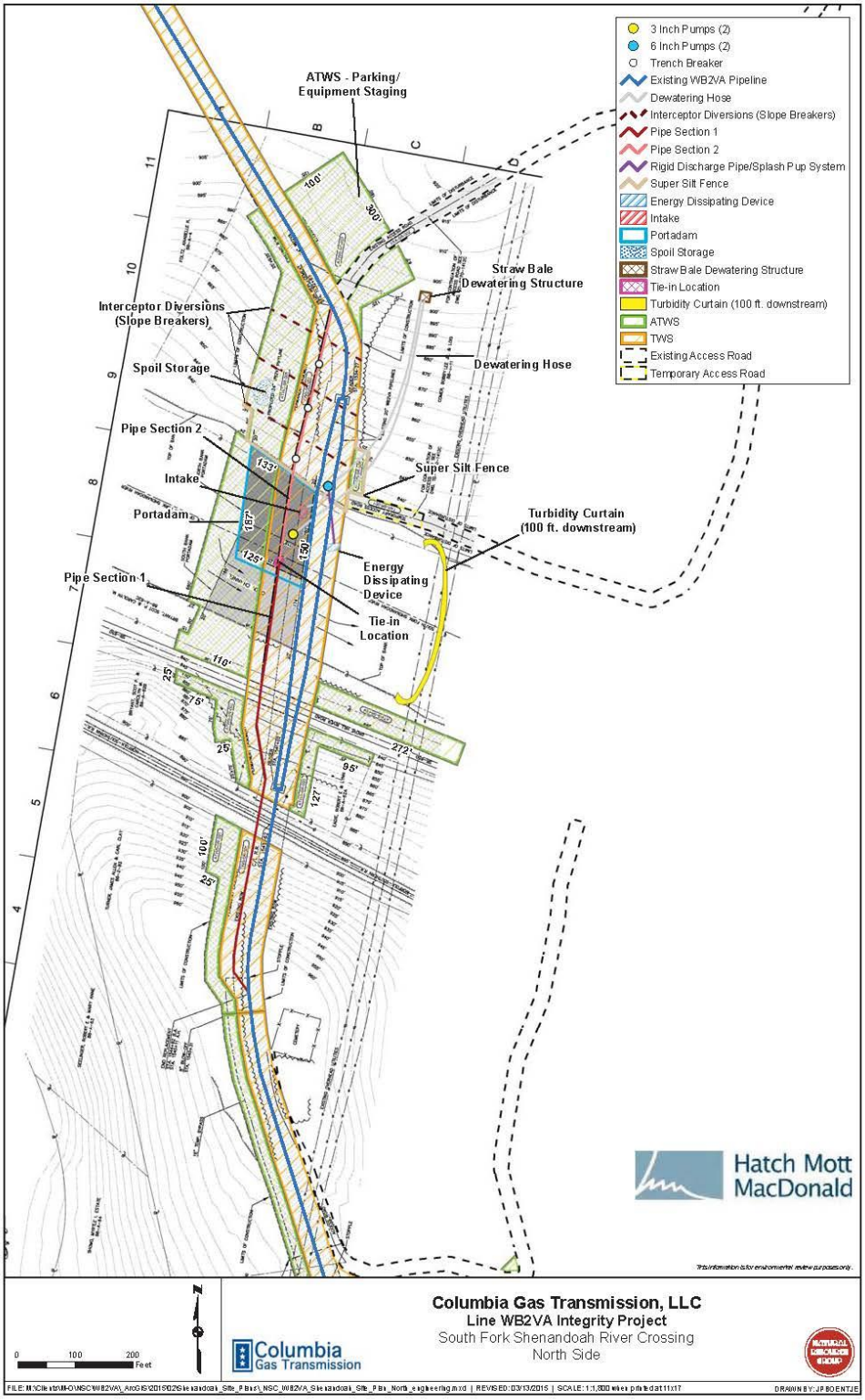
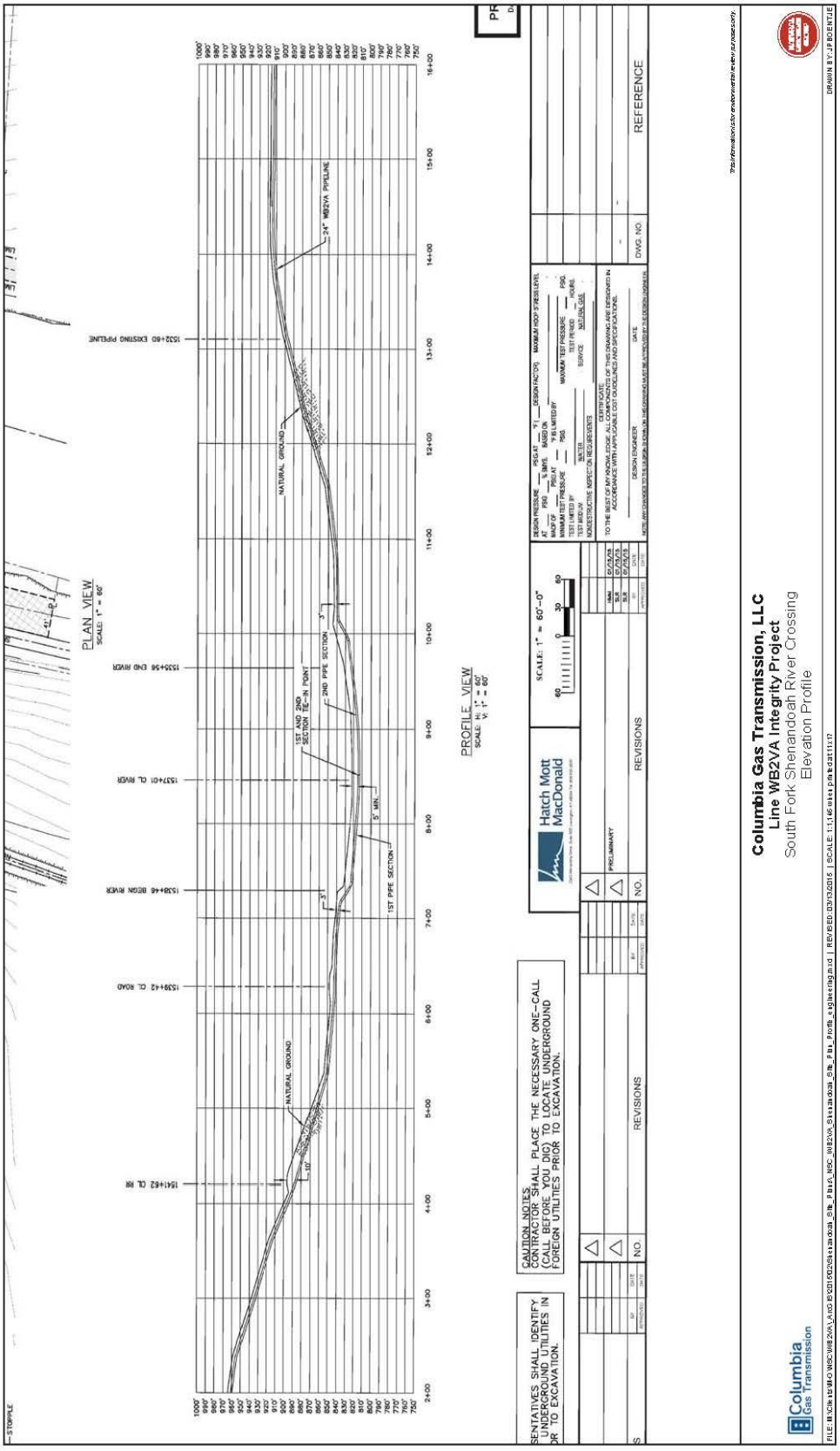

3 Inch Pumps (2)
6 Inch Pumps (2)
Trench Breaker
Existing WB2VA Pipeline
Dewatering Hose
Interceptor Diversions (Slope Breakers)
Pipe Section 1
Pipe Section 2
Rigid Discharge Pipe/Splash Pup System
Super Silt Fence
Energy Dissipating Device
Intake
Portadam
Spoil Storage
Straw Bale Dewatering Structure
Tie-in Location
Turbidity Curtain (100 ft. downstream)
ATWS
TWS
Existing Access Road
Temporary Access Road
ATWS - Parking/ Equipment Staging
Straw Bale Dewatering Structure
Interceptor Diversions (Slope Breakers)
Dewatering Hose
Spoil Storage
Pipe Section 2
Super Silt Fence
Intake
Portadam
Turbidity Curtain (100 ft. downstream)
Energy Dissipating Device
Pipe Section 1
Tie-in Location
Hatch Mott MacDonald
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
South Fork Shenandoah River Crossing
North Side
Columbia Gas Transmission
0 100 200 Feet


PLAN VIEW
SCALE: 1" = 60'
PROFILE VIEW
SCALE: H: 1" = 60'
V: 1" = 60'
SCALE: 1" = 60'-0"
Hatch Mott MacDonald
Columbia Gas Transmission, LLC
Line WB2VA Integrity Project
South Fork Shenandoah River Crossing
Elevation Profile
REFERENCE
REVISIONS
PRELIMINARY
CAUTION NOTES
CONTRACTOR SHALL PLACE THE NECESSARY ONE-CALL (CALL BEFORE YOU DIG) TO LOCATE UNDERGROUND FOREIGN UTILITIES PRIOR TO EXCAVATION.
24" WB2VA PIPELINE
1ST PIPE SECTION
2ND PIPE SECTION
1ST AND 2ND SECTION TIE-IN POINT
NATURAL GROUND
1532+60 EXISTING PIPELINE
1532+58 END RIVER
1537+01 CL RIVER
1538+46 BEGIN RIVER
1539+42 CL ROAD
1541+62 CL RR
STOPHILE

Appendix D

Past, Present and Reasonably Foreseeable Future Actions

TABLE 1G-1

Line WB2VA Integrity Project
Cumulative Impacts Analysis

Project	Company Name	County	State	Facility Type	Existing or Greenfield	Duration	Construction Years	FERC Determination	Project Description	Project within 5 Miles*	Project 5 to 15 Miles*	Project 15 to 50 Miles*	Watershed	Within Air Region and 50 Miles[1]
Atlantic Coast Pipeline[2]	Dominion Transmission, Inc.	Highland, Augusta, Nelson, Buckingham, Cumberland, Prince Edward, Nottoway, Dinwiddie, Brunswick, Greensville, Southampton, Suffolk, Chesapeake	VA, WV, NC	Natural Gas Pipeline	Greenfield	3 years	2016 - 2018	FERC	Construction of 550 miles of new pipeline	No	No	Yes	No	Yes (Valley of Virginia)
Leidy Southeast Expansion Project[3]	Transcontinental Gas Pipe Line Corporation	Prince William, Orange, Fluvanna, Pittsylvania, Appomattox	VA, NJ, PA, NC, MD	Natural Gas Compression	Existing	1 year	2014 - 2015	FERC	Add compressor stations in NJ; Modify compressor stations in PA; Modify existing CSs, meter stations, mainline valves, and L/Rs in NC, VA, (5 CSs) and MD	No	No	Yes	No	Yes (Northeastern Virginia)
WB XPress Project[4]	Columbia Transmission, LLC	Kanawha, Braxton, Upshur, Randolph, Pendleton, Hardy; Shenandoah, Warren, Loudoun, Fairfax	WV, VA	Natural Gas Pipeline and Facilities	Existing and Greenfield	2 years	2017 - 2018	FERC	Replacement of existing pipeline in West Virginia; Modification of existing facilities and construction of new compressor stations in West Virginia and Virginia; 2.5 miles of new pipeline in Virginia	Yes	Yes	Yes	Yes (Lost River)	Yes (Valley of Virginia, Allegheny)
Harrisonburg-Endless Caverns 230kV Double Circuit Line Project[5]	Dominion Virginia Power	Rockingham, Harrisonburg City	VA	Transmission Line	Existing	2 years	Fall 2013 - June 2015	Non-Jurisdictional	Replace an existing 20 mile transmission line and add 230kV between existing Harrisonburg and Endless Caverns Substations. Also includes addition of 6.8 acres of land at Endless Caverns Substation.	Yes	Yes	Yes	Yes (Smith Creek)	Yes (Valley of Virginia)
Cunningham-Elmont 500kV Rebuild Project[6]	Dominion Virginia Power	Fluvanna, Goochland, Louisa, Henrico, Hanover	VA	Transmission Line	Existing	2 years	Spring 2015 - December 2017	Non-Jurisdictional	Rebuild an existing transmission line between Cunningham Substation and Elmont Substation	No	No	Yes	No	Yes (Northeast Virginia)
Dooms-Lexington Transmission Line Rebuild Project[6]	Dominion Virginia Power	Rockbridge, Augusta	VA	Transmission Line	Existing	22 months	Feb 2014 - Dec 2015	Non-Jurisdictional	Replace existing transmission line between Dooms Substation and Lexington Substation	No	No	Yes	No	Yes (Valley of Virginia)
Passage Creek Bridge Replacement[7]	Virginia Department of Transportation	Shenandoah	VA	Bridge Replacement	Existing	1 year	Spring 2015 - Spring 2016	Non-Jurisdictional	Replace existing single-lane low-water bridge with a new two-lane bridge over Passage Creek (Route 758)	No	No	Yes	No	Yes (Valley of Virginia)
Route 211 Westbound Bridge over S. Fork of the Shenandoah River Project[8]	Virginia Department of Transportation	Page	VA	Bridge Replacement	Existing	Undetermined	Early 2016 - Undetermined	Non-Jurisdictional	Replace Route 211 westbound bridge over the South Fork of the Shenandoah River with a 625-feet long bridge and improve the approaches to the bridge. The project length is 0.64-mile	No	Yes	Yes	Yes (Hawksbill Creek-South Fork Shenandoah River)	Yes (Valley of Virginia)
Route 616 (Leakesville Rd) Project[7]	Virginia Department of Transportation	Page	VA	Turn Lanes Addition	Existing	1 year	Fall 2017 - Late Summer 2018	Non-Jurisdictional	0.29-mile-long construction of two turn lanes	No	Yes	Yes	Yes (Hawksbill Creek-South Fork Shenandoah River)	Yes (Valley of Virginia)

TABLE 1G-1

Line WB2VA Integrity Project
Cumulative Impacts Analysis

Project	Company Name	County	State	Facility Type	Existing or Greenfield	Duration	Construction Years	FERC Determination	Project Description	Project within 5 Miles*	Project 5 to 15 Miles*	Project 15 to 50 Miles*	Watershed	Within Air Region and 50 Miles[1]
Route 340 Cub Run Bridge Project[6]	Virginia Department of Transportation	Page	VA	Bridge Replacement	Existing	Undetermined	Late 2016 - Undetermined	Non-Jurisdictional	0.3-mile-long construction of a bridge to replace an existing bridge. Lane closures and flagging operations are anticipated along Route 340 north of the intersection with Route 650.	Yes	Yes	Yes	Yes (Hawksbill Creek-South Fork Shenandoah River)	Yes (Valley of Virginia)
Route 600 (Headley Rd) North Fork Bridge Project[7]	Virginia Department of Transportation	Shenandoah	VA	Bridge Replacement	Existing	6 months	Spring 2017 - Fall 2017	Non-Jurisdictional	Replaces single-lane low water bridge on Route 600 over the North Fork of the Shenandoah River with 0.2-mile bridge.	No	No	Yes	No	Yes (Valley of Virginia)
Route 340 (North Stuart Avenue) Project[7]	Virginia Department of Transportation	Rockingham	VA	Roadway	Existing	6 months	Early 2015 – Sep 2015	Non-Jurisdictional	Widen roadway to 40 feet from E Street to F Street and add a new five-foot sidewalk on the west side of the street.	Yes	Yes	Yes	Yes (Naked Creek-South Fork Shenandoah River)	Yes (Valley of Virginia)
Interstate 81 Northbound Pavement Rehabilitation[7]	Virginia Department of Transportation	Augusta, Shenandoah, Frederick	VA	Roadway	Existing	2 years	Sep 2013 – Oct 2015	Non-Jurisdictional	Replacement of safety features, re-pavement, and strengthening of subsurface will occur between New Market and Mount Jackson.	Yes	Yes	Yes	Yes (Smith Creek, Linville Creek-North Fork Shenandoah River)	Yes (Valley of Virginia)
Route 607 and U.S. 29 Interstate Improvement Project[7]	Virginia Department of Transportation	Greene	VA	Roadway	Existing	Undetermined	2016 – Undetermined	Non-Jurisdictional	Improve safety and increase capacity at the intersection of Route 607 and Route 29 in Ruckersville.	No	Yes	Yes	Yes (North Fork Rivanna River)	Yes (Northeast Virginia)

*Note: Due to the large geographic span of the Line WB2VA Integrity Project, other projects considered during the cumulative impacts review may be represented within multiple geographic distance categories.

[1] Meaning of Terms, 40 C.F.R. §81.1 (2015). Web.
[2] Dominion. 2015. Natural Gas. Available online at https://www.dom.com/corporate/what-we-do/natural-gas/. Accessed March 2015.
[3] Williams. 2015. Expansion Projects. Available online at http://co.williams.com/expansionprojects/. Accessed March 2015.
[4] Columbia Pipeline Group. 2015. Current Projects. Available online at https://www.columbiapipelinegroup.com/ourpipeline/projects. Accessed March 2015.
[5] Dominion. 2015. Harrisonburg-Endless Caverns 230kV Double Circuit Line. Available online at https://www.dom.com/corporate/what-we-do/electricity/transmission-lines-and-projects/harrisonburg-endless-caverns-230kv-double-circuit-line. Accessed October 2014.
[6] Dominion. 2015. Transmission Lines and Projects. Available online at https://www.dom.com/corporate/what-we-do/electricity/transmission-lines-and-projects. Accessed March 2015.
[7] Virginia Department of Transportation. 2015. Available online at http://virginiadot.org/projects/default.asp. Accessed March 2015.
[8] Virginia Department of Transportation. 2014. Page County – Route 211 Westbound Bridge over South Fork of the Shenandoah River. Available online at http://www.virginiadot.org/projects/staunton/page_county_-_route_211_westbound_bridge_over_south_fork_of_the_shenandoah_river.asp. Accessed March 2015.
[9] Virginia Department of Transportation. 2014. Page County – Route 340-Cub Run Bridge. Available online at http://www.virginiadot.org/projects/staunton/page_county_-_route_340_-_cub_run_bridge.asp. Accessed March 2015.

Appendix E

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Appendix E – References

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Appendix F

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